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Sleep patterns in collegiate dancers

Jacque Price and Beth Nicks

Key words, concepts, and names: sleep deprivation, collegiate dancers, sleep patterns, weight gain due to lack of sleep, sleep and injuries, sleep and caffeine intake, sleep and wellness

Introduction

As college dance majors, the investigators have witnessed firsthand the effects that sleep and the lack thereof can have on the performance quality of University level dancing. It has been shown that lack of sleep can compromise nearly every physiological process such as memory, coordination, metabolism, and new learning (Wozny 2008). Studies on disruptions of the human circadian rhythms have shown that athletes involved in endeavors where sleep is restricted or totally deprived have severe consequences on behavior and performance. (Edwards 2007). However, the environment of college dance programs is different than athletics due to there being no off season. Dancers train up to eighteen hours per week in various technique styles and then rehearse up to 12 hours per week on top of full academic loads. Sleep many times is overlooked or limited as deadlines and performances are fast approaching. There has not been substantial research done into the area of dancer sleep patterns and its affect on the dancer's body.

The investigators expect to discover correlations between sleep and wellness in the college level dancer, while also highlighting the amount and quality of sleep. Studies have shown that getting an adequate amount of sleep and having regular sleep patterns allows the body to alternate between REM and non-REM cycling, which is necessary for the body to be refreshed, restored, reinvigorated, and full of energy perform at the highest level every day (Grimes 2008). After evaluating the outcome of the study the investigators hope the information will help educate fellow college dancers about the need to pace, plan, and prepare for the semester requirements in order to maximize the amount and quality of sleep.

Review of Literature

For most college students sleep is very low on the priority list behind schoolwork, athletics, and social activities. Most college students are also not aware of the effects that lack of sleep has on them and how important it is to not only get enough sleep, but have high quality sleep. According to Karlyn Grimes in *Sleep Essentials*, "sleep is a necessity, not a luxury, and without it your mental and physical systems cannot operate properly or productively"

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(Grimes 2008). It is important to have an adequate amount of sleep and regular sleep patterns in order for the body to be refreshed, restored, reinvigorated, and full of energy to perform at the highest level every day. Some physiological effects caused by lack of sleep that Grimes discusses include restricting hormones released during sleep that control hunger and appetite, which cause overeating and food cravings high in fat and sugar, weakening of the immune system, suppression of concentration, creativity, productivity, and patience (which are all very important for aspiring artists), and even increased risk of obesity, heart disease, and diabetes (Grimes 2008). These can all be very detrimental to a college dance major's performance. For students who are trying to be healthy and fit into the dancer aesthetic, they cannot afford to have increased sugar cravings. Illness can also keep dancers from performing at their highest level in class and performances. In *Sleep Secrets*, Nancy Wozny also discusses that one of sleep's major functions is consolidating short-term memory into long-term memory (Wozny 2008). It is very important for dancers to be able to pick up choreography quickly and remember it rehearsal after rehearsal. Lack of sleep can make it difficult for dancers to focus and retain choreography, which also inhibits their performance quality.

There has not been an adequate amount of research done on sleep patterns and the effects of sleep deprivation on dancers, but according to studies done on athletes and sports performance lack of sleep can have major effects on circadian rhythms. Irregular sleep-wake cycles and disruptions of the human circadian rhythms can greatly affect an athlete's performance and behavior. The circadian rhythm is the twenty four hour cycle in the biochemical, physiological, and behavioral processes of living entities. Reilly Edwards states that "These disturbances usually occur due to domestic or occupational schedules that do not permit normal sleep quotas, rapid travel across multiple meridians, and extreme athletic and recreational endeavors where sleep is restricted or totally deprived" (Edwards 2007). This can also relate to dancer majors who have irregular schedules involving long days of rehearsal, training, and performances on top of their schoolwork and social activities, which can disturb their sleeping patterns and result in lack of sleep. In this study the investigators hope to expand upon this research they have found by studying how lack of sleep can affect dance majors specifically. We hope to find how sleep patterns can be connected to daily performance level in order to improve the general well-being and performance quality of university level dancers. Dancer's should be improving their health and taking advantage of every performance opportunity at the college level in order to prepare them for a professional career, but according to research lack of sleep can actually be inhibiting their overall health and ability to perform at their highest level every day.

Methodology

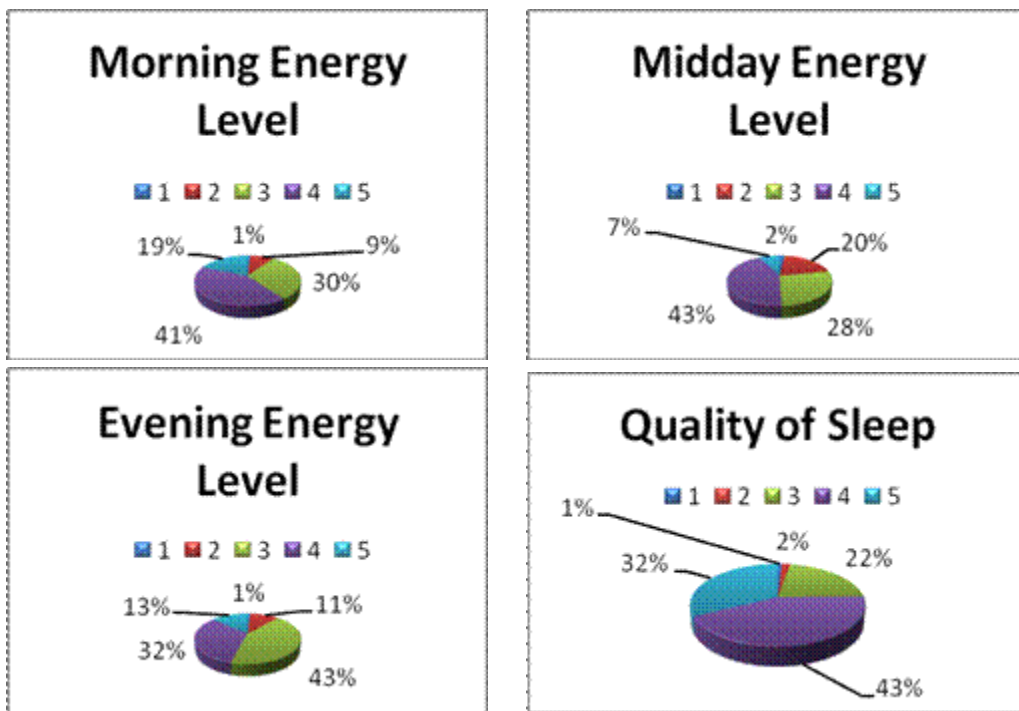
In order to best collect data for analysis the researchers distributed a performance assessment survey and a one week sleep log. The sleep log collected data on: hours of sleep; quality of sleep; energy levels in the morning, midday, and evening; and whether or not naps and/ or a caffeine stimulus were needed to get through the day. The participants recorded information on a daily basis and returned the log after one week's time. The performance assessment survey recorded the participants answered to questions regarding: current injuries;

newly presented injuries; weight fluctuations; sugar and carbohydrate craving levels; level of performance quality in class and during show; general health rating; and opinions on the effect of sleep. During the spring and fall semesters of 2010 research was conducted during four peak performance weeks on 45 Chapman University dance majors.

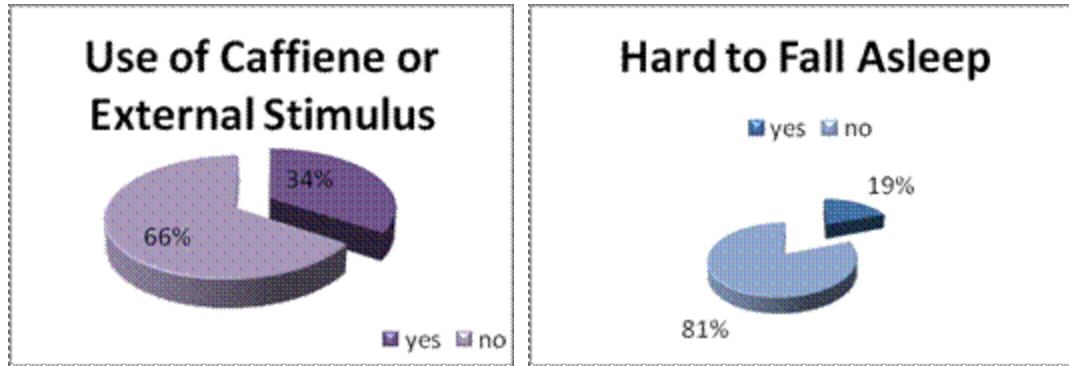
All participants completed an informed consent reviewed and approved by the IRB. Once the investigators collected the surveys and logs the information was recorded and compiled. From there the investigators were able to analyze the data using descriptive statistics to find patterns and correlations between sleep and performance quality, injury level, weight gain, and overall health and wellness.

Results

Energy levels throughout the day and the overall quality of sleep was assessed on a scale of 1-5. (1= poor or low and 5= good or high).



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The overall average of the four weeks surveyed was 7.11 hours of sleep per night. The lowest amount of sleep reported was 0 hours and the highest amount reported was 12 hours. Of those reporting between 0 and 5 hours of sleep per night 64% resorted to caffeine or an external stimulus to get through the day, and 32% needed to take naps. The nights of more than 9.1 hours of sleep reported the lowest need for caffeine, external stimuli, and naps; only around 18%. Generally subjects that showed a fluctuation greater than 3 hours from night to night showed a greater need for both caffeine and naps. Many subjects who slept inconsistently throughout weekdays tried to make-up sleep on their weekends. For example, subject 13 slept for only 3 and a quarter hours on Friday night and then slept for 12 hours on Sunday night. Another example, is subject 6 who slept for 4 hours on Friday night and then received 12 hours of sleep on Sunday. Interestingly, throughout the four observed weeks, respondents consistently rated their performance qualities in both class and show to be 3's and 4's; regardless of quantity of sleep or energy levels marked throughout the day.

Week one consisted of 2 days of technical rehearsals and then 5 performances.

On average respondents received 7.5 hours of sleep per night. 19% of the participants reported new injuries throughout this week. 44% reported aggravation of old injuries this week. 75% reported an increase in sugar cravings, which was the most significant increase in sugar cravings from any week observed. The lowest amounts of sleep across the spectrum of this research occurred on Friday night, a performance night.

Week two consisted of 2 days of technical rehearsals and 5 performances, in addition to academic finals ongoing throughout the week. On average dancers received about 7.1 hours of sleep per night. This was the only week in which no new injuries were reported; however, 38% saw an increase in aggravation of old injuries. 46% saw increased sugar cravings, and 54% saw increased carbohydrate cravings. Dancers who received between 6 and 9 hours of sleep per night consistently throughout the week were less likely to need caffeine or naps. For example subject 5 consistently received between 6 and 9 hours of sleep; reported no new or old injury flare-ups, no increased cravings, and no need for caffeine or a nap. Subject 10 consistently received between 6 and 8 hours of sleep per night and also had no new or old injury flare-ups, no increased sugar cravings, and no need for caffeine or a nap. On the contrary, dancers who had inconsistency in their sleep patterns were more likely to see adverse

effects. For example subject 7 ranged from 3 to 8 hours of sleep and frequently reported needing both caffeine and a nap, experienced aggravation of old injuries and increased sugar and carbohydrate cravings.

Week three was the first of a new academic semester and had two 3 hour evening auditions. Average amount of sleep per night was 7.375 hours. The nights following auditions reported lower sleep numbers than nights not following auditions. Nights with low amounts of sleep were often followed by days requiring caffeine, naps, or both. For example subject 20 reported less than 5 hours of sleep four days of the week, the days following these nights of low sleep required both caffeine and naps.

Week four was the fifth week of the semester, both the technical rehearsal and the performance occurred on Friday. The average amount of sleep was 6.45 hours, overall this week recorded the lowest sleep numbers for the entire collection period. This week also seemed to be the most injury prone, 54% had current injuries, 29% reported new injuries, and 54% reported aggravation of old injuries. This week marked the most significant amounts of participants becoming sick, 33.3%. Over half the participants, found it more difficult to focus in their academic classes than normal. The night of the performance reported the lowest overall sleep numbers from the entire 4 week set. This week appears to have been the most stressful one for participants.

Discussion/Conclusion

In conclusion, the investigators have discovered that lack of sleep does have an effect on the overall health and performance quality of university level dance majors. There were positive correlations found between lack of sleep and caffeine intake, naps taken, and sugar and carbohydrate cravings. Although it was not possible to measure weight fluctuations within the one week time period of the surveys and sleep logs, these increases in sugar and carbohydrate cravings may have a connection to weight gain. Dancers need to be in the best possible shape they can be to perform at their highest level and fit into the aesthetic preferences of their choreographers. Excess carbohydrates and sugar will not only be stored as fat in dancers bodies, but will also not fuel the dancer's bodies with the correct nutrients for their level of physical activity. Because body image and eating disorders are an issue in the dance world the investigators hope to educate their peers on the effect that lack of sleep has on their weight rather than just the food that they are eating or the amount of exercise they are doing. Recent studies have also shown that eating sugar can cause inflammation in the body, which increases the risk of injury. In their research the investigators did find an increase in new injuries, old aggravated injuries, and illness during these high performance periods, but there is not enough information to infer a definite correlation. During rest is when the body heals itself, but if the dancers do not get enough rest then their bodies cannot repair itself, which leads to increased risk of injury and aggravation of old injuries. The investigators also expected to see fluctuations in energy levels, but there was no significant information found in this area, possibly due to error in self-reported surveys. The problem with self reported surveys in this study is that dance majors report high performance quality and energy levels each day because they believe they are performing to the best of their ability, but they don't realize how much better their performance could be if they were healthier and had better sleep patterns. The

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investigators did see differences between the reports given in the daily sleep log and the survey taken at the end of the week, in which the dance majors reported low performance quality during the week due to lack of sleep. With this study the investigators hope to educate fellow dance majors on the effects that lack of sleep can have on their performance quality and overall health. It is very important for dancers to not only get enough sleep, which according to studies is about seven to eight hours a night, but have regular sleeping patterns and good quality sleep. College dance majors are in school to prepare themselves for a professional career, but injuries or weight gain due to sleep deprivation could greatly affect their chances of ever dancing professionally. The investigators hope to help college dance majors be aware of the importance of managing their time to best take care of their bodies and give it the rest that it needs. A dancer's body is their medium in this art form, and their tool to becoming successful in the industry. To further this study the investigators would be interested in expanding their research to many different areas, which include the effects of power naps during the day and whether they are beneficial, the effect that weight gain due to lack of sleep has on a dancer's body image and possible links to depression, or possibly the effects of travel across time zones on professional dancers in travelling companies.

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