Bump and Sleep: How Sexual Intercouse Can Improve Sleep of Women with Insomnia

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Abstract

Background: Insomnia is characterized as trouble initiating or upholding sleep and can be categorized as a primary or secondary disorder. It affects up to one fifth of adults, mostly women, making it the most prevalent sleeping disorder in society. In the health landscape, this disorder can be an underlying cause for many other severe health issues. Currently, the medical community suggest changes in lifestyle, cognitive-behavioral treatments and pharmaceutical therapies. However, many of these interventions are proven to be insufficient. Our aim is to propose a lifestyle change that may give more significant results: by engaging in coitus before bedtime, there can be an improvement in the quality of sleep of insomniacs.

Research Question: *How can the effects of engaging in sexual intercourse prior to sleep be compared to leading therapies for treating women with stress-induced insomnia?*

Methodology: A structured literature review was conducted. The scientific articles were targeting by using pre-determined keywords in the following databases: PubMed and MEDLINE. Keywords include: sleep, insomnia, orgasm, oxytocin, cortisol, thyroid stimulating hormone, prolactin, sexual activity, blood pressure, stress. Articles were excluded if they were not published within the last 20 years and if they were not published in English.

Results: A total of 12 articles were analyzed pertaining to the release of hormones associated with sexual intercourse, as well as blood pressure, and their role as precursors of sleep. The effects oxytocin, Thyroid-Stimulating Hormone (TSH), prolactin, the inhibition of cortisol, and the effects of dopamine were reviewed. These studies were tested on both rodents and humans.

Conclusion: Engaging in sexual intercourse prior to sleep can decrease stress, and can assist female insomniacs by helping to initiate and maintain sleep. These secondary factors make sexual intercourse a possible alternative or addition to other intervention strategies for insomnia. There is an urgent need to address this health disorder due to its widespread prevalence in society.

Introduction

Research question: *How can the effects of engaging in sexual intercourse prior to sleep be compared to leading therapies for treating women with stress-induced insomnia?*

Background:

- Insomnia is characterized as one's trouble initiating and/or upholding sleep. This sleeping disorder can cause multiple symptoms, such as fatigue and irritation, affecting one's participation in daily activities (12).
- Insomnia can be reported as a primary disorder or secondary to another health condition. Stress is a major risk factor in the development of insomnia (7).
- The medical community gears towards 3 main treatment options: changes in lifestyle, cognitive-behavioral therapy and pharmaceutical therapies (11). However, the latter are known to have harmful side effects. Therefore, lifestyle and behavioral therapies are favored (1).
- Untreated insomnia can result in a number of health problems, particularly cardiovascular diseases (11).

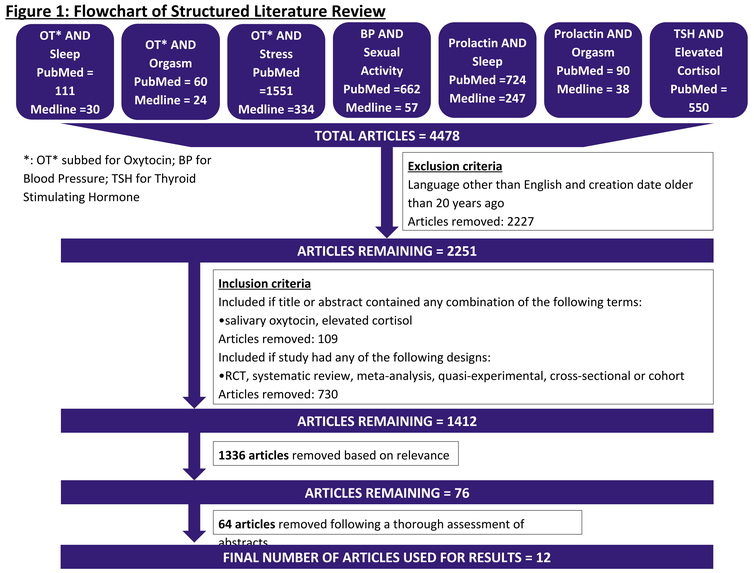
Rationale:

- Insomnia disorder affects up to 20% of the adult population (12), making it one of the most common health problems in today's society (4).
- Recent data show that this sleeping disorder is diagnosed in women two times more than in men(11).
- Research on available therapies are recondite, due to the various possible causes. Moreover, there is limited information on lifestyle and behavioral treatments(4).
- Engaging in sexual intercouse can be implemented as a new lifestyle change therapy.

Methods

A structured literature review was conducted using the PubMed and MEDLINE databases. The following keywords were used: *Insomnia*, *oxytocin*, *sleep*, *sex*, *orgasm*, *stress*, *blood pressure*, *TSH*, *cortisol*, *sexual activity*, *sexual intercourse*, and *prolactin*. Inclusion criteria specified that the articles must be published in the English language and must be within a 20 year timeframe. The following flowchart illustrates the search outcomes, the articles excluded. A total of 12 articles were included in this study.

Figure 1: Flowchart of Structured Literature Review



Results

The 12 chosen articles were analyzed using the PICO method. The studies were chosen based on suspected links between products of sexual intercourse and improved sleep or stress management. The search identified links between oxytocin and sleep (2 articles), oxytocin and anxiety/stress management (2 articles), the effects of sexual intercourse on blood pressure and stress response (2 articles), the relationship between TSH, sex, and cortisol (2 articles), the effects of sex and prolactin on sleep quality (2 articles) and the effects of dopamine on sleep (2 articles).

Table 1: Results of Literature Review

Study	Population	Study Design	Outcome Measures	Results
Fekete et al., 2013	71 low-income minority women living with HIV.	Cohort study. Women were randomly assigned one of two therapies: a 10-week cognitive behavioral stress management intervention or psychoeducational control condition.	Regression analyses were done to examine the direct effects of social support on women's total Pittsburgh Sleep Quality Index score. Higher amount of social support resulted in increased measurements of oxytocin in obtained blood samples.	Analyses concluded that women with higher amount of oxytocin and social support experienced more efficient sleep.
Lipschitz et al, 2015	30 cancer survivors, and including 21 females and 9 males, 29 to 74 years old.	Prospective randomized control. Participants were randomly assigned to either mind–body interventions or sleep education control.	Saliva samples were collected at pre-intervention, post-intervention and follow-up (2 months after treatment) to measure for salivary oxytocin.	Correlations were parallel with the hypothesis: salivary oxytocin levels were positively associated with better quality of life and negatively associated with sleep disturbance.
Amico, Mantella, Vollmer, Li, 2004	Female oxytocin deficient mice.	Cohort study to determine effects of increased oxytocin on stress tolerance. Control group=artificial cerebrospinal fluid. First case group= synthetic oxytocin Second case group=ornithine vasotocin; an oxytocin antagonist.	Exposed to anxiety-inducing situations such as an elevated plus maze, a behavioral test of anxiety, or psychogenic stressors (platform shaker or novel environment.	Mice treated with oxytocin tolerated stress more efficiently than the control group. Oxytocin is anxiolytic (anxiety-reducing), and reduces stress response to psychogenic provocation in female mice.
Xue-rui et al., 2008	49 healthy adults: 22 males, aged 40.6 ± 7.8 years; 27 females, aged 40.3 ± 7.8 years.	Randomized control group to measure blood pressure 3 times after orgasm in every 10 minute interval and 60 minutes after orgasm. Blood pressure and heart rate were also obtained between baseline and 1 hour after orgasm.	Data was statistically analyzed with paired t-test.. They used dynamic electrocardiogram to measure coital blood pressure.	For both males and females, the peak blood pressure appeared at the beginning of plateau and dropped to baseline level 10 min after orgasm. Sexual activity matches moderate physical exercise, which requires a much lower BP compared to maximal exercise.
Brody, 2006	24 women and 22 men (age mean 24.5) received medical examination and were assessed as healthy indicating a body mass index > 32.	Randomized control group to analyze the relation between sexual behavior and blood pressure (BP) and its response to stress (public speaking and verbal arithmetic).	14 days before intervention, participants answered a daily diary to document occurrence of penile–vaginal intercourse, masturbation or other sexual activity that excluded intercourse. Participants then completed the Trier Social Stress Test. Also, systolic (SBP) and diastolic blood. pressure (DBP) were studied.	A direct correlation exists between penile-vaginal intercourse (PVI) and better psychological well-being. Participants who had PVI disclosed greater stress tolerance. Those who masturbated/partnered sex had superior systolic BP response.
Harvard Health Publications, 2011	13 women and 19 men with an average age of 55. Approximately three-quarters of the men were married, and almost 70% had a form of cardiovascular disease; 53% were taking beta blockers. Men who suffered from cardiovascular disease, also certified that they exercised 4 times a week and were having sexual activity around 6 times per month on average.	Randomized control group to evaluate the cardiovascular effects of sexual activity.	Researchers recorded heart rate and blood pressure during standard treadmill exercise tests and during sexual activity with a familiar partner at home. All sexual activities ended with vaginal intercourse and male orgasm.	Throughout sexual activity, men attained heart rates 72% as high as they did on the treadmill, and the average blood pressure was only 80% as high as during maximal treadmill exercise. Sexual activity was even less demanding for women concerning heart rate, blood pressure, and perceived intensity of exertion. During sexual intercourse, a man's heart rate rarely gets above 130 beats a minute, and his systolic blood pressure 170. Average sexual activity ranks as mild to moderate in terms of exercise intensity.
Walter et al., 2012	54 young, healthy men (19) and women (35). Mean 20.98 +/- 0.37 years.	Cross-sectional study.	Blood was drawn via catheters during lab sessions to calculate TSH and cortisol levels.	Results suggested a positive correlation between TSH and cortisol in healthy young individuals.
Uvnas-Moberg, Petersson, 2005	Female and male rats.	Literature review.	They treated rats with oxytocin during 5 days.	Oxytocin causes several anti-stresses effects: heart rate, blood pressure and levels of stress hormones like cortisol decreases.
Leeners et al., 2013	9 women.	Prospective study; cross-over design (naturalistic field setting).	Women's blood samples were analyzed for prolactin levels. Examined the correlation between the increase in women's post-orgasmic serum prolactin after sexual intercourse and women's recognized quality of orgasm and sexual satisfaction by completing a survey.	Increased levels of prolactin in women that had an orgasm aftersexual intercourse are greatly linked to the quality of orgasm and sexual satisfaction. A rise in prolactin levels after orgasm=objective indicator of orgasm and orgasm quality.
Krueger et al., 1998	Rabbits, rats and cats.	Literature review.	They treated the rabbits, rats and cats with prolactin as well as measured their brain activity during sleep with an electroencephalogram.	Prolactin amplified rapid eye movement sleep (REMS).
Meston et al., 2004	Human females.	Literature review.	Reviewed several functions of orgasms experienced by women during coitus.	Reveals that women release oxytocin during orgasm which helps create bonding feelings and emotions. Oxytocin also influences movements of the uterus and fallopian tubes.
Pereira, Andersen, 2014	Humans.	Literature review	Analyzed the relationship between the thyroid gland and sleep.	Shows that the presence of thyroid stimulating hormones (TSH) inhibit sleep.

Discussion

Findings and Contextualization

This literature review has allowed us to identify sexual activity as a treatment for insomnia. It is important to note that our study focuses on intercourse specifically, as a direct correlation exists between penile-vaginal intercourse and better psychological well-being. This type of sexual activity has greater stress tolerance, which is demonstrated by lower systolic blood pressure in response to stress (3).

The information gathered through extensive research revealed an interesting association between the effects of orgasms and precursors of sleep. First off, once a woman reaches orgasm, oxytocin is released. In addition to feelings of bonding and affiliation (13), greater levels of this hormone are proven to provide better quality of sleep (10), (5). Another study demonstrated that oxytocin has anxiolytic properties. Therefore, oxytocin released during orgasms can serve as a stress regulator (2), and women with stress-induced insomnia who practice our suggested therapy can benefit. Furthermore, in another study, when rats were infused with oxytocin, it caused many anti-stresses effects, such as a decrease in heart rate, blood pressure and cortisol, a stress hormone (17). Blood tests were issued during another study to calculate TSH as well as cortisol levels. Results suggested a positive correlation between TSH and cortisol in healthy young individuals (18). High levels of TSH provokes sleep deprivation (15). Since cortisol levels decrease post-orgasm and so do levels of TSH, both of these reductions also help improve quality of sleep.

Another hormone that is linked to both sex and sleep is prolactin; a pituitary hormone that takes part in controlling satiety and quality induced orgasms. A strong correlation was made between the increase in prolactin after sexual intercourse and their perceived sexual satisfaction (9). A second study demonstrates the involvement of prolactin in the regulation of sleep. More specifically, when cats, rabbits and rats were administered prolactin, their rapid eye movement sleep (deep sleeping phase) was enhanced (8). This would confirm that prolactin can also help maintain sleep.

Blood pressure is a considerably important factor when studying orgasm effects on quality of sleep. An electrocardiogram measuring women's blood pressure after orgasm demonstrated a peak at the beginning followed by a drop at baseline 10 minutes after. It must also be noted that sexual activity requires a much lower blood pressure than maximal exercise. In fact, research shows that a man's heart rate rarely gets above 130 beats per minute in addition to his systolic blood pressure practically never surpassing 170. Surprisingly, women demonstrated even lower heart rates, blood pressures and perceived intensity of exertion (19). Sexual activity is on average, considered as mild or moderate exercise in terms of intensity (16). Therefore, blood pressure combined with the effects of oxytocin, TSH and prolactin help reduce stress and better the quality of sleep (19).

The results of this research are surprising, as sexual intercourse is not considered a conventional treatment option. Currently, there has not been any research conducted to highlight sexual intercourse as a plausible therapy in treating insomnia.

Strengths

- In order to avoid reporting bias, a rigorous analysis was conducted regarding all physiological effects of sexual intercourse. Although dopamine, which promotes wakefulness and inhibits REM, surges immediately during an orgasm, levels fall dramatically post-orgasm (6). As a result, while women may feel the waking effect of dopamine during an orgasm, the relaxing effects of oxytocin and prolactin surpass the wakeful effects of dopamine (14).
- Considering sexual intercourse as a therapy option is a new and innovative approach in treating insomnia. A systematic analysis of both the effects of sexual activity and sleep were reviewed, allowing for associations to be established.

Limitations

The reviewed studies focused on the effects of oxytocin and prolactin, as well as the hypotensive benefits, relating to the potential increased quality of sleep for women with insomnia. They are observed following a female orgasm. However, some women do not experience orgasm during or after sexual intercourse. Moreover, this suggested therapy would not apply to women who are sexually inactive. Another key point is that the availability of research on sexual intercourse tends to be limited in that it is difficult to measure the variables involved. Based on the findings through the structured literature review, the positive effects of sexual intercourse on the quality of sleep in women suffering from insomnia does not apply to all forms of insomnia, but specifically targets stress-induced insomnia. Insomnia can have multiple causes or can in itself be a primary disorder. Each of these factors would have to be assessed individually. Finally, Pubmed and Medline (Ovid) were the only databases used, which possibly limited the number of results that could have been potentially used to extend our research.

Selection Bias: Study subjects were judged to be healthy which limits our ability to compare the results we found with women who suffer from insomnia.

Foreign language exclusion bias: The literature review conducted for the purpose of this study included only article in English.

Recall bias: Some results were measured through self-reporting of sleep quality rather than objective means such as an EEG (8).

Generalizability: Those who suffer from insomnia may not have the levels of hormones released post-orgasm compared to their healthier counterparts due to the variety of causes of insomnia.

General Recommendations and Future Implications

- To take into consideration the medical history of the female patient, in order to verify if there are any existing health conditions that may interfere with their sexual responses. Age may also be a variable that could affect this.
- Future studies relating to prolactin on improving the quality of orgasms and sexual satiety may eliminate the hurdle of achieving an orgasm, increasing the potential reach of our therapy (9).
- Women selected to participate in the study should be women who suffer from a specific form of insomnia, and must be willing participants. Sexual activity is a sensitive topic for certain individuals to openly discuss.
- Moving forward, men should be considered as a target population for our proposed therapy.
- The use of larger sample sizes in longitudinal prospective studies may yield even more promising results.

Conclusion

Current therapies in treating insomnia are considered lacking or present side effects that can be harmful for the patient. Sexual intercouse was proposed as a potential lifestyle change that women suffering from insomnia can integrate into their sleeping routine. The literature collected in this structured review strongly suggest that there is indeed an association between female orgasms and this sleeping disorder. Oxytocin and prolactin are each elevated, and cortisol is reduced after sexual intercourse. Data shows that each of these hormones are linked to either reduced stress or aid in initiating or maintaining sleep. Another factor drawn from the literature review was that after orgasm, blood pressure lowers, therefore reduces stress. As a result, engaging in sexual intercourse prior to sleep may be a plausible lifestyle change alternative to consider for treating women who suffer from insomnia. It may even also be combined with other treatments. Literature findings were consistent and effective in answering the research question. In further research, it is necessary to measure and explicate the remedial implications for women as well as men's orgasms and their subsequent therapeutic

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