

## **A Structural Equation Model for Hope as a moderator in the relationship between Insomnia and Body Pain Intensity among Working Women**

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Women face problems or challenges in their day to day life either socially or physically. Midlife, the period of the lifespan between younger and older adulthood, has been described as a period of transition in women's lives. Women identified the most challenging aspects of midlife as changing family relationships, re-balancing work/personal life, re-discovering self, securing enough resources, and coping with multiple co-occurring stressors. Body pain and Insomnia are the remnants of this age of high demand and stress. This paper attempts to understand the moderating effect of hope in the relationship between insomnia and body pain intensity among Working Women. One hundred and seventeen working women from various fields were selected through random sampling and administered by the Insomnia Scale (Croenlein et al., 2013), Brief Pain Inventory (Cleeland, 1994) and the Adult Hope Scale (Snyder et al., 1991). Structural Equation Model indicated that hope moderated the relationship between Insomnia and Body pain issues. The higher the intensity of pain experienced, higher is the level of insomnia, and lower the hope.

**Keywords:** Insomnia, Brief Pain Inventory, Hope, Working Women

Women are generally known to be multi-taskers. They fulfill varied roles with ease, are wonderful mothers, dutiful daughters, caring daughters-in-law, lovely and enthusiastic wives, beautiful sisters, jubilant friends, and brilliant in all that they set their minds to. Many times, they take on varied roles when they work outside their homes. Women found themselves searching for balance in the midst of multiple co-occurring stressors while coping with losses and transitions, for some in a context of limited resources. Nowadays, women have conquered all professions to the board room to rocket engineering. Within these themes the most frequently reported challenges were: multiple co-occurring stressors, divorce/breaking up with a partner, health problems of self, and death of parents.

Women have made their presence felt in all spheres of life and have mostly eliminated the Gender differences in professions. But still, owing to various roles and responsibilities that the working women have, they tend to neglect their own physical and mental health; and well

being, instead focus and concentrate on fulfilling the expectations from their various roles, thus paying the price for satisfying everyone else and ignoring themselves. Many of them encounter numerous aches and pains in their bodies, suffer from migraines, body pain, stomach disturbances, leg pain and many such acute and chronic pain related disorders. Many of them are so tired by the end of the day and in so much pain that sleep also eludes them. Many hence suffer from Insomnia and numerous aches and pains. As a result of these issues, their personal and professional lives suffer greatly. They are left wanting in numerous spheres and cause them a great amount of worry and stress. Their mental health and well being hence deteriorates. The whole process becomes a vicious circle thus sucking them into the vortex of stress, anxiety and many other such mental health issues.

### ***Insomnia and Pain***

Insomnia has been defined in most researches as, the experience of sleeplessness despite the time and opportunities to fall asleep.

This difficulty can be manifested in the ability to fall asleep or stay asleep. Many times insomnia is considered the inability to sustain non restorative sleep patterns, and this difficulty many times persists despite sufficient opportunities and situations conducive to developing a good sleep. Also it has been considered that insomnia leads to distress and disturbance of day time activities (Roth, 2007). Short term or transient insomnia is a temporary phase of sleeplessness most probably due to stress or any form of trauma. This type of insomnia is temporary and subsides when the stress is relieved.

Many times pain in the body, such as headache, back ache, body pain and many other forms of pain also lead to insomnia. This type of insomnia caused by other factors, such as pain in this case is known as secondary insomnia. The relationship sleep and pain is most likely to be bidirectional, though the interaction effects between the two problems requires further research (Tang, 2008). A chronic painful condition physically, leads to worsening the symptoms of insomnia are the result of many such researchers (Ohayon, 2005). The major forces working to improve the mental health and well being here is seen as the optimism and hope that an individual has. Better optimism and hope levels foster better pain management and improve the quality of sleep. This paper attempts to understand the level of insomnia, body pain intensity and the levels of remaining hope among working women.

A brief review of available literature was conducted to better understand the constructs taken up for study.

Smith (2015) conducted a large study examining the effectiveness of cognitive behavioural therapy as a sole treatment for insomnia related to chronic pain. Results showed that patients in the cognitive behavioural therapy group had significantly greater reductions in wake time after sleep onset. In that group, most patients also reported significant and comparable reduction in pain over six months, with one third of them reporting a 30% reduction in pain severity. Furthermore, diary and polysomnography measurements of sleep

improvement predicted decreased pain at each study end point, indicating that better sleep has at least some beneficial effects on pain. Andrew et al. (2019) reported that a variety of pharmacological treatment options are available along with cognitive behavioural therapy as a viable option.

Significant relationships were reported between Total Hope Scale scores and the psychosocial inferences of pain in the Brief Pain Inventory (BPI) and sleep among 225 oncology patients (Utne, Miaskowski, Bjordal, Paul, Jakobsen and Rustoen 2008). Another interesting research on the neural pathways involved in the sensation of pain and its relationship to addiction, depression and anxiety was conducted by Zamponi (2019). This research also helped develop a newer drug therapies to target the pain stimulation and provide relief for pain sufferers along with providing relief for anxiety and depression arising out of the pain.

Schiavon, et al. (2017) identified the scientific literature on the influence of optimism and hope on chronic disease treatment. The studies about optimism had more similar outcomes than the hope studies due to the fact that they focused mainly on cancer and cardiac diseases, while hope studies mentioned a wider range of conditions. It was reported that there are still a small number of articles that relate optimism and hope with chronic disease, that many of the authors have focused on studying mainly heart disease and cancer in comparison with hope, optimism was used in a larger number of studies. Another longitudinal study tested the prospective effects of hope on depression and anxiety among 522 college students. Results indicated that statistically significant negative effect for the agency component of hope on later depression but no unique effect of the pathways component of hope on depression. Likewise, agency showed a statistically significant negative effect on later anxiety, but again pathways had no significant influence on anxiety. In both cases, neither depression nor anxiety demonstrated any longitudinal effects on either the agency or pathways components of hope.

The above review indicates that there is a need to identify the relationship between insomnia, pain intensity and hope among the specific population of working women, who undergo high levels of stress.

**Method**

- The study on “Insomnia, Body Pain Intensity and Hope among Working Women” was undertaken with the following objectives:
- To identify the levels of pain, insomnia and hope among the participants
- To identify the relationship between insomnia, pain intensity and hope among working women.
- To understand the mediation effect of hope in the relationship between insomnia and pain.

**Sample**

The sample consisted of 117 working women from various fields who were selected through random sampling and administered by Insomnia Scale (Croenlein et al., 2013), Brief Pain Inventory (Cleeland , 1994) and the Adult Hope Scale (Snyder et al., 1991). The women from age of 22 years to 60 years, who worked in permanent or temporary or contractual posts were included in the sample. Both married and unmarried working women were included. An informed consent was taken from all the participants of the study.

**Tools**

Insomnia Scale (Croenlein et al., 2013), consisting of 10 items regarding the quantity and quality of sleep.

Brief Pain Inventory (Cleeland , 1994) consisted of 9 items with the 9th item containing 7 sub questions regarding the interference of pain with general life.

Adult Hope Scale (Snyder et al., 1991) had 12 items used to measure the individuals dispositional hope.

The data was collected using Google forms and the results analyzed using the SPSS software version 21.

**Hypotheses**

The null hypotheses for the study are as follows:

There will be no significant relationship between insomnia, pain and hope among working women

There will be no significant mediation effect of hope in the relationship between pain and insomnia

**Results**

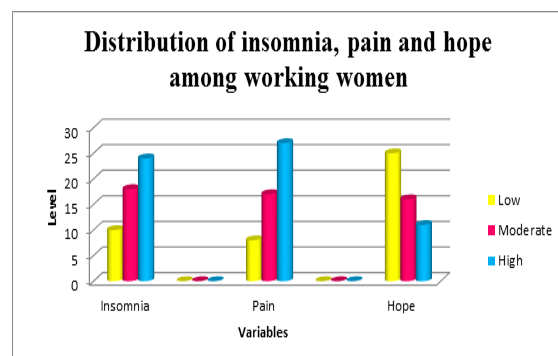
The distribution of insomnia, pain and hope among working women was analyzed. The results are tabulated below.

**Table 1. Distribution of insomnia, pain and hope among working women**  
N= 117

S. No.	Levels	Insomnia	Pain	Hope
1	Low	19%	15%	48%
2	Moderate	35%	33%	31%
3	High	46%	52%	21%

Table 1 indicates that 19% of the working women face high level of insomnia, 18% moderate level and 46% had high level. Also, it can be seen that 15% of the working women face low pain, 17% face moderate and 27% face high levels of pain. 48% of the working women have low hope, while 31% have moderate and 41% high levels of hope.

Product moment correlation was computed between levels of insomnia, pain and hope among working women.



**Figure 1. Distribution of insomnia, pain and hope among working women**

**Table 2. Correlation between insomnia, pain and hope among working women**  
N=117

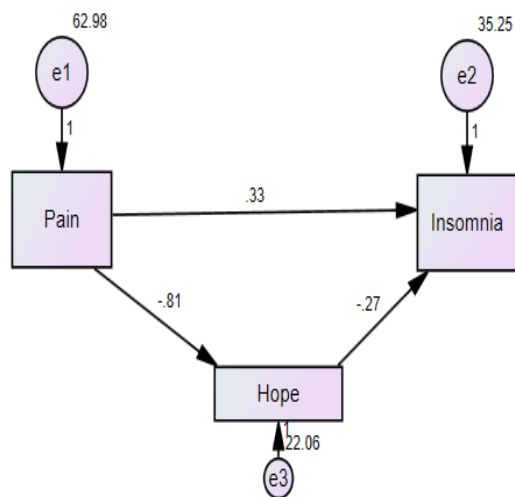
Variables	Insomnia	Pain	Hope
Insomnia	1	0.58**	-0.56**
Pain	0.58**	1	-0.79**
Hope	-0.56**	-0.79**	1

\*\* = Significant at 0.01 level

Table 2 shows that there was significant positive correlation ( $r=0.58$ ) between insomnia and pain, which implies that higher the level of insomnia experienced, higher is the pain and vice versa. Also, there was significant negative correlations ( $r=-0.56$ ,  $r=-0.79$ ) between hope and insomnia, and hope and pain, indicative of that higher the insomnia and pain, lower the hope and vice versa respectively. Hence the hypothesis, “There will be no significant relationship between insomnia, pain and hope among working women” is rejected.

**Mediation Analysis**

Next, the Structural Equation Modelling (SEM) for mediation analysis was computed using AMOS Graphics, version 22. The model derived is as follows:



**Figure 2.**  
**Structural Equation Model of mediation of hope in the relationship between pain and insomnia.**

The above diagram indicates that the relationship between pain and insomnia is 0.33, indicating a positive direct effect. However, when hope is taken as a factor of mediation, there is an indirect negative effect (-0.81 and -0.27 respectively). It can be seen that hope reduces the negative effect and successfully mediates the relationship between pain and insomnia. Hence the hypothesis, “There will be no significant mediation effect of hope in the relationship between pain and insomnia” is rejected.

The model fit indices of the above structural equation model are shown in the table below.

**Table 3. Model fit indices of the mediation model**

Model Fit Indices	Obtained Values	Suggested values
Normed Chi-Square	2.97	<5
NFI (Normed Fit Index)	0.96	>0.90
RFI (Relative Fit index)	0.94	>0.90
IFI (Incremental Fit Index)	0.98	>0.90
TLI (Tucker-Lewis Index)	0.97	>0.90
CFI (Comparative Fit Index)	0.98	>0.90
SRMR (Standardized Root Mean Squared Residual)	0.06	<0.08
RMSEA (Root Mean Square Error of Approximation)	0.06	<0.08

The above table indicates that the model fit indices are significant. The various fit indices indicate that the model arrived is fit. Also, the model indicates significant regression coefficients.

**Table 4. Regression coefficients indicated through mediation analysis**

Variables			Estimate
Hope	<---	Pain	-.808
Insomnia	<---	Pain	.350
Insomnia	<---	Hope	-.287

The above table 4 indicates that hope has a negative predictive ability for both pain and insomnia. That is, higher hope levels in a person predicts lower pain and insomnia levels.

Next, the direct and indirect effects of hope were analysed.

**Table 5. A comparison of standardized direct and indirect effects**

Variables	Direct Effects		Indirect Effects	
	Pain	Hope	Pain	Hope
Hope	-0.811	0.000	0.000	0.000
Insomnia	0.330	-0.269	0.232	0.000

The above table 5 shows that hope has a direct negative effect on the pain and insomnia levels (-0.811 and -0.269), but when the indirect mediation effects are taken into consideration, hope successfully nullifies the pain (0.000) and reduces the negative effect on insomnia (0.232). The direct and indirect effects analysis further prove the full mediation effects of hope in the relationship between pain and insomnia.

**Discussion**

The present study attempts to understand the mediation effects of hope in the relationship between pain and insomnia. Hope is a positive psychology construct, that helps mitigate the negative influences of many negative influences such as pain and insomnia. This study effectively establishes that hope mediates the relationship between pain and insomnia. When an individual is in pain, if he/she has high levels of hope, then there is lesser influence of the pain in his/her daily life. Similar findings were reported by Woosley et al (2014), who indicated that hopelessness was a mediating factor in the relationship between insomnia and many other negative factors to mental health. Similarly, Arinson (2023) reports that several preventive factors including hope are necessary intervention factor in pain and insomnia among adolescents. Another similar study reports that pain-related beliefs mediated the relationship between pain intensity and sleep quality among war veterans. This study also mitigates the effect of hope on both pain and sleep quality (Schwartz, 2021). The role of hope as a preventive and protective factor against psychopathology, depression, insomnia, pain catastrophization and many other constructs have revealed that hope as an intervention reduces negative affect significantly (Or, et al., 2012; Chan, Wong and Lee, 2019; Wright, et

al., 2011; Wai-Ming Mak, et al, 2021). Thus, the positive effects of hope indicate that hope can be seen as a factor in consideration for treatment of pain and insomnia.

**Limitations**

**The study had the following limitations:**

- The sample size used is small. Larger sample can be used for future research.
- Only working women were included. Future research can compare results of working and non-working women.
- Both genders can be included in future studies

**Implications for further research**

- As there are significant number of working women facing insomnia and pain, as a result of which their hope levels are reduced, the following can be implemented:
- Employers can conduct interventions to improve the mental health of the women employees
- Government can introduce policy-based changes to care for mental health of the citizens
- Interventions focusing on reducing the apprehension of pain as well as focusing on overcoming insomnia need to be developed.

**Conclusion**

It can be concluded from the above study that

There was a significant positive correlation between insomnia and pain intensity among working women

There was a significant negative correlation between hope and insomnia, and hope and pain intensity among working women

Hope mediates the relationship between pain and insomnia.

It can be concluded that working women face insomnia due to pain that they experience. Interventions to overcome pain and insomnia can significantly improve the hope and happiness

levels and well-being and overall mental health of working women.

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