

Morningness versus Eveningness and Associated Sleep hygiene behaviors, interaction & mediating role of Sleep hygiene Affecting Sleep quality and components among young Sudanese adults

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INTRODUCTION

Circadian typology is generally considered an individual trait with a genetic basis, It is, however, affected by external factors and changes across the lifespan with maximal eveningness at the end of puberty.(1-3). Poor sleep hygiene behaviors and sleep-disrupting effects among young adults are well established, yet whether sleep hygiene affects human circadian timing is unknown. However, Evidence suggests evening-type individuals have a higher risk of reporting both poor sleep hygiene and quality.(4-6) However, less is known regarding the underlying processes that mediate this association. This study aimed to investigate whether sleep hygiene would mediate the association between circadian typology and sleep quality and components through either the direct or indirect effect of the mediation model.

MATERIALS & METHODS

The cross-sectional study conducted in among young adults Al-Neelain university. Morningness-Eveningness Questionnaire (MEQ) was used to assess chronotype, Sleep hygiene index was used to address different sleep hygiene behaviors associated with sleep. SHI is 13-item questionnaire. Total score ranged from 0-52 with higher scores indicating poor sleep hygiene status. Sleep quality was assessed using Pittsburgh sleep quality index. C. MacKinnon's four-step procedure was employed to examine the mediation effect, while Hayes PROCESS macro (model 4) was used to perform the mediation analysis.

RESULTS

Sleep onset latency was significantly shorter for definite morning circadian typology 8.66 min± (5.88) compared to 31.87 min± 40.61 for definite evening chronotype group (P<0.001). Sleep hygiene index scores were lower for Morning circadian typologies [definite Morning 22.50± (7.00), moderate morning 24.89± (5.63)] compared to evening typologies [definite evening 32.25± (4.43), moderate evening 29.00± (6.09)]. Which indicated good sleep hygiene behaviors for Morning chronotype groups.

Figure.1.0. Moreover, Lower scores of PSQI indicated Good sleep quality to be more evident in Morning circadian typologies (definite Morning 4.50± (1.37) (moderate morning 5.40± (2.62)) compared to Evening typologies (definite evening 8.88± (3.72)) (moderate evening 7.88± (3.23)) (P<0.001). **Figure.2.0.** Poor sleepers had higher scores of sleep hygiene index indicating poor sleep hygiene behaviors compared to good sleepers 28.08 ± (5.38), 24.53 ± (6.60) respectively (P<0.001). **Figure.3.0**

Sleep hygiene inversely correlated with MEQ scores (r=-.292, P<0.001) indicating that poor sleep hygiene correlates with evening chronotype. **Figure.4.0** Eveningness was associated with poor overall sleep quality (r= -.356 P<0.001) **Figure.5.0** and nearly all sleep components. Namely, Subjective sleep quality (r=-.334 P<0.001), Sleep Onset latency r=-.340, P<0.001, use of sleep medications r=-.113 P<0.05, and Daytime dysfunction r=-.191 P<0.01). Morningness also correlated with longer sleep duration r=.145 P<0.05) and higher levels of habitual sleep efficiency r=.222 P<0.001.

Multiple regression analysis showed that higher scores of MEQ predicted lower scores of Sleep hygiene index (β= -.1818 (P< 0.001) indicating an association between Morningness and good sleep hygiene behaviors. In addition, after controlling for Sleep hygiene index, MEQ scores were negatively associated with PSQI global score. (β= -.0856) (P<0.001) demonstrating that eveningness predicted worse sleep quality. Sleep hygiene index was positively associated with PSQI scores (β= .1564) (P<0.001), indicating that poor sleep hygiene predicted worse sleep quality. Finally, the results of bias-corrected percentile bootstrap method presented that the total effect was negative indicating an inverse correlation between MEQ score and PSQI score β= -.1141, P<0.001 Mainly as a partially mediated indirect inverse association between Chronotype and sleep quality through sleep hygiene β=-.0284, SE= .0077, 95% CI=[-.0452 – -.0151]). The mediation model of the influence of sleep hygiene on the relationship between chronotype and sleep quality is demonstrated in **Figure.6.0**

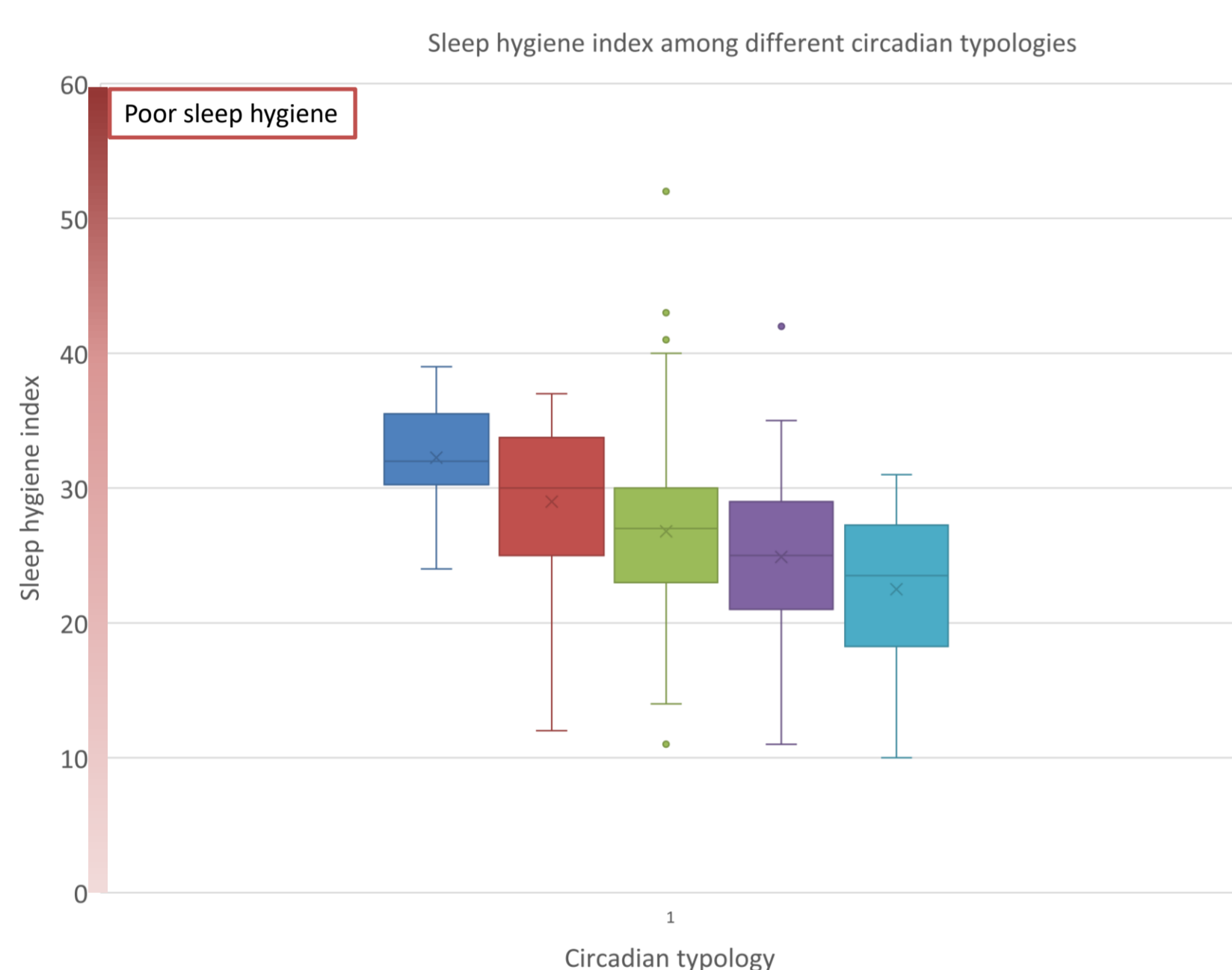


Figure.2.0. Sleep hygiene index score mean distribution across different circadian preference groups

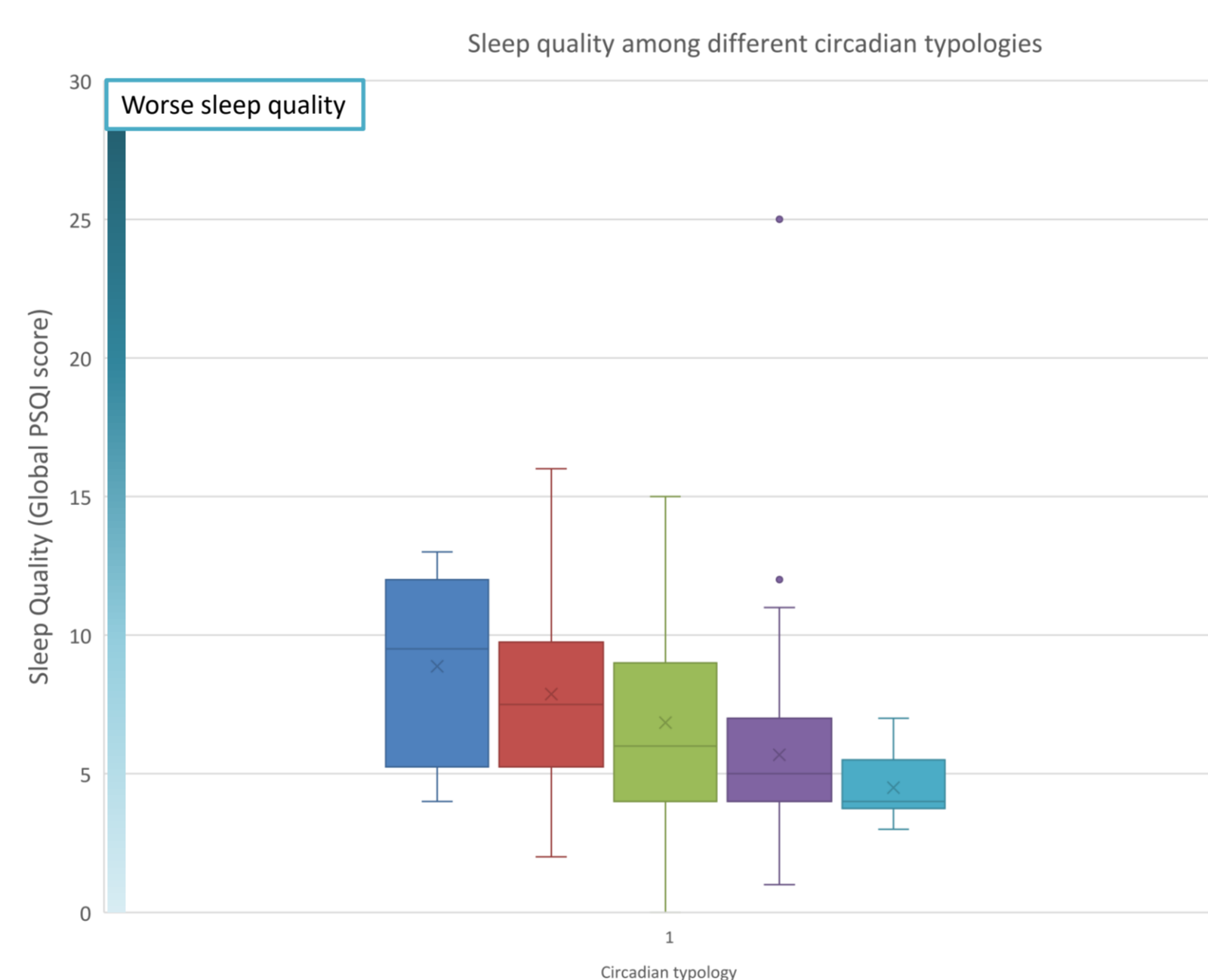


Figure.2.0. Global Pittsburgh sleep quality index score mean distribution across different circadian preference groups

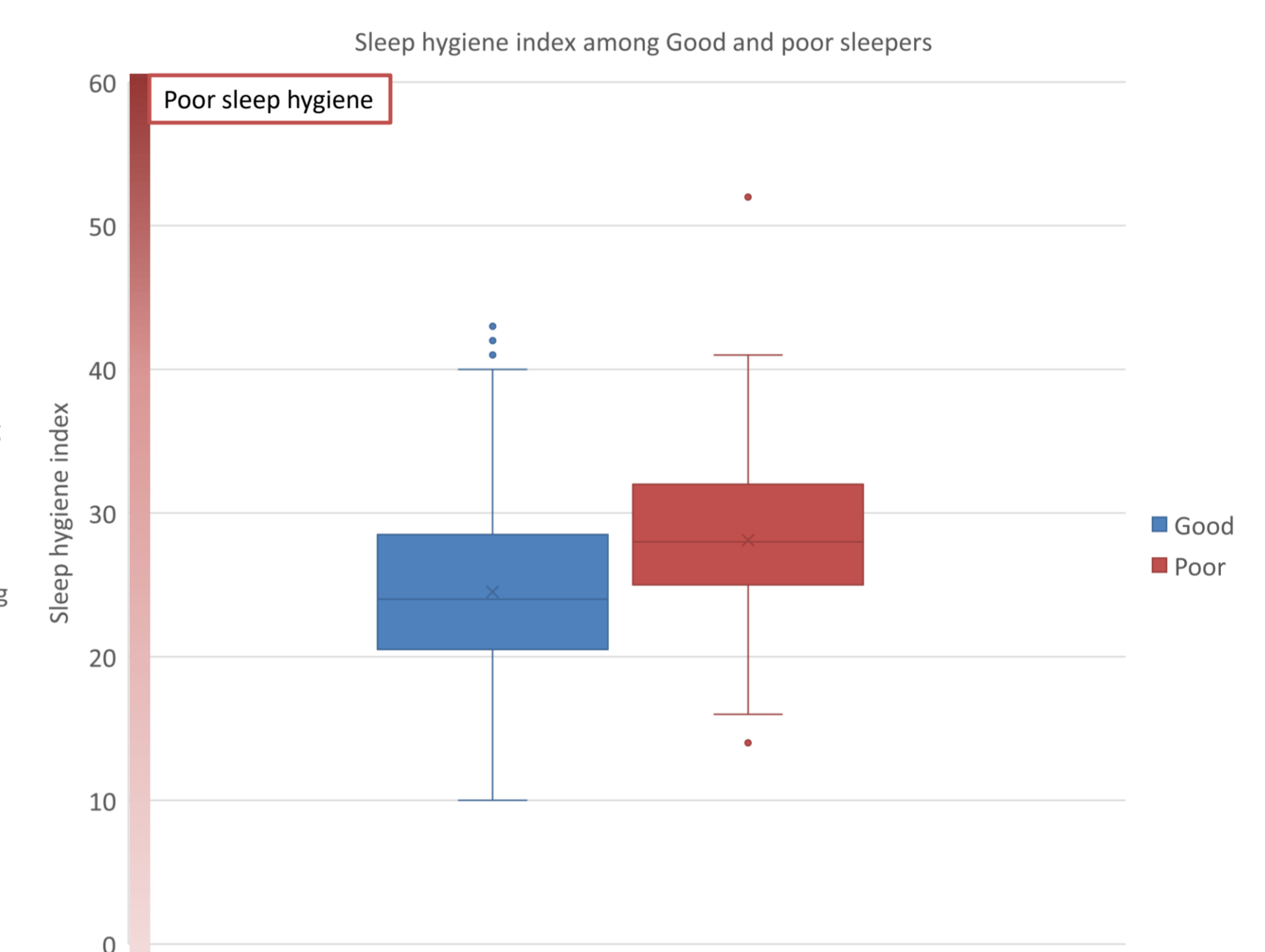


Figure.3.0. Sleep hygiene index score mean distribution across good and poor sleepers

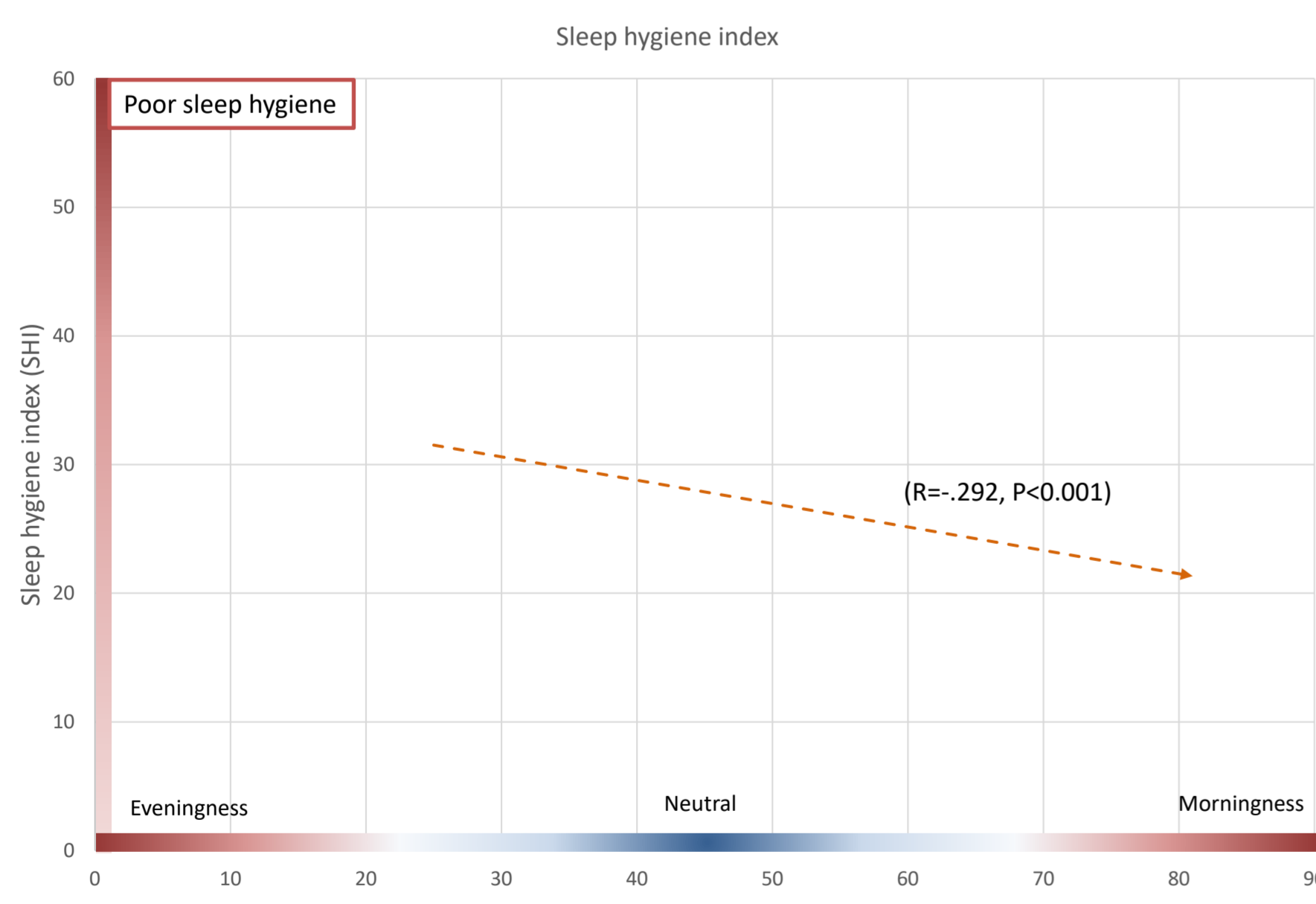


Figure.4.0. correlation between Sleep hygiene index score and morningness-eveningness score reflecting circadian preference R=Correlation Coefficient

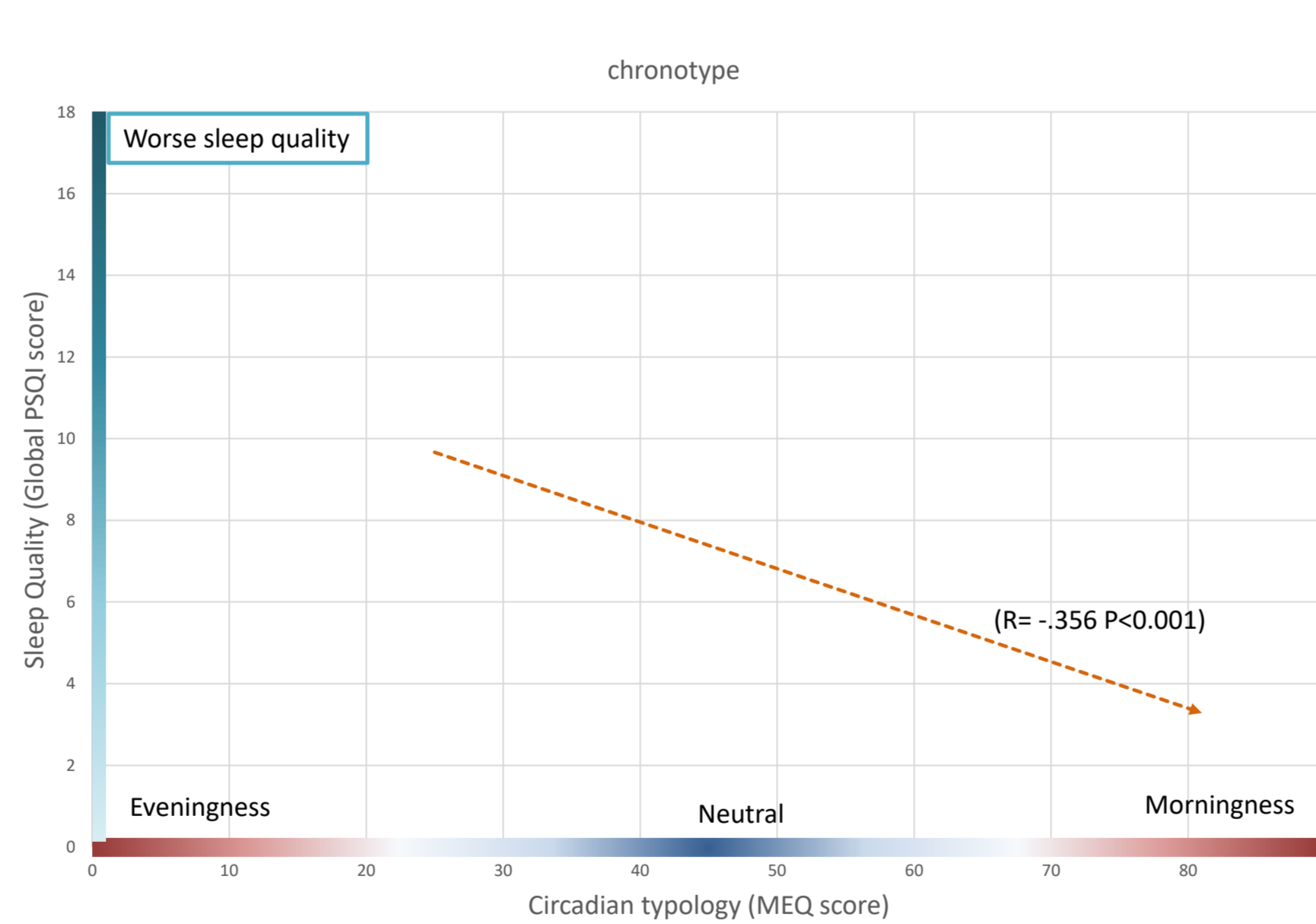


Figure.5.0. correlation between global Pittsburgh sleep quality index score and morningness-eveningness score reflecting circadian preference R=correlation coefficient

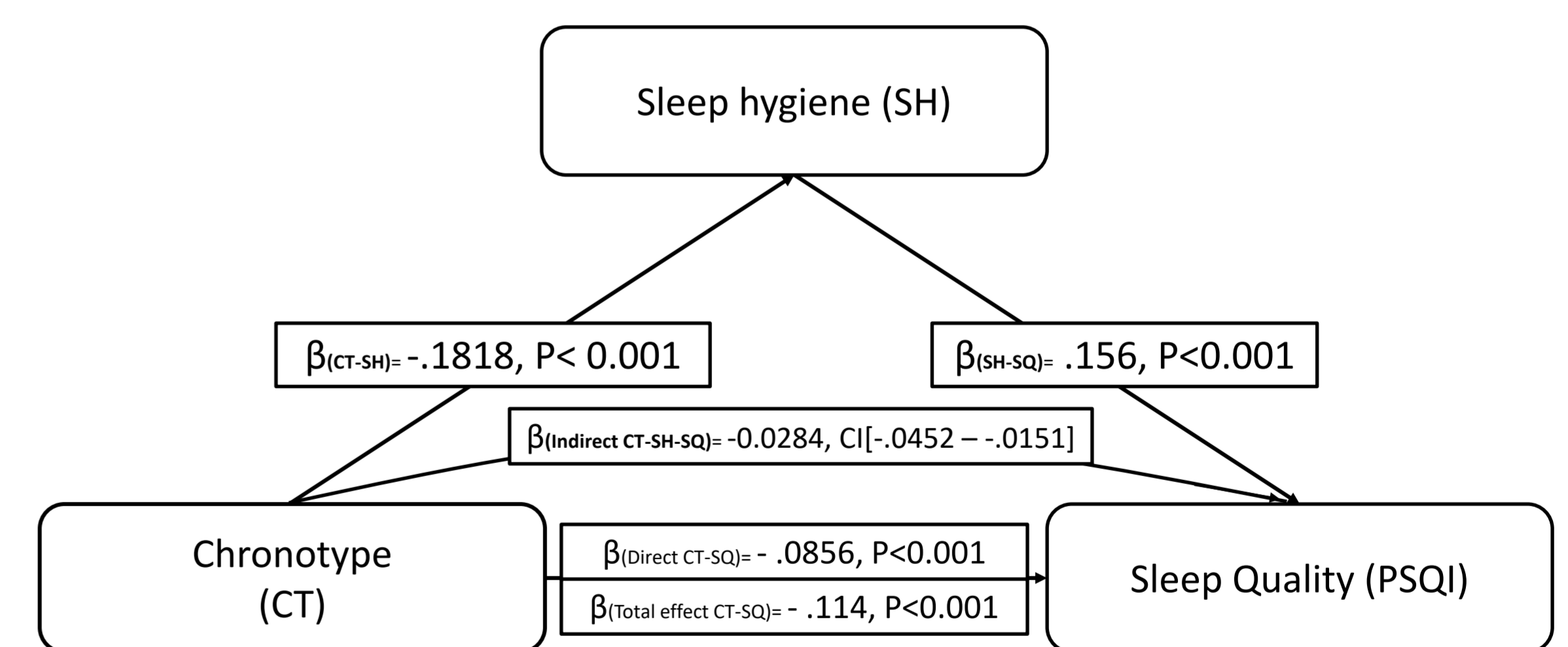


Figure.6.0. Mediation model for the influence of Sleep hygiene on the relationship between Circadian typology (chronotype) and Sleep quality

CONCLUSION

Morningness predicted good sleep quality both directly and indirectly through keeping a restful sleep environment. These findings can inform the design of personalized sleep hygiene recommendations appropriate for the target population. Practical implications regarding sleep hygiene education and interventions are discussed.

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