

## Relationship between Personality and Sleep Quality of Young Adults: A Correlational Study

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### ABSTRACT

The purpose of the present study was to determine the relationship between the big five factors of personality and the domains of sleep quality, and to assess the difference, if any, in the personality factors and sleep quality of male and female young adults. Convenient sampling and snowball sampling techniques were used to gather a sample of 565 young adults (Females: 293; Males: 270; Prefer not to say: 2), aged between 18 to 25 years, all of whom were residents of West Bengal. The Big Five Inventory (BFI) and the Pittsburgh Sleep Quality Index (PSQI) were employed to collect data and measure the variables under study. The obtained data was analyzed using Pearson's Product Moment Correlation (r), Independent sample t test, Mann-Whitney U test and Multiple Regression Analysis. The results imply that all the personality factors (i.e., Extraversion, Agreeableness, Conscientiousness and Neuroticism), except that of Openness to experience, are significantly correlated with sleep quality. The same four personality factors (i.e., Extraversion, Agreeableness, Conscientiousness and Neuroticism) are also found to be significant predictors of sleep quality. Component 1 (Subjective sleep quality), component 5 (Sleep disturbances) and component 7 (Daytime Dysfunction) were found to bear a correlation with all the mentioned four factors of personality, thereby, contributing majorly to the significant relationship between personality and sleep quality. Hence, personality of an individual plays a considerable role in determining one's sleeping patterns and quality of sleep. The gender difference is prevalent in sleep quality as female young adults are found to have poorer sleep quality than their male counterparts. However, it has little impact on personality as only Neuroticism is found to be considerably higher in females than in males.

**Keywords:** *Young adults, Personality, the Big Five Factors of Personality, Sleep, Sleeping pattern, Quality of Sleep*

**Y**oung adult is a time of frequent change and evaluation when very little is normative. This process of becoming an adult vary greatly by gender, race and ethnicity, and social class. Young adulthood is a phase of turbulence as, young people take longer to achieve economic and psychological autonomy.

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- **Adjust to sudden physical changes.** The young adult becomes all the more adjusted to the rapid and profound hormonal and sexual changes by this time. Generally, most of the physical changes are complete by the time the individual attains to the stage of a young adult. Eventually, they accept their physical changes and accept themselves as who they are.
- **Developing abstract thinking skills.** In this phase, there is a significant change in abstract thinking. The capacity of abstract thinking become established with clusters of abstract ideas and creating systems with organizing abstract thoughts become more vibrant. This phase makes an individual more philosophical and idealistic.
- **Adjust to sexual and mature body feelings.** Young adults continually experience and adjust with their body feelings and must adapt sexually and establish a sense of sexual identity. Besides projecting seriousness on a relationship, they are able to understand, incorporating a personal sense of masculinity or femininity into one's personal identity. While projecting all those phenomena they become more serious about their potential for emotional and physical intimacy.
- **Personal sense and identity.** Here they identify themselves with their uniqueness and separation from parents (childhood). This phase helps one to express their own self as an individual and as a person connected to valuable people and group. They purify their senses around issues such as gender, physical attributes, sexuality, ethnicity. *"Who am I? How do I fit in?"* is the major topic of this experiences, with a former sense of identity while a lingering sense of in-between, neither an adolescent nor an adult.
- **Personal value system.** This phase is so defined with a complex understanding of moral behavior and underlying principles of justice; generally, peers are not influential. personal beliefs and concepts are not influenced by peers. While respecting the viewpoints of others they can separate their own too.
- **Renegotiate relationship with parents/caregivers.** Adolescents negotiate relationship with parents which begins to balance autonomy (independence) with connection, while maintaining and redefining connections they make a room for other adult relationships that meet the cultural ethnicity and expectations. With the improvement of relationship with parents, the conflict arising from renegotiating parent-child role reduces.
- **Stable and productive peer relationship.** With time, the peer relationship becomes better to provide youth with more support and connections as they spend less time with adults and in supervised activity. Peer relationship actually shape the teen personality's self-concept and interaction. They start to relate the individual peer more than the whole peer group, with increasing the balance between the influence of family and peers which empowers the stable, intimate, and supportive peer relationship.
- **Meet the demands and responsibilities.** With having a growing stable interest, ability to compromise, self-reliance they become concerned about others, their own future etc. They become more focused on making their career and suitable occupation.

### **Personality**

The term personality refers to the characteristic set of behaviors, cognitions and emotional patterns that develop from the biological and environmental factors of an individual. It takes into consideration the individual differences in characteristic patterns of thinking, feeling and behaving. The most common and widely studied definition of personality was given by Allport (1961) according to which, "Personality is the dynamic organization within the individual of those psychophysical systems that determine his characteristics, behavior and thought".

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The study of personality focuses on two broad areas:

1. Understanding individual differences in particular personality characteristics, such as sociability or irritability.
2. Understanding how the various parts of a person come together as a whole.

### **Big Five Factors of Personality**

The study of personality traits was first begun by Allport and Odbert in the 1930s and continued by Cattell in the 1940s and by Tupes, Christal, and Norman in the 1960s. In the late 1970s and early 1980s, Costa and McCrae, like most other factor researchers, were building elaborate taxonomies of personality traits, but they were not using these classifications to generate testable hypotheses. Instead, they were simply using factor analytic techniques to examine the stability and structure of personality.

McCrae and Costa (1983) initially proposed a three-factor model, the factors being neuroticism, extraversion and openness. In 1985 they reported two more factors, namely, agreeableness and conscientiousness. The major accomplishment of the Five-Factor Model (FFM) was that, it provided a structure of personality and it had risen above the barriers of culture and language.

The model proposed by McCrae and Costa (1992) states that personality can be boiled down to five core factors, known by the acronym CANOE or OCEAN, which are as follows-

- **Extraversion (E)**- Extraversion reflects the tendency and intensity to which someone seeks interaction with their environment, particularly socially. It encompasses the comfort and assertiveness levels of people in social situations.
- **Agreeableness (A)**- Agreeableness refers to how people tend to treat relationships with others. Agreeableness focuses on people's orientation and interactions with others (Ackerman, 2017).
- **Conscientiousness (C)**- Conscientiousness describes a person's ability to regulate their impulse control in order to engage in goal-directed behaviors (Grohol, 2019). It measures elements such as control, inhibition, and persistency of behavior.
- **Neuroticism (N)**- Neuroticism describes the overall emotional stability of an individual through how they perceive the world. It takes into account how likely a person is to interpret events as threatening or difficult.
- **Openness to experience (O)**- Openness to experience refers to one's willingness to try new things as well as engage in imaginative and intellectual activities. It includes the ability to "think outside of the box."

**Table 1. Facets of each of the five factors are as follows (John & Srivastava, 1999):**

FACTORS	HIGH	LOW
Extraversion	<ul style="list-style-type: none"> <li>• Sociable</li> <li>• Energized by social interaction</li> <li>• Excitement-seeking</li> <li>• Outgoing</li> </ul>	<ul style="list-style-type: none"> <li>• Prefers solitude</li> <li>• Fatigued by too much social interaction</li> <li>• Reflective</li> <li>• Reserved</li> </ul>
Openness to experience	<ul style="list-style-type: none"> <li>• Unconventional</li> <li>• Creative</li> <li>• Curious</li> <li>• Imaginative</li> </ul>	<ul style="list-style-type: none"> <li>• Not very imaginative</li> <li>• Dislikes changes, prefers routines</li> <li>• Predictable</li> <li>• Traditional</li> </ul>

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Neuroticism	<ul style="list-style-type: none"> <li>• Anxious</li> <li>• Experience a lot of stress</li> <li>• Self-conscious</li> <li>• Vulnerability</li> </ul>	<ul style="list-style-type: none"> <li>• Doesn't worry much</li> <li>• Emotionally stable</li> <li>• Confident</li> <li>• Resilient</li> </ul>
Conscientiousness	<ul style="list-style-type: none"> <li>• Organized</li> <li>• Dutifulness</li> <li>• Achievement-striving</li> <li>• Self-disciplined</li> </ul>	<ul style="list-style-type: none"> <li>• Disorganized</li> <li>• Careless</li> <li>• Procrastinates</li> <li>• Indisciplined</li> </ul>
Agreeableness	<ul style="list-style-type: none"> <li>• Straightforwardness</li> <li>• Altruism</li> <li>• Compliance</li> <li>• Modesty</li> </ul>	<ul style="list-style-type: none"> <li>• Demanding</li> <li>• Insults and belittles others</li> <li>• Stubborn</li> <li>• Show-off</li> </ul>

Costa and McCrae shared the same view as Eysenck. According to them, personality traits are bipolar and they follow a bell-shaped distribution. That is people score near the middle of each trait, with only a few people scoring at the extremes.

### ***The Five Factor Theory-***

Initially, the five factors constituted of only a taxonomy, a classification of basic personality traits. However, describing the personality factors is not the same as explaining them. McCrae and Costa, thus, developed the five-factor theory from the five-factor model for the purpose of describing them.

In the personality theory of McCrae and Costa (1996, 1999, 2003), behavior is predicted by an understanding of three central or core components and three peripheral ones.

The three central components include-

- i. **Basic Tendencies-** The universal raw material of personality capacities and dispositions that are generally inferred rather than observed. (Costa and McCrae, 1996). Basic, either inherited, imprinted by early experience or modified by disease or psychological intervention, at any given period in an individual's life, define the individual's potential. Basic tendencies have four postulates: individuality, origin, development, and structure.
- ii. **Characteristic Adaptations-** These are acquired structures of personality which develop as people adapt to their environment. They differ from culture to culture.
- iii. **Self-Concept-** It "consists of knowledge, views, and evaluations of the self, ranging from miscellaneous facts of personal history to the identity that gives a sense of purpose and coherence to life" (Costa and McCrae, 1996).

The three peripheral components include-

- i. **Biological Bases-** The principle biological mechanisms include genes, hormones and brain structure. This positioning of biological bases reduces the role played by the environment in the formation of basic tendencies.
- ii. **Objective Biography-** Includes everything the person does, thinks or feels across the whole lifespan (McCrae and Costa, 2003).
- iii. **External Influences-** Particular physical or social situation that has some influence on the personality system.

### ***Sleep***

Sleep may be referred to as a behavior which is characterized by the persistent urge of

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sleepiness that forces us to seek out a warm and comfortable place; lie down; and remain that way for several hours. Because we remember very little about what happens while we sleep, we tend to think of sleep more as a change in consciousness than as a behavior. The change in consciousness is undeniable, but it shouldn't prevent us from noticing the behavioral changes.

There is a difference between sleep and rest, rest is a condition in which the body is in decreased state of activity without physical emotional stress and freedom from anxiety. On the other hand, sleep is a state of rest accompanied by altered level of consciousness and relative inactivity, and perception to environment is decreased.

### ***Cognitive Function of Sleep***

Another theory regarding why we sleep, involves sleep's importance for cognitive function and memory formation (Rattenborg, Lesku, Martinez-Gonzalez, & Lima, 2007). Indeed, we all know sleep deprivation leads to disruptions in cognition and memory deficits (Brown, 2012), resulting in impairments in our abilities to take care of attention, make decisions, and recall long-term memories. Moreover, such impairments become all the more severe as sleep deprivation increases (Alhola & Polo-Kantola, 2007). Furthermore, slow-wave sleep can improve the resultant performance of a new task if it is carried out after learning a new task (Huber, Ghilardi, Massimini, & Tononi, 2004) and seems essential for effective memory formation (Stickgold, 2005). Research indicates that the possible benefits of sleep are increase in capacities of creative thinking (Cai, Mednick, Harrison, Kanady, & Mednick, 2009; Wagner, Gais, Haider, Verleger, & Born, 2004), language learning (Fenn, Nusbaum, & Margoliash, 2003; Gómez, Bootzin, & Nadel, 2006), and inferential judgments (Ellenbogen, Hu, Payne, Titone, & Walker, 2007). Even the processing of emotional information is influenced by quite a few aspects of sleep (Walker, 2009).

### ***Physiology of Sleep***

The cyclic nature of sleep is assumed to be controlled by centers located within the brain and by circadian rhythms. Reticular Activating System (RAS) located at the brain stem and cerebral cortex plays a crucial role in sleep-wake cycle. Sleep begins with the activation of the pre-optic region of the anterior hypothalamus. By the release of Gamma amino butyric acid (GABA), the sleep-promoting neurons act over wake-promoting neurons. The inhibition of wake promoting neurons leads to intensifying sleep process. Another key factor to sleep is exposure to darkness, and also preparing for sleep cause a decrease in stimulation of the RAS. During this time the pineal gland in the brain begins to actively secrete the natural hormone melatonin, and person feels less alert.

### ***Sleeping Pattern***

Sleep is composed of different stages that can be differentiated from one another not a uniform state of being, each stage occurs with brain wave activity. These wave activities are easily distinguishable by both frequency and amplitude which can be visualized by EEG. Sleep can be divided into two different stages: REM sleep and non-REM (NREM) sleep. The Rapid eye movement (REM) sleep is characterized by flitting movements of the eyes under closed eyelids. During this stage brain waves looks very similar to waves during wakefulness. While in contrast, non-REM (NREM) sleep is subdivided into four distinguishable stages, they're significantly differentiated from the waves of wakefulness. The first four stages of sleep are under those subdivisions of NREM sleep, while the fifth and final stage of sleep is REM sleep. So, the stages of sleep can be organized by STAGE1, STAGE 2, STAGE 3, STAGE 4 And finally the REM stage. When a person prepares to go to sleep, waxing and

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waning of alpha waves bursts into 8-12-Hz EEG begins with a the low-voltage, high-frequency waves detect the wakefulness. After falling asleep there is a sudden transition to a period of stage 1. The EEG of STAGE 1 is a low-voltage, in contrast the high frequency signal that is similar but slower than the alert wakefulness. As the person progresses from stage 1 sleep through stages 2, 3, and 4 there is a gradual increase and decrease in EEG voltage. Correspondingly, the stage 2 sleep EEG is characterized with slightly higher amplitude and a lower frequency than the stage 1; furthermore, it is apostrophized by k complexes and sleep spindles, two characteristic wave forms. In between which the former one is a single large negative wave (upward deflection) followed straight by a single large positive wave (downward deflection). Where each sleep spindle is a burst of 12-14-Hz waves along with 1-2 seconds waxing and waning. The stage 3 sleep EEG is signified by the sporadic presence of delta waves, the largest and slowest EEG waves having the frequency of 1-2 Hz whereas, the stage 4 sleep EEG is characterized by a prevalence of delta waves. Once the sleeping individual reach stage 4 EEG sleep, they stay there for a time, and then they retreat back to the sleep stage 1., However, after returning to stage 1, nothing is same as they were the first time through. The initial stage 1 EEG during a night's sleep is not marked by any conspicuous electromyographic or electrooculographic changes, whereas ensuing periods of stage 1 sleep EEG (emergent stage 1 EEG) are occurred with by REMs and by a demotion in the muscles of the body core. After having the first cycle of sleep EEG from initial stage 1 to stage 4 and back to arising stage 1 the rest of the night is spent commutating through the stages. Every cycle tends to be about 90 minutes long. As more time passes by, and night proceeds the cycle spends more time in stage one comparing to other stages specially the stage 4.

### *Quality of Sleep*

Sleep quality has become a research imperative that leads to need for the definition of what restoring or quality sleep justifies. This phrase requires across domain investigation, it depends on both psychological and physiological factors. It is all about the satisfaction of sleep defined by individual, it's a summation of sleep initiation, sleep maintenance, sleep quantity, and refreshment upon waking up. Surveys especially epidemiological surveys reported that 13-35% of that adult population complain quality disturbance, such as maintaining sleep (Karancan, L., et al,1979). This sleep quality disturbances and recurrent circadian disruption affects the young adults more than older adults. As for the case of college students, they are dealing hugely with stress and other hectic life schedules, as for their daily socialization, internet accessibility they have to deal with their sleep schedules (Araujo et al 2013).

Sleep deprivation processes affect the endocrine system, immunologic, metabolic and cardiovascular system; and the impacts depend upon the severity of the symptoms (Teter, McCabe, LaGrange, Cranford & Boyd, 2006; Buboltz, 2002). Lack of sleep and drowsiness is common among the college students. Studies showed that lack of sleep and poor sleep quality always deteriorate intellectual execution and psychomotor capacities, even poor scores and regular daytime dysfunction happens for this poor quality of sleep.

### *Subjective sleep quality*

The role of subjective sleep quality has its own popularity. Sleep quality was generally assessed by Pittsburg Sleep Quality Index (PSQI) and many other scales. In the cognitive performance the subjective sleep quality has its own importance. It's a belief though and some researchers proved it that the poor subjective sleep quality has disproportionate relationship with cognitive functions. Weaker memory, attentional deficiency is always

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related to this and nowadays most young adults suffer for this. There is a potential relationship of subjective sleep quality with procedural learning/memory that has largely been neglected. This procedural memory system signifies the learning, storage, and use of cognitive and perceptual-motor skills and habits.

### ***Sleep latency***

This is also called the sleep one-shot latency, which denotes the time which is taken by an individual to fall asleep and that varies from person to person. It defines the amount and quality of sleep one gets by denoting the time how quickly one can reach rapid eye movement (REM) sleep.

### ***Sleep duration***

It typically refers to the amount of sleep taken by an individual; it can be during the nocturnal sleep episode or across the 24-hour period. According to Francesco Cappuccio, Lanfranco D'elia (2010), both the duration of sleep (long and short) are significant predictors of death. According to National Sleep Foundation guidelines a healthy adult need to have 7 to 8 hours of sleep while in cases of teens and toddlers this sleep duration increases as this enables their growth and development. And people above 65, need to have sleep of 7 to 9 hours each night.

### ***Habitual sleep efficiency***

Habitual sleep efficiency defines the actual time an individual is asleep during the time spent in bed. The ratio of total sleep time (TST) and time in bed (TIB) commonly defines the sleep efficiency. It expresses the main reason of insomnia and other sleeping disorders. Sleep efficiency of 75% or higher is considered as the good one or the normal one, which defines the higher quality of sleep with fewer interruptions.

### ***Sleep disturbances***

The word sleep disturbances elapsed with the problems of falling asleep, disturbances during the sleep or having nightmares etc. According to WHOOP app (specially designed to monitor the sleep) awake is a stage for an individual, as it is normal to awake for a brief period of time at night and it is normal to experience 10 to 20 per night.

### ***Use of sleeping medication***

Environmental conditions or any other physical cues can cause the disturbances which leads an individual to take the sleeping medications.

Triazolam (Halcion), Zaleplon (Sonata), Zolpidem (Ambien, Edluar, Intermezzo, Zolpimist) are some popular drugs for insomnia, among them the Zaleplon is the one which helps patient to stay asleep. If there is regular trouble for falling asleep then that is a red flag. It is may be due to the excess usage of phone or watching TV or stress. It might also be a symptom of a medical or psychological problem. But whatever it is, it won't be cured with sleeping pills as long-term usage of sleeping medications can worsen the insomnia. Long term dependence on the sleeping pills can cause drowsiness, headache, muscle aches, constipation, lack of concentration, dizziness, and most importantly rebound insomnia.

### ***Daytime dysfunction***

It emphasizes the lack of motivation to carry on the daily functions and having trouble staying awake while driving, eating meals, or engaging in social activity. Due to daytime dysfunction 43% of adults reported interference with daily activities at least a few days a month. This issue causes serious morbidity and increased economic costs. It is reported that in USA more than 50,000 people have died in car accidents due to being sleepy while

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driving. These daytime dysfunctions also significantly affect the patients with Inflammatory Bowel Disease (IBD).

*The aim of the present study is to determine the relationship between the big five factors of personality and the domains of sleep quality among young adults, and to assess whether males and females of West Bengal differ significantly in terms of personality factors and sleeping patterns.*

### REVIEW OF LITERATURE

According to a study published on May 17, 2021, researchers at the University of Warwick and University of Tartu, found that there is a definite relationship between the sleep patterns and the personality of an individual. As per their paper, 'Personality Traits Relate to Chronotype at Both the Phenotypic and Genetic Level' which has been published in the 'Journal of Personality', at the facet level, individuals scoring high in the domain of conscientiousness and low in the personality trait of openness to experience, portray a tendency to be early chronotypes, i.e., they went to bed and got out of bed early. Similarly, less straightforward and excitement-seeking (a trait adjective of agreeableness and extraversion, respectively) and more self-disciplined (a trait adjective of conscientiousness) were associated with people having early chronotypes.

Another longitudinal study conducted by Yannick Stephan, Angelina R. Sutin, Sophie Bayard, Zlatan Križan, and Antonio Terracciano (Nov 27, 2017) aimed to assess the longitudinal association between personality traits and sleep quality in four samples of middle aged and older adults. The study assessed more than 22,000 adults aged from 30 to 107 years from three US samples- the Wisconsin Longitudinal Study (WLS), the Midlife in the United States Study (MIDUS), the Health and Retirement Study (HRS), and one Japanese sample- the Midlife in Japan Study (MIDJA). The personality traits and sleep quality were assessed at the beginning of the study and again after 4-10 years. The results supported the longitudinal association between some of the personality factors and sleep quality. Sleep quality was found to be better both at the beginning and over time in individuals with low tendencies of neuroticism and high tendencies of extraversion. Individuals having low conscientiousness tendencies were found to have deteriorating sleep quality over time. The factors agreeableness and openness to experience were found to have little to no association with sleep quality. However, poor sleep quality at the beginning was associated with a sharp decline in extraversion, agreeableness, conscientiousness and a little decrease in neuroticism over time.

A cross-sectional study conducted with 1,406 Korean women within an age range of 18 to 40 years (Kim, Cho, Chang, Ryu, Shin & Kim, 2015), showed that neuroticism was the most significant predictor of the global PSQI score of sleep quality, as according to the multiple linear regression model. Conscientiousness was found to bear a strong significant correlation with sleep quality, whereby, individuals scoring high on the personality trait of conscientiousness were least likely to possess poor sleep quality. The individuals, chosen for the study, were reported to have no clinical symptom of meaningful depression. According to the findings, "Personality may be a factor in poor sleep quality and should be considered in sleep interventions targeting young women" (Kim, Cho, Chang, Ryu, Shin & Kim, 2015).

### ***The Big Five Factors of Personality and Gender Differences-***

A study conducted by Tamban and Maningas (2019), with 115 participants, showed that female respondents ranked relatively low in the personality factors of extraversion and

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neuroticism, whereas, male respondents were relatively low as far as the domains of openness to experience and conscientiousness were considered. Gender differences were evident in four, out of the five personality traits, leaving agreeableness as the only personality trait with no significant gender difference.

According to the study by Costa, Terracciano and McCrae (2001) (N =23,031), gender differences between males and females were relatively small, in comparison to the individual variations within each gender concerned. Taking into consideration 26 different cultures and individuals aged 18 years and above, Costa Terracciano and McCrae found that the reported differences were, to a considerable extent, consistent with the gender stereotypes. On the self-report Inventory of Revised NEO-PI, female respondents reported to be high on warmth, agreeableness, neuroticism, and openness to feelings. Males, on the other hand, responded to be high on assertiveness and openness to ideas. However, contradicting the predictions of the evolutionary theory, Costa et al., concluded that gender differences and its magnitude reportedly varied from culture to culture.

In accordance to a study by Weisberg, DeYoung and Hirsch (2011) conducted on 2643 individuals (892 males and 1751 females) within the age range of 17 to 85 years, women participants scored higher than men, on the domains of extraversion, agreeableness and neuroticism, thereby, reporting higher levels of the trait adjectives of the mentioned personality factors. Their findings suggested that, the gender differences, for the domains of extraversion, openness to experience and conscientiousness diverged at the aspect level, resulting in "either small or undetectable at the Big Five level".

### *Components of Sleep quality and Gender Difference-*

A study done by Andreas Hinz, Heide Glaesmer, Elmar Brähler, Markus Löffler, Christoph Engel, Cornelia Enzenbach, Ulrich Hegerl and Christian Sander (February, 2017) on 9284 adults (aged 18-80 years) showed the sleep quality in general population using PSQI. The results showed that 36% of the general population had bad sleep quality. Furthermore, females reported much more sleep problems than males (mean score for females- 5.5 and mean scores for males- 4.4). However, sleep quality was found to be strongly correlated with fatigue, quality of life, anxiety, professional situation (poorer in unemployed individuals) and obesity.

Another survey study done on Gender and regional differences in Sleep Quality and Insomnia (Tang, J., Liao, Y., Kelly, B. C., Xie, L., Xiang, Y. T., Qi, C., & Chen, X, 2017) on 26,851 subjects from Hunan, China showed little difference on the basis of gender in case of insomnia but significant difference between male and female in case of sleep quality. The mean PSQI score was found to be significantly higher in females than males.

According to another study by Barbara C. Galland, Andrew R. Gray, Jonathan Penno, Claire Smith, Carmen Lobb and Rachael W. Taylor (April, 2017), 56% of the adolescent population (aging from 15 to 17 years) had poorer sleep quality which is significantly higher in girls than in boys. Higher number of girls reported drinking hot caffeinated drinks after dinner which was found to be significantly associated with bad sleep quality.

## **METHODOLOGY**

### *Objective*

- 1) To study the relationship between the big five factors of personality and the domains of sleep quality among young adults, of West Bengal.

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- 2) To assess whether males and females of West Bengal differ significantly in terms of personality factors and sleeping patterns.

### *Hypotheses*

- Null Hypotheses ( $H_0$ ):
  - $H_{01}$  - There is no significant correlation between the big five factors of personality and the domains of sleep quality, among young adults.
  - $H_{02}$  - There is no significant difference in the personality factors of male and female young adults.
  - $H_{03}$  - There is no significant difference in the sleeping patterns of male and female young adults.
  - $H_{04}$  - There is no role of personality factors in the prediction of sleeping patterns, among young adults.
- Alternate Hypotheses ( $H_a$ ):
  - $H_{a1}$  - There is a significant correlation between the big five factors of personality and the domains of sleep quality, among young adults.
  - $H_{a2}$  - There is a significant difference in the personality factors of male and female young adults.
  - $H_{a3}$  - There is a significant difference in the sleeping patterns of male and female young adults.
  - $H_{a4}$  - There is a role of personality factors in the prediction of sleeping patterns, among young adults.

### *Variables to be studied*

- **Big five factors of personality:**
  1. Extraversion (E)
  2. Agreeableness (A)
  3. Conscientiousness (C)
  4. Neuroticism (N)
  5. Openness to experience (O)
- **Sleep quality:**
  1. Subjective sleep quality (Component 1)
  2. Sleep latency (Component 2)
  3. Sleep duration (Component 3)
  4. Habitual sleep efficiency (Component 4)
  5. Sleep disturbances (Component 5)
  6. Use of sleeping medication (Component 6)
  7. Daytime dysfunction (Component 7)
  8. Global PSQI Score

### *Operational definition*

- **Big Five Factors of personality:** The score of individual five factors of personality as obtained on the Big Five Inventory (BFI) by young adults of West Bengal, on whom the said inventory would be administered.
- **Sleep quality:** The score of seven individual domains of sleep quality and Global PSQI Score of sleep quality as obtained on the Pittsburgh Sleep Quality Index (PSQI)

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by young adults of West Bengal, on whom the said questionnaire would be administered.

### *Research design*

A quantitative correlational study was implemented using a survey method. A correlational study was conducted to determine the relationship between the big five personality factors and the dominance of sleep quality.

### *Inclusion criteria*

- Young adults within the age range of 18 to 25 years will be considered.
- Residents of the state of West Bengal will be considered.

### *Exclusion criterion*

- Individuals with educational qualification lower than higher secondary will not be considered.

### *Sampling method*

- Convenience or accidental sampling- a type of non-probability sampling technique in which the participants are sampled based on their availability and convenience to the researcher.
- Snowball sampling- a type of non-probability sampling technique whereby, the existing participants, in turn, gather additional participants for the research study.

### *Sample description*

- Total number of participants (N) – 565
- Age range – 18 to 25 years

*Table 2. Sample distribution*

Gender	No. of participants (n)	Percentage	Mean Age
Female	293	51.86 %	20.952
Male	270	47.79 %	21.607
Prefer not to say	2	0.35 %	21.5

### *Instruments used in the study*

- **Big Five Inventory (BFI):** The Big Five Inventory (BFI), based on the Big Five Factors as given by Costa and McCrae, is a scale that was popularized in 1980, The present scale was revised in 1991 by John, Donahue and Kentle. The BFI consists of 44 items and is a self-report inventory. The scale allows efficient & flexible assessment of the five personality dimensions (i.e., Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to change). The items are short and have simple sentence structures, which retains the advantages of adjectival items (brevity and simplicity) while avoiding some of their shortcomings (ambiguous or multiple meanings and salient desirability). BFI items are rated on a five-point scale ranging from 1 to 5, where 1- Disagree Strongly, 2- Disagree a little, 3- Neither agree nor disagree, 4- Agree a little, and, 5- Agree Strongly. Scale scores are computed as the participant's mean item response (i.e., Summing up the score on all items of a scale and dividing it by the number of items on the scale).
- **Pittsburgh Sleep Quality Index (PSQI):** A self-rating questionnaire developed by Daniel J. Buysse, Charles F. Reynolds III, Timothy H. Monk, Susan R. Berman, and

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David J. Kupfer in the year 1988, the Pittsburgh Sleep Quality Index (PSQI) assess sleep quality and disturbances over the past 1 month. The 1-month time-frame allows PSQI to lie intermediate, between the post-sleep inventories (assessing previous night's sleep, only) and survey-type questionnaires (assessing the sleeping pattern over the previous year or more). The scale consists of 19 items to be rated by the participant himself/herself and 5 items to be rated by the bedpartner/roommate, if they have any. The 19 self-rated items constitute the seven "component" scores: Subjective sleep quality, Sleep latency, Sleep duration, Habitual sleep efficiency, Sleep disturbances, use of sleeping medication, and Daytime dysfunction. The sum of scores for the mentioned seven components yields one Global PSQI Score. The range of the scale is from 0 to 21. Higher the score an individual receives, worse is her sleep quality.

### ***Procedure***

For the collection of data, Google Form was created. The link was distributed to potential participants on 16.04.2021 (16<sup>th</sup> April, 2021). Participants were assured about the anonymity and confidentiality of their responses and were also encouraged to share the link with other people too. Responses were accepted till 20.05.2021 (20<sup>th</sup> May, 2021), 11:59pm.

In the Google Form, the first page included the purpose of the study following which the participants were required to give their consent for voluntary participation. Information schedule followed next, which consisted of participants' details such as initials of name, age, gender, etc. This was followed by the BFI inventory, and lastly the PSQI questionnaire. All the necessary fields were marked mandatory to ensure that the participants have given all the necessary information. After completion of the data collection process, scoring was done and the scores were arranged according to gender. Following this, necessary statistical tools were employed to interpret and conclude the result of the study.

### ***Statistical analyses***

1. To assess the relationship among the personality factors and sleep quality, Pearson's  $r$ , i.e., product-moment correlation was used.
2. To assess the difference between the responses of male and female, independent sample  $t$  test and Mann-Whitney  $U$  test were used.
3. To predict the nature of the relationship between personality factors and sleep quality, multiple regression analysis was used.

### ***Ethical considerations***

1. The individuals should be provided with a consent form to ensure the voluntary participation of the concerned individuals.
2. The participants should have the right to withdraw their participation at any point during the course of the study.
3. The responses and the details of each participant should be kept anonymous and confidential to the best of the researchers' interest.
4. The participants should be debriefed about the purpose of the present study on completion of the concerned study.
5. The participants should not be exposed to any sort of harm during the course of the study.
6. The data collected should only be used for research purposes to the best knowledge of the researchers.

## RESULTS

The tables 3.1 & 3.2 shows the descriptive statistics for the Big five personality factors (Extraversion, Agreeableness, Conscientiousness, Neuroticism & Openness to experience) and components of sleep quality (Subjective sleep quality, Sleep latency, Sleep duration, Habitual sleep efficiency, Sleep disturbances, use of sleeping medication and Daytime dysfunction) and Global PSQI Score of sleep quality respectively. Both the tables include mean value, Standard Error (SE) for mean, Standard Deviation (SD), Variance, Minimum and Maximum value for each of the factors and components.

*Table 3.1. Descriptive statistics: Big Five Factors of personality.*

Variable	Mean	Standard Error (S.E) (Mean)	Standard Deviation (S.D)	Minimum	Maximum
<b>Extraversion</b>	3.15	0.03	0.69	1.25	5.00
<b>Agreeableness</b>	3.82	0.02	0.53	1.44	5.00
<b>Conscientiousness</b>	3.28	0.03	0.61	1.55	5.00
<b>Neuroticism</b>	3.24	0.03	0.75	1.11	5.00
<b>Openness to Experience</b>	3.71	0.02	0.47	1.50	4.80

From table 3.1, the mean values for the five factors of personality namely, Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to experience is found to be 3.15, 3.82, 3.28, 3.24 and 3.71 respectively. The standard errors for mean of the same is found to be 0.03, 0.02, 0.03, 0.03 and 0.02 respectively. The SD values are found to be 0.69, 0.53, 0.61, 0.75 and 0.47 for extraversion, agreeableness, conscientiousness, neuroticism and openness to experience respectively. Variance of the same are 0.47, 0.28, 0.37, 0.57 and 0.22 respectively. The minimum & maximum values in extraversion are 1.25 and 5 respectively, in agreeableness are 1.44 and 5 respectively, in conscientiousness are 1.55 and 5 respectively, in neuroticism are 1.13 and 5 respectively and lastly in openness to experience are 1.5 and 4.8 respectively.

*Table 3.2. Descriptive statistics: Sleep quality.*

Variable	Mean	Standard Error (S.E) (Mean)	Standard Deviation (S.D)	Minimum	Maximum
<b>C1: Subjective sleep quality</b>	1	0.03	0.71	0.00	3.00
<b>C2: Sleep latency</b>	1.37	0.04	1.04	0.00	3.00
<b>C3: Sleep duration</b>	1.06	0.04	0.89	0.00	3.00
<b>C4: Habitual sleep efficiency</b>	0.39	0.03	0.77	0.00	3.00
<b>C5: Sleep disturbances</b>	1.19	0.02	0.57	0.00	3.00
<b>C6: Use of sleeping medication</b>	0.16	0.03	0.60	0.00	3.00
<b>C7: Daytime dysfunction</b>	0.99	0.03	0.91	0.00	3.00
<b>Global PSQI Score</b>	6.15	0.13	3.16	0.00	18.00

Table 3.2 presents the mean values to be 1, 1.37, 1.06, 0.39, 1.19, 0.16, 0.99 and 6.15 for C1, C2, C3, C4, C5, C6, C7 and Global PSQI Score respectively. The Standard Errors in those means are found to be 0.03, 0.04, 0.04, 0.03, 0.02, 0.03, 0.03 and 0.13 respectively. The SD

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values for C1, C2, C3, C4, C5, C6, C7 and Global PSQI Score are shown to be 0.71, 1.04, 0.89, 0.77, 0.57, 0.60, 0.91 and 3.16 respectively. Variances were calculated to be 0.50, 1.09, 0.79, 0.59, 0.33, 0.36, 0.82 and 9.97 in case of C1, C2, C3, C4, C5, C6, C7 and Global PSQI Score respectively. The minimum and maximum values for C1, C2, C3, C4, C5, C6 and C7 are found to be 0 and 3 respectively and for Global PSQI Score the same are found to be 0 and 18 respectively.

The Pearson's Product Moment Correlation was applied to assess if there exists any significant relationship between the five personality factors (Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness to experience) and the components of sleep quality (C1, C2, C3, C4, C5, C6, C7 and Global PSQI Score). Table 4 shows the correlation coefficient between each personality factors and components of sleep quality.

**Table 4. Pearson's correlation between Big Five Factors of personality and Sleep quality.**

	Extraversion	Agreeableness	Conscientiousness	Neuroticism	Openness to Experience	C1: Subjective Sleep Quality	C2: Sleep Latency	C3: Sleep Duration	C4: Habitual Sleep Efficiency	C5: Sleep Disturbance	C6: Use of Sleeping Medication	C7: Daytime Dysfunction	Global PSQI Score
Extraversion	1	0.197**	0.258**	-0.307**	0.126**	-0.181**	-0.06	-0.072	-0.007	-0.155**	-0.088*	-0.276**	-0.206**
Agreeableness		1	0.266**	-0.211**	0.234**	-0.112**	-0.026	-0.043	-0.024	-0.119**	-0.070	-0.114**	-0.119**
Conscientiousness			1	-0.263**	0.107*	-0.179**	-0.072	-0.016	-0.107*	-0.144**	-0.06	-0.256**	-0.205**
Neuroticism				1	0.013	0.186**	0.191**	0.035	0.017	0.268**	0.066	0.31**	0.269**
Openness to Experience					1	-0.006	0.066	0.013	-0.024	0.004	-0.027	0.049	0.026
C1: Subjective Sleep Quality						1	0.384**	0.306**	0.266**	0.299**	0.165**	0.28**	0.667**
C2: Sleep Latency							1	0.168**	0.235**	0.287**	0.194**	0.205**	0.668**
C3: Sleep Duration								1	0.473**	0.105*	0.075	0.16**	0.599**
C4: Habitual Sleep Efficiency									1	0.099*	0.036	0.067	0.558**
C5: Sleep Disturbance										1	0.177**	0.263**	0.506**
C6: Use of Sleeping Medication											1	0.150**	0.395**
C7: Daytime Dysfunction												1	0.555**
Global PSQI Score													1

Note: \*\*. Correlation is significant at 0.01 significance level (2-tailed)

\*. Correlation is significant at 0.05 significance level (2-tailed)

- According to the table, extraversion is significantly correlated with the other four factors of personality (Agreeableness, Conscientiousness, Neuroticism and Openness to experience) at 0.01 significance level. Extraversion has a weak positive correlation with

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agreeableness, conscientiousness and openness to experience (the values are 0.197, 0.258, 0.126 respectively) and a weak negative correlation with neuroticism (-0.307). Extraversion is also negatively and weakly correlated with C1 (Subjective sleep quality), C5 (Sleep disturbances), C6 (Use of sleeping medication), C7 (Daytime dysfunction) and Global PSQI Score of sleep quality. C1, C5, C7 and Global PSQI Score are correlated with extraversion at 0.01 significance level (the values are -0.181, -0.155, -0.276 and -0.206 respectively) while C6 is correlated at 0.05 significance level (-0.088).

- Much like extraversion, agreeableness is also significantly correlated with conscientiousness, neuroticism and openness to experience at 0.01 significance level and has a weak positive correlation with conscientiousness (0.266) and openness to experience (0.234) while has a weak negative correlation with neuroticism (-0.211). Agreeableness, similar to extraversion has a weak negative correlation with C1 (-0.112), C5 (-0.119), C7 (-0.114) and Global PSQI Score (-0.119) of sleep quality at 0.01 significance level.
- The next factor conscientiousness is also almost similar to extraversion and agreeableness and has a weak negative correlation with neuroticism (-0.263) at 0.01 significance level and a weak positive correlation with openness to experience (0.107) at 0.05 significance level. In case of the components of sleep quality, this factor is weakly and negatively correlated with C1 (-0.179), C5 (-0.144), C7 (-0.256) and Global PSQI Score (-0.205) at 0.01 significance level. Conscientiousness also has a weak negative correlation with C4 (-0.107) at 0.05 significance level.
- Unlike the previous three factors, neuroticism has a weak positive correlation with the components of sleep quality at 0.01 significance level. The factor is significantly correlated with C1 (0.186), C2 (0.191), C5 (0.268), C7 (0.31) and Global PSQI Score (0.269) of sleep quality. Neuroticism however has no significant correlation with Openness to experience.
- The last personality factor openness to experience, unlike all the other personality factors, does not have a significant correlation with any of the components of sleep quality.
- The first component of sleep quality (Subjective sleep quality) has a weak positive correlation with all the other components of sleep quality (the values are 0.384, 0.306, 0.266, 0.299, 0.165 and 0.28 for C2, C3, C4, C5, C6 and C7 respectively) at 0.01 significance level.
- Just like C1, C2 (Sleep latency) is also weakly and positively correlated with all the other components of sleep quality (the values are 0.168, 0.235, 0.287, 0.194 and 0.205 for C3, C4, C5, C6 and C7 respectively) at 0.01 significance level.
- The third component which is Sleep duration has a moderate positive correlation with C4 (0.473) and a weak positive correlation with C7 (0.16) at 0.01 level. It is also weakly and positively correlated with C5 (0.105) at 0.05 significance level.
- The fourth component, Habitual sleep efficiency has a weak positive correlation with C5 (0.099) at 0.05 significance level.
- C5 which is Sleep disturbances has a weak positive correlation with C6 (0.177) and C7 (0.263) at 0.01 significance level.
- C6 (Use of sleeping medication) and C7 (Daytime dysfunction) of sleep quality are weakly and positively correlated with each other (0.150) at 0.01 significance level.
- Lastly, the Global PSQI Score of sleep quality has a positive correlation with all the components of sleep quality at 0.01 significance level. It is moderately correlated with C1 (0.667), C2 (0.668), C3 (0.599), C4 (0.558), C5 (0.506) and C7 (0.555) of sleep quality. With the sixth component of sleep quality that is, Use of sleeping medication, the Global PSQI Score has a weak positive correlation (0.395).

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Before assessing the gender difference in the personality factors and components of sleep quality, Levene's test (F) had to be applied for each personality factors and components of sleep quality to determine whether to use parametric (t test) or non-parametric measure (Mann-Whitney U test) to assess the gender difference. If the obtained F value is significant at 0.05 significance level, a non-parametric statistic (Mann-Whitney U test) has to be used for that particular variable and if not significant at 0.05 level, then a parametric (t test) statistics is to be used.

**Table 5. Levene's statistics.**

Variables	F-value	Level of Significance
Extraversion	4.32	0.038*
Agreeableness	4.77	0.029*
Conscientiousness	0.01	0.912
Neuroticism	0.64	0.424
Openness to Experience	0.33	0.566
C1: Subjective sleep quality	0.59	0.444
C2: Sleep latency	2.78	0.096
C3: Sleep duration	5.41	0.020*
C4: Habitual sleep efficiency	13.86	0.000*
C5: Sleep disturbances	2.55	0.111
C6: Use of sleeping medication	2.06	0.151
C7: Daytime dysfunction	0.00	0.969
Global PSQI Score	6.37	0.012*

Note: \*. F-value is significant at 0.05 significance level (2-tailed)

Table 5 shows that there are five variables which have a significant F value at 0.05 level, these are extraversion (4.32), agreeableness (4.77), C3 (5.41), C4 (13.86) and the Global PSQI Score (6.37). A Mann-Whitney U test was applied for these five variables to assess the mean difference of male and female.

**Table 6. Independent sample t-test: assessing the difference between Males and Females.**

Variables	Gender	Mean	t	df	Level of Significance
Conscientiousness	Female	3.284	0.2	561.00	0.844
	Male	3.274			
Neuroticism	Female	3.433	6.49	561.00	0.000**
	Male	3.035			
Openness to experience	Female	3.726	1.04	561.00	0.297
	Male	3.680			
C1: Subjective sleep quality	Female	1.048	1.87	561.00	0.062
	Male	0.937			
C2: Sleep latency	Female	1.468	2.38	561.00	0.018*
	Male	1.260			
C5: Sleep disturbances	Female	1.208	0.58	561.00	0.565
	Male	1.170			
C6: Use of sleeping medication	Female	0.134	0.75	561.00	0.454
	Male	0.178			
C7: Daytime dysfunction	Female	1.058	1.92	561.00	0.055
	Male	0.911			

Note: \*\*. t-value is significant at 0.01 significance level (2-tailed)

\*. t-value is significant at 0.05 significance level (2-tailed)

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Independent sample t test was done to assess the difference between male and female. From table 6, it can be seen that only neuroticism and C2 (Sleep latency) have a significant t value which indicates that only these two have a significant difference in male and female.

- The t value of neuroticism is found to be 6.49 which is significant at 0.01 level. The means of male and female in the concerned domain shows a higher mean for females than that of the males.
- The t value for C2 is found to be 2.38 which is significant at 0.05 level and the mean values of male and female in this suggest a higher value of females than males.

**Table 7. Mann-Whitney U test: assessing the difference between Males and Females.**

Variables	Gender	Mean	z- value	p- value
<b>Extraversion</b>	Female	3.12		
	Male	3.19	1.34	0.180
<b>Agreeableness</b>	Female	3.83		
	Male	3.80	0.84	0.401
<b>C3: Sleep duration</b>	Female	1.09		
	Male	1.04	0.49	0.624
<b>C4: Habitual sleep efficiency</b>	Female	0.46		
	Male	0.31	1.92	0.055
<b>Global PSQI Score</b>	Female	6.44		
	Male	5.80	2.41	0.012*

Note: \*. z-value is significant at 0.05 significance level (2-tailed)

As mentioned earlier, Mann-Whitney U test was applied for extraversion, agreeableness, C3 (Sleep duration), C4 (Habitual sleep efficiency) and the Global PSQI Score. The table 7 shows that only Global PSQI Score has a significant z value (2.41) at 0.05 significance level. This indicates that among the five variables, only the Global PSQI Score has a significant difference between male and female and the means of male and female young adults in the concerned area shows that females have a higher mean value than their male counterparts.

Multiple regression analysis was applied to assess whether the five personality factors (Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness to experience) predict the components of sleep quality (Subjective sleep quality, Sleep latency, Sleep duration, Habitual sleep efficiency, Sleep disturbances, Use of sleeping medication, Daytime dysfunction and Global PSQI Score).

**Table 8.1. Regression Analysis (N=565) Criterion Variable: Component 1 (C1)- Subjective sleep quality.**

S. No.	Predictors	R	R-Square	Beta-value ( $\beta$ )	T	Level of Significance
1.	Extraversion	0.26	0.07	-0.18	-4.36	0.00**
2.	Agreeableness			-0.11	-2.67	0.008**
3.	Conscientiousness			-0.18	-4.31	0.000**
4.	Neuroticism			0.19	4.49	0.000**
5.	Openness to Experience			-0.01	-0.15	0.88

Note: \*\*.  $\beta$ -value is significant at 0.01 significance level (2-tailed)

Table 8.1 shows that the correlation of all the predictor variables (five personality factors) taken together with the criterion variable, that is, Subjective sleep quality (C1) is 0.26 (R)

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which is significant at 0.01 level. 7% of the variances occurring in the criterion variable is explained by the predictor variables (R square= 0.07). It is also observed in the table that four out of five predictor variables have a significant (0.01 significance level) influence on the changes occurring in the criterion variable. These variables are extraversion (Beta value= -0.18), agreeableness (Beta value= -0.11), conscientiousness (Beta value= -0.18) and neuroticism (Beta value= 0.19).

**Table 8.2. Regression Analysis (N=565) Criterion Variable: Component 2 (C2)- Sleep latency.**

S. No.	Predictors	R	R-Square	Beta-value ( $\beta$ )	T	Level of Significance
1.	Extraversion	0.2	0.04	-0.06	-1.42	0.155
2.	Agreeableness			-0.03	-0.59	0.552
3.	Conscientiousness			-0.07	-1.72	0.086
4.	Neuroticism			0.19	4.61	0**
5.	Openness to Experience			0.07	1.58	0.114

Note: \*\*.  $\beta$ -value is significant at 0.01 significance level (2-tailed)

Table 8.2 shows the correlation of all the predictor variables (five personality factors) together with Sleep latency (C2) to be 0.2 (R) which is also significant at 0.01 level. Only 4% of the variances in the criterion variable can be explained through the predictor variables as the R square is 0.04. The table also shows that only neuroticism has a significant influence (0.01 significance level) on the criterion variable (Beta value= 4.61).

**Table 8.3. Regression Analysis (N=565) Criterion Variable: Component 3 (C3)- Sleep duration.**

S. No.	Predictors	R	R-Square	Beta-value ( $\beta$ )	T	Level of Significance
1.	Extraversion	0.08	0.01	-0.07	-1.71	0.088
2.	Agreeableness			-0.04	-1.01	0.314
3.	Conscientiousness			-0.02	-0.38	0.705
4.	Neuroticism			0.03	0.83	0.409
5.	Openness to Experience			0.01	0.31	0.754

Table 8.3 shows the regression analysis of the five personality factors as the predictor variables and Sleep duration (C3) as the criterion variable. The correlation of all the predictor variables together with the criterion variable is shown to be 0.08 (R) which is not significant. Only 1% of the variances in sleep duration can be explained by the predictor variables as the R square value is found to be 0.01. The table also implies that none of the predictor variables have a significant influence on sleep duration as none of the Beta value is significant.

**Table 8.4. Regression Analysis (N=565) Criterion Variable: Component 4 (C4)- Habitual sleep efficiency.**

S. No.	Predictors	R	R-Square	Beta-value ( $\beta$ )	t	Level of Significance
1.	Extraversion	0.11	0.01	-0.01	-0.16	0.871
2.	Agreeableness			-0.02	-0.55	0.582
3.	Conscientiousness			-0.11	-2.56	0.011*

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S. No.	Predictors	R	R-Square	Beta-value ( $\beta$ )	t	Level of Significance
4.	Neuroticism			0.02	0.4	0.691
5.	Openness to Experience			-0.02	-0.54	0.588

Note: \*.  $\beta$ -value is significant at 0.05 significance level

The correlation of all the predictor variables, that is, the five personality factors together with Habitual sleep efficiency (C4) is observed from table 8.4 to be 0.11 which is not significant. Similar to C3, only 1% of the variances in Habitual sleep efficiency is explained by the predictor variables (R square= 0.01). The table also shows that only conscientiousness has a significant influence (at 0.05 level) on C4, the Beta value being -2.56.

**Table 8.5. Regression Analysis (N=565) Criterion Variable: Component 5 (C5)- Sleep disturbances.**

S. No.	Predictors	R	R-Square	Beta-value ( $\beta$ )	t	Level of Significance
1.	Extraversion	0.29	0.08	-0.16	-3.72	0**
2.	Agreeableness			-0.12	-2.83	0.005**
3.	Conscientiousness			-0.14	-3.45	0.001**
4.	Neuroticism			0.27	6.6	0**
5.	Openness to Experience			0	-0.07	0.942

Note: \*\*.  $\beta$ -value is significant at 0.01 significance level (2-tailed)

The correlation of the predictor variables together with Sleep disturbances (C5) according to the table 8.5 is 0.29 (R) and is significant at 0.01 level. 8% of the variance in the criterion variable is explained by the predictor variables as R square is found to be 0.08 from the table. Just like C1, sleep disturbance is significantly influenced (at 0.01 significance level) by extraversion (Beta value= -3.72), agreeableness (Beta value= -2.83), conscientiousness (Beta value= -3.45) and neuroticism (Beta value= 6.6).

**Table 8.6. Regression Analysis (N=565) Criterion Variable: Component 6 (C6)- Use of sleeping medication.**

S. No.	Predictors	R	R-Square	Beta-value ( $\beta$ )	t	Level of Significance
1.	Extraversion	0.11	0.01	-0.09	-2.11	0.036*
2.	Agreeableness			-0.07	-1.67	0.095
3.	Conscientiousness			-0.06	-1.42	0.157
4.	Neuroticism			0.07	1.57	0.118
5.	Openness to Experience			-0.03	-0.64	0.522

Note: \*.  $\beta$ -value is significant at 0.05 significance level (2-tailed)

The use of sleeping medications (C6) as a criterion variable has a non-significant correlation coefficient of 0.11 (R) with all the predictor variables together. The table 8.6 also reveals that only 1% of the variances in C6 is explained by the predictor variables (R square= 0.01) and only extraversion has a significant influence (at 0.05 level) on this component (Beta value= -2.11).

**Table 8.7. Regression Analysis (N=565) Criterion Variable: Component 7 (C7)- Daytime dysfunction.**

S. No.	Predictors	R	R-Square	Beta-value ( $\beta$ )	t	Level of Significance
1.	Extraversion	0.4	0.16	-0.28	-6.82	0**
2.	Agreeableness			-0.11	-2.72	0.007**
3.	Conscientiousness			-0.26	-6.27	0**
4.	Neuroticism			0.31	7.74	0**
5.	Openness to Experience			0.05	1.16	0.247

Note: \*\*.  $\beta$ -value is significant at 0.01 significance level (2-tailed)

C7 which is Daytime dysfunction as a criterion variable is significantly correlated with all the predictor variables together (R= 0.4) and 16% of the variances in this component is explained by the predictor variables (R square being 0.16). It is also obtained from the table 8.7 that all the predictor variables except openness to experience have a significant influence (at 0.01 level) on daytime dysfunction and the Beta values are -0.28, -0.11, -0.26 and 0.31 for extraversion, agreeableness, conscientiousness and neuroticism respectively.

**Table 8.8. Regression Analysis (N=565) Criterion Variable: Global PSQI Score.**

S. No.	Predictors	R	R-Square	Beta-value ( $\beta$ )	t	Level of Significance
1.	Extraversion	0.33	0.11	-0.21	-5	0.000**
2.	Agreeableness			-0.12	-2.83	0.005**
3.	Conscientiousness			-0.21	-4.97	0.000**
4.	Neuroticism			0.27	6.62	0**
5.	Openness to Experience			0.03	0.64	0.521

Note: \*\*.  $\beta$ -value is significant at 0.01 significance level (2-tailed)

The global PSQI Score of sleep quality has a significant correlation with all the predictor variables (five personality factors) together at 0.01 significance level (R= 0.33). Table 8.8 also shows that 11% of the variances in Global PSQI Score can be explained by the predictor variables (R square= 0.11) and all the predictor variables except openness to experience have a significant influence (at 0.01 significance level) on Global PSQI Score of sleep quality where the Beta values are -0.21, -0.12, -0.21 and 0.27 for extraversion, agreeableness, conscientiousness and neuroticism respectively.

## DISCUSSION

The aim of the present study was to assess the relationship between the big five factors of personality and the domains of sleep quality among the young adults, of West Bengal, and to examine whether the males and females of the concerned sample differ significantly in terms of personality factors and sleeping patterns, respectively.

To address the above-mentioned purposes the following tools were used:

- The Big Five Inventory (BFI) (John, Donahue and Kentle, 1991).
- The Pittsburgh Sleep Quality Index (PSQI) (Buysse, Reynolds III, Monk, Berman and Kupfer, 1988).

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Individual responses were analyzed and the obtained results were noted in a tabular format in the section mentioned above.

From table 3.1 it can be seen that the mean of the present sample (N=565) for the domains of extraversion (E), conscientious (C) and neuroticism (N), are 3.15, 3.28 and 3.24 respectively. Hence, the present sample indicate moderate levels of the afore-mentioned domains and possess average levels of gregariousness, assertiveness, warmth (facets of extraversion); competent, self-discipline, dutifulness (facets of conscientiousness); anxiety, self-consciousness and impulsiveness (facets of neuroticism). The mean values in case of the domains of agreeableness (A) and openness to experience (O), as far as the present sample is concerned, was obtained to be 3.82 and 3.71 respectively. Thus, the present sample indicate slightly above average levels of agreeableness and openness to experience and thus, possess respective levels of trait adjectives such as altruism compliance modesty (facets of conscientiousness); aesthetic, values and ideas (facets of openness to experience).

The Standard Error (SE) is an indication of the reliability of the mean and a small SE value would indicate that the sample mean is more accurate reflection of the actual population mean. Table 3.1 shows that the SE of mean for the five factors of personality, that is, Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness to experience are considerably low. Hence, it is safe to assume that the means of the five factors are more or less accurate reflection of the actual population mean.

The Standard Deviation (SD) indicates the consistency among the scores. Lower SD indicates more of a consistent score in the respective field. The SD values of the five personality factors (Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness to experience) indicate that openness to experience has the most consistent or least diverse scores among all the personality factors followed by agreeableness. In case of extraversion and conscientiousness, scores are more inconsistent or diverse, and the most diverse scores are found in the domain of neuroticism where the SD value is observed to be highest among all the personality factors.

The mean values of C1 (Subjective sleep quality), C3 (Sleep duration), C4 (Habitual sleep efficiency), C5 (Sleep disturbances), C6 (Use of sleeping medication) and C7 (Daytime dysfunction) of sleep quality was obtained to be 1, 1.06, 0.39, 1.19, 0.16, and 0.99, respectively. The low values of the mentioned domains indicate that the present sample experience fairly decent subjective sleep quality, longer sleep duration, better sleep efficiency, minor sleep disturbance, less use of sleep medication and lesser daytime dysfunction, respectively. For C2 (Sleep latency) of sleep quality, the mean value was found to be 1.37, which indicates moderate levels of sleep latency. The mean value for the domain of Global PSQI Score was calculated to be 6.15. Thus, from the respective values we can infer that the present sample experiences fairly poor quality of sleep.

The Standard Error (SE) of mean for the components of sleep quality, that is, Subjective sleep quality (C1), Sleep latency (C2), Sleep duration (C3), Habitual sleep efficiency (C4), Sleep disturbances (C5), Use of sleeping medication (C6), Daytime dysfunction (C7) and the Global PSQI Score were found to be 0.03, 0.04, 0.04, 0.03, 0.02, 0.03, 0.03 and 0.13 respectively. Considering the low value of SE, it can be stated that the mean of the sample is more or less an accurate reflection of the actual population mean.

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Next the Standard Deviation (SD) for the components of sleep quality (C1, C2, C3, C4, C5, C6, C7) and Global PSQI Score are 0.71, 1.04, 0.89, 0.77, 0.57, 0.60, 0.91 and 3.16 respectively. The values indicate that the Global PSQI Scores are much diverse than the scores in all the components of sleep quality and in general. This diversity can be explained through the wider range of scores possible in this domain (0-21). The SD value of Global PSQI Score is followed by the SD value of C2 which is higher than 1, indicating much diversity in the scores. The SD values of C3 and C7 is closer to 0.9 which again is pretty high and signifies much diversity in the scores. Next, the SD values of C1 and C4 is almost closer to 0.7 and hence these two components have moderately diverse scores. Lastly, C5 and C6 possesses lower SD value than all the other components and the values are almost 0.6 which indicates lower diversity among the scores. In general, it can be interpreted that all the components of sleep quality possess more or less diverse scores due to the large sample size (N= 565).

Table 4 shows that the personality factor of extraversion (E) is significantly correlated with the other four personality traits, namely, agreeableness (A), conscientiousness (C), neuroticism (N) and openness to experience (O), respectively. Extraversion is significantly correlated with component 1 (subjective sleep quality, component 5 (sleep disturbances), component 6 (use of sleeping medication), component 7 (daytime dysfunction) and global PSQI score of sleep quality, respectively.

- The correlation coefficient ( $r$ ) between extraversion and agreeableness ( $r= 0.197$ ) indicates that there is a weak positive correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high in the domain of extraversion and possessing high levels of the respective trait adjectives such as of gregarious, assertiveness, activeness, warmth and positive emotions, may score high on agreeableness and possess high levels of compliance, modesty, trust, altruism, and straight-forwardness, and vice versa.
- The correlation coefficient ( $r$ ) between extraversion and conscientiousness ( $r= 0.258$ ) indicates that there is a weak positive correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high in the domain of extraversion and possessing high levels of gregarious, assertiveness, activeness, warmth and positive emotions, may score high on the personality factor of conscientiousness, thus possessing high levels of competence, orderliness, dutifulness, self-discipline and deliberation, and vice versa.
- The correlation coefficient ( $r$ ) between extraversion and neuroticism ( $r= -0.307$ ) indicates that there is a weak negative correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high in the domain of extraversion and possessing high levels of the respective trait adjectives, may possess low levels of traits of neuroticism, such as, anxiety, impulsiveness, vulnerability and self-consciousness, and vice versa.
- The correlation coefficient ( $r$ ) between extraversion and openness to experience ( $r= 0.126$ ) indicates that there is a weak positive correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high in the domain of extraversion and thereby, possessing high levels of gregarious, assertiveness, activeness, warmth and positive emotions, may score high on openness to experience, thereby, possessing high levels of feelings, aesthetics, values, fantasy and ideas, and vice versa.
- The correlation coefficient ( $r$ ) between extraversion and component 1, i.e., subjective sleep quality ( $r= -0.181$ ) indicates that there is a weak negative correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus,

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an individual scoring high in the domain of extraversion and possessing respective levels of the trait adjectives, may score low on the domain of subjective sleep quality, thereby, indicating a good quality of sleep, and vice versa.

- The correlation coefficient ( $r$ ) between extraversion and component 5, i.e., sleep disturbances ( $r = -0.155$ ) indicates that there is a weak negative correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high in the domain of extraversion may score low on the component of sleep disturbance, thereby, experiencing less disturbance and acquiring a good quality of sleep, and vice versa.
- The correlation coefficient ( $r$ ) between extraversion and component 6, i.e., use of sleeping medication ( $r = -0.181$ ) indicates that there is a weak negative correlation between the two mentioned variables which is significant at 0.05 level of significance. Thus, an individual possessing high levels of gregarious, assertiveness, activeness, warmth and positive emotions, may require less or no use of medication to fall asleep, thus indicating a healthy quality of sleep, and vice versa.
- The correlation coefficient ( $r$ ) between extraversion and component 7, i.e., daytime dysfunction ( $r = -0.181$ ) indicates that there is a weak negative correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual possessing high levels of the trait adjectives of extraversion may experience lower levels of daytime dysfunction. In other words, such individuals may have no trouble in staying awake while driving, eating meals or engaging in social activities, and also face less or no problem in keeping up their enthusiasm enough to get things done, and vice versa.
- The correlation coefficient ( $r$ ) between extraversion and the global PSQI score ( $r = -0.206$ ) indicates that there is a weak negative correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high in the domain of extraversion may be found to acquire a low global PSQI score, thereby indicating low levels of sleep related problems, and a better level of sleep quality, and vice versa.

Hence, the null hypothesis ( $H_{01}$ ) is rejected, and the alternative hypothesis ( $H_{a1}$ ) is accepted. Agreeableness (A) is significantly correlated with the other four personality traits of extraversion (E), conscientiousness (C), neuroticism (N) and openness to experience (O), respectively. The personality factor of agreeableness is significantly correlated with component 1 (subjective sleep quality), component 5 (sleep disturbances), component 7 (daytime dysfunction) and global PSQI score of sleep quality, respectively.

- The correlation coefficient ( $r$ ) between agreeableness and conscientiousness ( $r = 0.266$ ) indicates that there is a weak positive correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high on agreeableness and possessing high levels of compliance, modesty, trust, altruism, and straight-forwardness, may also score high on the personality factor of conscientiousness, thus possessing high levels of competence, orderliness, dutifulness, self-discipline and deliberation, and vice versa.
- The correlation coefficient ( $r$ ) between agreeableness and neuroticism ( $r = -0.211$ ) indicates that there exists a weak negative correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual possessing high levels of compliance, modesty, trust, altruism, and straight-forwardness may possess low levels of traits of neuroticism, such as, anxiety, impulsiveness, vulnerability and self-consciousness, and vice versa.

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- The correlation coefficient ( $r$ ) between agreeableness and openness to experience ( $r=0.234$ ) indicates that there is a weak positive correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high on agreeableness and possessing high levels of the respective trait adjectives may score high on openness to experience, thereby, possessing high levels of feelings, aesthetics, values, fantasy and ideas, and vice versa.
- The correlation coefficient ( $r$ ) between agreeableness and component 1, i.e., subjective sleep quality ( $r=-0.112$ ) indicates that there is a weak negative correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high on agreeableness and possessing high levels of compliance, modesty, trust, altruism, and straight-forwardness may score low on the domain of subjective sleep quality, thereby, experiencing a healthy quality of sleep, and vice versa.
- The correlation coefficient ( $r$ ) between agreeableness and component 5, i.e., sleep disturbances ( $r=-0.234$ ) indicates that there is a weak negative correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high in the domain of agreeableness may score low on the component of sleep disturbances, thereby, experiencing less interruptions and acquiring a good quality of sleep, and vice versa.
- The correlation coefficient ( $r$ ) between agreeableness and component 7, i.e., daytime dysfunction ( $r=-0.181$ ) indicates that there is a weak negative correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual possessing high levels of compliance, modesty, trust, altruism, and straight-forwardness may experience lower levels of daytime dysfunctions, and vice versa.
- The correlation coefficient ( $r$ ) between agreeableness and the global PSQI score ( $r=-0.119$ ) indicates that there is a weak negative correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high on agreeableness may be found to acquire a low global PSQI score, thereby indicating low levels of sleep related problems, and a better level of sleep quality, and vice versa.

Hence, the null hypothesis ( $H_{01}$ ) is rejected, and the alternative hypothesis ( $H_{a1}$ ) is accepted. The personality factor of conscientiousness (C) is significantly correlated with extraversion (E), agreeableness (A), neuroticism (N) and openness to experience (O), respectively. The mentioned domain is significantly correlated with component 1 (subjective sleep quality), component 4 (habitual sleep efficiency), component 5 (sleep disturbances), component 7 (daytime dysfunction) and global PSQI score of sleep quality, respectively.

- The correlation coefficient ( $r$ ) between conscientiousness and neuroticism ( $r=-0.263$ ) indicates that there is a weak negative correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high on conscientiousness and possessing high levels of competence, orderliness, dutifulness, self-discipline and deliberation. may possess low levels of traits of neuroticism, such as, anxiety, impulsiveness, vulnerability and self-consciousness, and vice versa.
- The correlation coefficient ( $r$ ) between conscientiousness and openness to experience ( $r=0.107$ ) indicates that there is a weak positive correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high in the domain of conscientiousness may score high on openness to experience, thereby, possessing high levels of feelings, aesthetics, values, fantasy and ideas, and vice versa.

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- The correlation coefficient ( $r$ ) between conscientiousness and component 1, i.e., subjective sleep quality ( $r = -0.179$ ) indicates that there is a weak negative correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual possessing high levels of the trait adjectives of conscientiousness, may score low on the domain of subjective sleep quality, thereby, experiencing a good quality of sleep, and vice versa.
- The correlation coefficient ( $r$ ) between conscientiousness and component 4, i.e., habitual sleep efficiency ( $r = -0.107$ ) indicates that there is a weak negative correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high on conscientiousness may score low on the component of habitual sleep efficiency, thereby indicating that the difference in her total sleep time and time in bed is less, which results in a good sleep quality, and vice versa.
- The correlation coefficient ( $r$ ) between conscientiousness and component 5, i.e., sleep disturbances ( $r = -0.144$ ) indicates that there is a weak negative correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high on conscientiousness may score low on the component of sleep disturbances, thereby, experiencing less interruptions during his/her sleep, and vice versa.
- The correlation coefficient ( $r$ ) between conscientiousness and component 7, i.e., daytime dysfunction ( $r = -0.256$ ) indicates that there is a weak negative correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual possessing high levels of competence, orderliness, dutifulness, self-discipline and deliberation may experience lower levels of daytime dysfunctions, i.e., have no trouble in staying awake while driving, eating meals or engaging in daily life activities, and vice versa.
- The correlation coefficient ( $r$ ) between conscientiousness and the global PSQI score ( $r = -0.205$ ) indicates that there is a weak negative correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high on conscientiousness may be found to acquire a low global PSQI score, thereby indicating low levels of sleep related problems, and a better level of sleep quality, and vice versa.

Hence, the null hypothesis ( $H_{01}$ ) is rejected, and the alternative hypothesis ( $H_{a1}$ ) is accepted. Neuroticism (N) is found to bear a significant correlation with the personality factors of extraversion (E), agreeableness (A) and conscientiousness (C), but not with that of openness to experience (O). It is significantly correlated with component 1 (subjective sleep quality), component 2 (sleep latency), component 5 (sleep disturbances), component 7 (daytime dysfunction) and global PSQI score of sleep quality, respectively.

- The correlation coefficient ( $r$ ) between neuroticism and component 1, i.e., subjective sleep quality ( $r = 0.186$ ) indicates that there is a weak positive correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high in the domain of neuroticism and possessing respective levels of the trait adjectives such as anxiety, impulsiveness, vulnerability and self-consciousness, may score high on the domain of subjective sleep quality, thereby, indicating a bad quality of sleep, and vice versa.
- The correlation coefficient ( $r$ ) between neuroticism and component 2, i.e., sleep latency ( $r = 0.191$ ) indicates that there is a weak positive correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high in the domain of neuroticism and possessing respective levels

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of the trait adjectives, may score high on the domain of sleep latency, thereby, thereby indicating that he/she experiences less or no trouble in falling asleep which results in a good sleep quality, and vice versa.

- The correlation coefficient ( $r$ ) between neuroticism and component 5, i.e., sleep disturbances ( $r= 0.268$ ) indicates that there is a weak positive correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high in the domain of neuroticism may score high on the component of sleep disturbances, thereby, experiencing more interruptions during his/her sleep, and vice versa.
- The correlation coefficient ( $r$ ) between neuroticism and component 7, i.e., daytime dysfunction ( $r= -0.31$ ) indicates that there is a weak positive correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual possessing high levels of the trait adjectives of neuroticism may experience high levels of daytime dysfunction, and vice versa.
- The correlation coefficient ( $r$ ) between neuroticism and the global PSQI score ( $r= -0.269$ ) indicates that there is a weak positive correlation between the two mentioned variables which is significant at 0.01 level of significance. Thus, an individual scoring high in the personality factor of neuroticism may be found to acquire a high global PSQI score, thereby indicating high levels of sleep related problems, and a bad level of sleep quality, and vice versa.

Hence, the null hypothesis ( $H_{01}$ ) is rejected, and the alternative hypothesis ( $H_{a1}$ ) is accepted. The personality factor of openness to experience (O) is significantly correlated with the domains of extraversion (E) agreeableness (A) and conscientiousness (C), respectively, but not with that of neuroticism (N). No significant correlation exists between the domain of openness to experience and the components of sleep quality whatsoever.

Hence, the null hypothesis ( $H_{01}$ ) is accepted, and the alternative hypothesis ( $H_{a1}$ ) is rejected. The table 4 shows that C1 (Subjective sleep quality) has a weak positive correlation with all the other components of sleep quality (Sleep latency, Sleep duration, Habitual sleep efficiency, Sleep disturbances, Use of sleeping medication and Daytime dysfunction) at 0.01 significance level. This indicates that if an individual scores high on C1 (indicating poor sleep quality), he/she might also score

- High on C2 that indicates more time taken to fall asleep at night
- High on C3 indicating lesser sleep at night
- High on C4 which leads to less efficient sleep
- High on C5 meaning more disturbance of sleep at night
- High on C6 that indicates more use of medication for sleep and
- High on C7 indicating more levels of daytime dysfunction such as trouble in staying awake, trouble in keeping up the enthusiasm in work etc. and vice versa.

The second component of sleep quality which is Sleep latency is found to have a weak positive correlation with all the other components of sleep quality (C3, C4, C5, C6 and C7) at 0.01 significance level, just like C1. Similar to C1, if an individual scores high on C2, that is, longer time taken to fall asleep at night, he/she might score high on the other components as well leading to the characteristics mentioned in the previous paragraph and vice versa.

Now the next component Sleep duration (C3), unlike the previous components is not significantly correlated with all the other components of sleep quality.

- The table shows that it has a moderately positive correlation with C4 (Habitual sleep efficiency) at 0.01 significance level that indicates a lesser efficient sleep at night

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(higher score on C4) when the duration of sleep is less (higher score on C3) and vice versa.

- C3 also has a weak positive correlation with C5 (Sleep disturbances) at 0.05 significance level and lesser duration of sleep (higher score on C3) might lead to more disturbance during the whole sleeping process (higher score on C5) and vice versa.
- C3 is also weakly and positively correlated with C7 (Daytime dysfunction) at 0.01 significance level. This might imply that lesser duration of sleep (higher score on C3) might lead to more dysfunction during the day (higher score on C7) like trouble staying awake while working or trouble to keep the enthusiasm to any work etc. and vice versa.

The Habitual sleep efficiency which is the fourth component of sleep quality is found to have a very weak positive correlation with C5 (Sleep disturbances) at 0.05 significance level. This implies that lesser efficient sleep at night (higher score on C4) might be associated with more disturbance during sleep (higher score on C5) and vice versa.

The fifth component, Sleep disturbances is observed to have a weak positive correlation with the remaining two factors, that is, Use of sleeping medication (C6) and Daytime dysfunction (C7) at 0.01 significance level. So, more disturbance during sleep at night (higher score on C5) might be related to more use of medication for sleep (higher score on C6) and more dysfunction at daytime (higher score on C7) and vice versa.

C6 (Use of sleeping medications) and C7 (Daytime dysfunction) is observed to be weakly and positively correlated with each other at 0.01 significance level indicating more dysfunction at daytime (higher score on C7) when an individual uses more medication for sleep (higher score on C6) and vice versa.

The Global PSQI Score as mentioned above has a weak positive correlation with the first three factors of BFI, that is, extraversion (E), agreeableness (A) and conscientiousness (C) and is found to have a weak negative correlation with neuroticism (N) at 0.01 significance level. Now in case of the components of sleep quality, it is observed that the Global PSQI Score which is the sum total of all the components of sleep quality has a moderate positive correlation with C1 (Subjective sleep quality), C2 (Sleep latency), C3 (Sleep duration), C4 (Habitual sleep efficiency), C5 (Sleep disturbances) and C7 (Daytime dysfunction) at 0.01 significance level. With C6 that is, Use of sleeping medication, Global PSQI Score has a weak positive correlation at 0.01 significance level. Thus, higher score in C1 (indicating poorer quality of sleep), C2 (indicating more time taken to fall asleep), C3 (indicating lesser duration of sleep), C4 (indicating less efficient sleep), C5 (indicating more disturbance of sleep), C6 (indicating more usage of sleeping medications) and C7 (indicating more dysfunction during the day) might also lead to higher score on the Global PSQI Score (indicating poorer quality of sleep in general) and vice versa.

Women and men tend to possess considerably distinctive biological roles as far as the propagation of the species is considered. Whether or not, they tend to differ in their behavioral, or rather, psychological mannerisms, is a matter of research and study.

From table 6, it can be seen that the obtained t value for the domain of neuroticism is 6.49, which is significant at 0.01 level of significance. The respective mean values of male and female young adults, in case of this domain, shows that the mean of the latter is greater than that of the former. This indicates that female young adults possess higher levels of trait adjectives such as anxiety, anger, self-consciousness, impulsiveness and vulnerability, and

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are also more prone to depression, than their male counterparts. Studies conducted Costa, Terracciano and McCrae (2001) and Weisberg, DeYoung and Hirsch (2011) support the findings of the present study. As BFI is a self-report inventory in which the participants rated themselves according to their own perception of the self, the difference in the gender-based expression for the personality factor of neuroticism may have taken place because of the fact that, in our society, females are encouraged to be more expressive of their emotions and, males, on the other hand, are motivated to prevent themselves from expressing their felt emotions (aggression being the only exception). Hence, this societal stereotype, over the years, may have been deeply incorporated into the judgement patterns of both, the males and females, resulting in them perceiving themselves as accordingly and, thus, creating a gender difference.

Hence, the null hypothesis ( $H_{02}$ ) is rejected, and the alternative hypothesis ( $H_{a2}$ ) is accepted. In case of C2 (Sleep latency), the obtained t value is 2.38 which is significant at 0.05 significance level. From table 6, it is evident that the mean value of female young adults is greater than that of the male young adults, indicating that females in this study takes longer time to fall asleep than their male counterparts.

From the Mann-Whitney U test, it was observed that only the Global PSQI Score of sleep quality had a significant z value. Hence, there exists a significant difference between male and female young adults in terms of the aggregate sleep quality. From table 7, the mean value of female young adults is found to be greater than male young adults in this field indicating poorer sleep quality of female young adults than male young adults. The present findings are in line with the studies conducted by Hinz, Glaesmer, Brähler, Löffler, Engel, Enzenbach, Hegerl and Sander (2017), Tang, J., Liao, Y., Kelly, B. C., Xie, L., Xiang, Y. T., Qi, C., & Chen, X, (2017), and, Galland, Gray, Penno, Smith, Lobb and Taylor (2017) each of which indicate that females possess poorer sleep quality than males, as indicated by their global PSQI scores.

Hence, the null hypothesis ( $H_{03}$ ) is rejected, and the alternative hypothesis ( $H_{a3}$ ) is accepted. The difference between the means of male and that of female for the domains of extraversion (E), agreeableness (A), conscientiousness (C) and openness to experience (O) is not significant, as can be inferred from the obtained t values and z values, respectively. This implies that the male and female young adults of the present study possess more or less similar strengths of extraversion (E), agreeableness (A), conscientiousness (C) and openness to experience (O) at the facet level.

Hence, the null hypothesis ( $H_{02}$ ) is accepted, and the alternative hypothesis ( $H_{a2}$ ) is rejected. Note: It should be kept in mind that the present study is conducted to examine, whether or not, there is any existing difference in the personality traits and sleeping qualities of males and females. By and large, the researchers of this study support equality between all genders in every sphere of life.

In case of C1 (Subjective sleep quality), C3 (Sleep duration), C4 (Habitual sleep efficiency), C5 (Sleep disturbances), C6 (Use of sleeping medication), and C7 (Daytime dysfunction), the obtained t values and z values respectively, indicate that the males and females of the present study do not differ significantly with respect to the mentioned components of sleep quality. Hence, it can be said that, the two concerned groups (male and female young adults) rank close enough in terms of subjective sleep quality, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication and daytime dysfunction, respectively.

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Three, out of the five, factors of personality have been found to predict sleep quality to a considerable extent, the three factors been extraversion (E), conscientious (C) and neuroticism (N). Each of the mentioned factors predict five, out of eight, components of sleep quality.

- Extraversion (E) has been found to be a predictor variable to subjective sleep quality, sleep disturbances, use of sleeping medication, daytime dysfunction and global PSQI score. Since, a weak negative correlation has been obtained between the score of extraversion and that of the respective domains of sleep quality, it can be said that the young adults of West Bengal are less prone to experience a bad quality of sleep if they identify themselves as being sociable, adventurous, enthusiastic energetic and outgoing.
- Conscientiousness (C) has been found to be a predictor variable to subjective sleep quality, habitual sleep efficiency, sleep disturbances, daytime dysfunction and global PSQI score. Since, of weak negative correlation has been obtained between the score conscientiousness and that of the respective domains of sleep quality, it can be said that the young adults of West Bengal are less prone to experience a bad quality of sleep if they identify themselves as being efficient, organized, achievement striving, self-disciplined and dutiful.
- The personality factor of neuroticism (N) has been found to be a predictor variable to subjective sleep quality, sleep latency, sleep disturbances, daytime dysfunction and global PSQI score. Since, a weak positive correlation has been obtained between the score neuroticism and that of the mentioned domains of sleep quality, it can be said that the young adults of West Bengal, scoring high on neuroticism may also score high on the mentioned domains of sleep quality, thus, experiencing a poor quality of sleep which might be result of being tensed, irritable, shy, moody, vulnerable and depressed.

The personality factor of agreeableness (A) has been found to predict four, out of eight, components of sleep quality, namely, subjective sleep quality, sleep disturbances, daytime dysfunction and global PSQI score. Since, a weak negative correlation has been obtained between the score agreeableness and that of the respective domains of sleep quality, it can be said that the young adults of West Bengal are less prone to experience a bad quality of sleep if they identify themselves as being warm, forgiving, compliant, sympathetic and modest.

Hence, the null hypothesis is rejected ( $H_{04}$ ), and the alternative hypothesis ( $H_{a4}$ ) is accepted.

### ***Limitation of this study:***

Despite taking various precautions, there are some unavoidable limitations to this study that are described below-

- The participants for this research were chosen from a particular state of India (West Bengal). Hence, the obtained findings of this research cannot be generalized to populations outside of West Bengal.
- The participants were approached based on a Convenience Sampling Method, which means samples were chosen according to the convenience of the researcher and thus, is not a proper representation of the whole population.
- The tools used in this research process (BFI and PSQI) are both Self Report type where the subject himself/herself has to assess and report. Hence, the data given might not represent exact feeling of the concerned individual.
- Lack of qualitative analysis in this study can be another limitation.
- Due to the unavoidable circumstances, the data collection process had to be done online which might lead to lack of concentration from the participant's side.

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- The correlational study was done only on the young adult individuals aging from 18 years to 25 years and thus the findings cannot be generalized on other age groups.
- As the collected data mostly consisted of only male and female young adults, the obtained findings cannot be safely generalized to individuals belonging to LGBTQ+ community.

### **Scope for further research-**

- Significant results with a greater accuracy might be obtained if the sample size is increased.
- The study can be extended by incorporating a wider variety of demographic and geographical area.
- Individuals, not only comprising of the young adults, but other stages of life as well (for example- adolescents, middle and late adults and older adults) can be included in the sample to extend the scope of the study.
- Mixed method of data collection, i.e., qualitative along with quantitative methods can be applied to gain a deeper understanding of the relationship between the variables under study.
- Gender identity is not limited to males and females, only. Hence, samples can be made such as to include different sections representing the LGBTQ+ community as well, so as to study the relevant gender differences among the different genders with respect to the variables under study.

## **CONCLUSION**

So far as the major objectives of the present study are considered, the findings, thus obtained, can be concluded as follows-

1. All the domains of big five factors of personality (i.e., Extraversion, Agreeableness, Conscientiousness, Neuroticism), except that of Openness to experience (O) are significantly correlated to component 1 (subjective sleep quality), component 5 (sleep disturbances), and the global PSQI score of sleep quality, respectively.
2. The domain of openness to experience (O), of big five factors of personality, shows no significant correlation with any of the components of sleep quality.
3. There is a significant gender difference between males and females with respect to the domain of neuroticism (N). Young adult females are found to possess higher levels of neurotic traits than young adult males, at least, when the facet level of neuroticism is considered.
4. Significant gender differences exist among male and female young adults, in terms of component 2, i.e., sleep latency, and global PSQI score of sleep quality. Young adult females, on an average, experience poorer quality of sleep than young adult males, especially with respect to sleep latency.

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