Association of Vagally Mediated Heart Rate Variability at Work With Exhaustion: The Importance of Trait Neuroticism

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Abstract: Vagally mediated heart rate variability (HRV) is a measure of parasympathetic modulation of the heart, which is considered an index of the ability to regulate emotional arousal attuned to environmental demands. The present study explores the association between HRV and exhaustion—the core symptom of burnout. Based on the multilevel model of employee well-being, we hypothesize that neuroticism moderates the relationship between HRV and exhaustion. We collected data among 271 workers (57.92% women, mean age M = 41.21 years, SD = 13.94), whose HRV was measured over the course of one working day, while exhaustion was measured at the end of the same working day. Neuroticism and covariates were measured at baseline, prior to the examined working day. Results from multiple linear regression models revealed that HRV was negatively related to exhaustion, even after controlling for exhaustion measured at baseline. In addition, as hypothesized, trait neuroticism moderated the negative association between HRV and exhaustion at the end of the working day such that it was stronger for workers high (i.e., +1 SD) versus low (i.e., −1 SD) in neuroticism. The test for constant variance pointed to high-neuroticism workers with low HRV as the group more at-risk of developing exhaustion-related symptoms. We discuss the theoretical and practical implications of these findings.

Keywords: Bipolar Disorder, Theory Human Caring, Nursing Care, Case Report

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INTRODUCTION

Bipolar disorder (BD) is known to be a mood disorder, leading to impairment and disability in the fields of occupational, social functioning, and interpersonal relationships (Sahin, 2019; Miller, 2020). The manic and depressive episodes inherent in the disorder complicate the quality of life, psychosocial functionality, and treatment compliance of individuals diagnosed with BD (Bonnín et al., 2019; Harmanci & Yildiz, 2023). Nursing interventions are aimed at eliminating or alleviating the symptoms identified, depending on the episode (depressive or manic) (Juczynski & Adamiak, 2005; Kowalewski et al., 2021). Planning nursing care according to the nursing theory and model in these periods can enhance the quality of care by providing a holistic perspective (Akbas & Yigitoglu, 2020). Furthermore, studies conducted by utilising the nursing theory and model contribute scientifically to the nursing profession and allow for the development of nursing practices (Nash, 2015).

Watson's Theory Human Care (THC) emphasises the significance of personal authenticity and experiences by recognising experimental, aesthetic, ethical, and personal ways of knowing (Melton, 2016). The theory of human caring is based on delivering quality care to the patient and maintaining communication with the patient (Park et al., 2013). This theory states that the use of "caring behaviours" in nursing care and practices such as listening carefully to the individual, establishing eye contact, being receptive and accessible, delivering individual-centred care, calling the individual by name, giving information, and paying attention to cultural differences build a trust relationship and enable the adaptation of the patient to the clinic. Cooperation is achieved with the patient, who becomes adapted to the clinic, and the patient is enabled to change and improve himself (Watson, 2002). The values related to human caring: (respect, accepting the power of human development and change, preserving human dignity, attaching importance to the relationship with the nurse and other people, and being a good listener) and the philosophy of psychiatric nursing (being respectful, recognising the potential for change and development of each individual, being whole with the biopsychosocial domains of each individual, being a good listener, allowing the patient to explain their feelings, inspiring hope, and establishing a therapeutic relationship) in THC go in harmony with each other (Alligood & Tomey, 2010; Arslan-Ozkan & Okumus, 2012; Durgun-Ozan & Okumus, 2017). Therefore, it is important for psychiatric nurses and student nurses to care using this theory in terms of both the adaptation of the theory to the clinic, the professionalisation of the profession, and the scientific basis of care.Studies conducted using THC have revealed that the theory will be useful for nurses to deliver more effective and conscious care. Durgun-Ozan & Okumus (2017) investigated the effect of nursing care based on Watson's Theory of Human Caring on the anxiety, coping, and infertility effects of women who

failed infertility treatment. The results of the study indicated that nursing care alleviated women's anxiety and infertility effects and increased their use of effective stress-coping methods during the infertility treatment and when the treatment failed (Durgun-Ozan & Okumus, 2017). Another study reported that using this theory for an individual diagnosed with chronic obstructive pulmonary disease (COPD) was very useful for the individual, and the care and training provided improved the treatment's effectiveness and enhanced the recovery process's effectiveness (Koksal & Durgun, 2022). The study conducted by Aktas et al., (2020) with an individual diagnosed with schizophrenia, concluded that the theory allows the nurses to listen to the patient as an individual and allows the patient to express positive or negative emotions and cope with these emotions.

According to the literature review, no study in which THC was used in the care process of individuals diagnosed with bipolar disorder who were treated in psychiatric clinics has been found. Based on this finding, the present case report aimed to use THC in the nursing care process of an individual diagnosed with bipolar affective disorder who was being treated in a closed psychiatry ward. The present case report aimed to close the gap in the literature on psychiatric nursing and to make a significant contribution to the literature. Therefore, THC was used in the nursing process of an individual diagnosed with bipolar affective disorder in the closed psychiatry ward of a psychiatric hospital located in the Black Sea region of Turkiye. The data collection process began when the patient arrived at the clinic and ended with his discharge. The researcher psychiatric nurses informed the individual about the data sharing in detail, and written consent was obtained from the individual. The name of the case was omitted from the study for privacy. No ethics committee approval or the institution permission was obtained on the grounds that the study involved no interventions, such as any assessment or voice recording.

CASE REPORT

The case was 42 years old, never married, and residing with his mother, father, and sister. He retired on disability in 2020 while he was a journalist and made a livelihood through his pension. He stated that he made military service by payment. The individual had no family history of mental illness.

History of Disease and Hospitalisation: Approximately five years ago, he began outpatient treatment with the diagnosis of bipolar affective disorder due to sudden anger and overspending. In 2019, he was diagnosed with kidney failure and began to undergo dialysis. In December 2020, he had a kidney transplant surgery with the kidney donated by his mother. He has a history of chronic hypertension. He stated that his psychiatric complaints increased after transplantation. He suffered from increased speech, distraction, feeling special,

and grandiose delusions. During the period when his illness reached a peak, he took out large amounts of loans and incurred high expenditures. The patient began to claim that he was appointed as a governor and became governor and had two bodyguards. He exhibited more anger towards family members at home and more suspicion towards the people around him (Table 1).

The patient, who was admitted to a psychiatric hospital in the Black Sea region of Turkiye for the first time on 01.07.2023 with the abovementioned complaints, was angry, hyperactive, and refused to be admitted when he was hospitalised in the closed psychiatry ward. The patient, who suffered from grandiose delusions, said, "I am the governor; you are committing a crime by keeping me here". Relatives informed us that he had discontinued his medication after kidney transplantation. After his agitation subsided, his history of the transplantation process and the psychiatric history, were recorded, and the medications used regularly by him were planned separately.

Medical Diagnosis and Treatment Process: The individual was treated with a decision of compulsory hospitalisation between 01/07/2023 and 02/08/2023. The psychotropic drugs administered during hospitalisation were risperidone 2mg 2x1, valproic acid 500 mg 2x1, olanzapine 10 mg 1x1, lorazepam 2.5 mg 1x1, and paliperidone 100 mg depot injection. The drugs administered for renal function after renal transplantation were tacrolimus 1 mg 2x2 and mycophenolate mofetil 250 mg 2x1. When the individual was discharged, the patient's physician prescribed only paliperidone 100 mg depot injection as a psychotropic drug, except for those administered for renal functions.

Nursing Approach According to the Theory of Human Caring: According to Watson (2012), the nursing care process consists of three stages: the transpersonal caring relationship, the caring moment/caring occasion, and the clinical caritas process (Watson, 2008). This concept includes ethical, professional, scientific, and personalised behaviours and reactions between the nurse and the individual. Communication between the nurse and the individual may develop as a consequence of a long-lasting therapeutic relationship or a brief interaction during care. This establishes a transpersonal caring relationship between the nurse and the individual and facilitates their ability to understand each other (Cara, 2003; Watson, 2012).

Establishing a transpersonal caring relationship: The transpersonal caring relationship includes feelings of sensitivity, harmony, sincerity, truthfulness, respect, empathy, warmth, reliability, morality, and ethical responsibility. Watson states that an affectionate, compassionate, and merciful relationship should be established between the individual and the nurse to establish a transpersonal caring relationship. The nurse who is aware of the transpersonal caring relationship should go beyond what is visible, such as the disease, diagnosis, and treatment of the individual, and try to see who he is as a whole with his soul, even transcending empathy (Arslan-Ozkan, 2012; Birol, 2016; Watson &

Woodward, 2010). For the assessment of the transpersonal caring relationship, which consists of three concepts: self, phenomenological domain, and intersubjectivity, a trust relationship was established and some nursing interventions were applied. The individual rested actively during the communication process and was encouraged to express his thoughts. When the individual communicates his problems in the clinic, it pays attention to approach with compassion to solve them. Present and past self-perceptions of the individual were assessed to evaluate the individual's self- concept. The individual interview was held in the interview room in the clinic, and the patient stated that he had been living with his family for 41 years, he had conflicts with his father, and the conflicts he had experienced bothered him. He also claimed that his psychiatric complaints increased due to chronic kidney disease. While he refused the use of psychotropic drug since he was sceptical, he paid attention to the use of medication for his inner problem. He claimed that he was not ill, but psychotropic medication made him feel bad. When a sense of trust was established, the transpersonal caring relationship was reinforced through interviews and informative training.

Caring Moment/Caring Occasion: The integration of human-to-human, nurse-and- individual life experiences and phenomenological fields creates the caring occasion. This integration helps the individual recover by building mutual understanding. According to Watson, the caring moment refers to the place and time where there is human-human communication and interaction between the patient and caregiver, the nurse comes together with the individual and creates an opportunity for care (Durgun- Ozan & Okumus, 2013). The caring moment begins from the moment of admission to the ward, where the individual arrives with anger. After introducing himself to the individual, the researcher nurse explained where the individual was and the condition of hospitalisation. The patient, who was assumed to have failed to calm down with the explanation, was given chemical restriction (haloperidol 10 mg 1x1 intramuscular) and observation room restriction with the physician's approval to avoid harming himself and his environment. The individual, who was followed up in the observation room for 2 hours, was frequently contacted, and his needs were inquired about. When the anger level was observed to be alleviating, the restriction ceased after two hours. The individual was followed up in a single observation room between 22.00 and 06.00 for ten days due to his sleep disorder. His personal needs were considered, and communication with his family was maintained to ensure his orientation to the ward. The necessary interventions were determined depending on the condition of hospitalisation. The individual was informed about his own treatment and care. He was encouraged to engage in his own care and treatment. When the nurse interacted with the patient to understand his feelings and thoughts, and when the nurse listened to the patient objectively and impartially, an environment of trust was established. During the first week of hospitalisation and

treatment, his scepticism persisted. The patient stated that he wanted to call the gendarmerie and make a complaint, and he was not ignored; his request was respected, and he was allowed to call the gendarmerie at the time of the ward phone call. Interviews were held at regular intervals during the two-week hospitalisation period. The training was conducted by identifying the need for information after discharge. During the evaluation interview for the hospitalisation process, the patient stated that they realised the importance of medication use, apologised for his anger and discourses due to confusion during his first hospitalisation, and stated that he felt safe and trusted his nurse. Considering the theory's human-to-human interaction process and awareness of care, the researcher nurse who led the interviews and the care process defined such experience as professional satisfaction.

Clinical Caritas Processes: Clinical caritas processes, the "essence" of nursing in the science and art of nursing, are recognised as the "basis" of the practices for recovery and care outcomes and contribute to the professional and independent presentation of the profession. Besides, it increases patient satisfaction and safety by providing a holistic assessment of the individual (Kum, 2000). Watson's clinical caritas process consists of 10 stages. The stages neither follow a linear path nor are all stages distinguished from each other with clear lines but interact with each other (Kum, 2000). According to Fawcett (2006), the techniques used in the case according to the transpersonal caring–clinical caritas methods proposed in the theory include the following:

- He was referred to in-house rehabilitation activities consisting of music, painting, and handicrafts for the use of hearing and visual modalities.
- Informative trainings such as breathing exercises and correct breathing were held for the conscious use of respiratory methods such as inhalation and exhalation.
- Practices such as acupressure or body therapies for the conscious use of touch methods could not be carried out due to the lack of trained personnel in the institution. When vital signs were recorded for reasons they suspected during the acute period, they asked for permission to touch the patient and explained why. When the suspicion of the individual subsided, the therapeutic touch method was used for support.
- Due to the physiological need for gustatory methods, the diet was regulated, and training was provided on the related subject.
- Providing training on the issues that the individual suspected of the conscious use of psycho-cognitive methods increased the level of knowledge. The focus was on what they did for their post-discharge plans. During the communication process with the individual, open-ended questions were asked, and information about the content of thoughts was obtained. Questions such as "If you were not here right now, where would you like to be and what would you like to do?" were asked to make him

imagine. He was asked about the thoughts that pass through his mind when he is anxious.

- The importance of maintaining basic skin care for kinaesthetic methods with the current self-care process was emphasised. Short-term sports activities, short walks, exercises in the clinic, or garden activities that would not exhaust him were recommended to prevent immobility.

The physiological and psychological needs of the individual were evaluated with the treatment team and himself, and interventions were applied under the ten therapeutic factors in the theory. It is known that nurses care for individuals with these ten therapeutic factors included in THC. Each therapeutic factor defines the health and care process, and the first three of these ten therapeutic factors constitute the philosophical basis of the science of care. Table 2 shows the practices performed on the patient under ten therapeutic factors. The observation of the individual in a single room at night was limited to 10 days with the establishment of a sleep routine as a result of the interventions indicated in Table

2. The family was contacted, their care needs were met, and their relationships within the family were evaluated. During the treatment, an environment of trust was established with the individual, and his adherence to the treatment was achieved. He described the grandiosity he had suffered as confusion due to the influence of those around him. The treatment team considered that the insight of the patient, who was observed to have raised awareness about the disease at the end of the training provided about BD, could not be fully attained. During the discharge planning period, monthly depot shots were injected in order to be comfortable for the individual. During the discharge process, the individual and his family (his father) were educated about the times and methods of depot injection and the importance of follow-up. The importance of follow-up visits was explained by educating them about the effects and side effects of the drug. The patient expressed his satisfaction with the treatment and nursing approach during the discharge process and left the clinic with his father, expressing his gratitude.

DISCUSSION

This case report presents the nursing process of a patient who was hospitalised in a closed psychiatry ward with the diagnosis of bipolar affective disorder, and the care process was carried out systematically utilising Watson's Theory of Human Caring. Based on the theory, the data were collected through a holistic assessment of the individual on biopsychosocial aspects, and the researcher and psychiatric nurses performed interventions under ten therapeutic factors. The utilisation of the THC provided systematic care with a holistic perspective and was useful in establishing an interaction based on compassion and

trust between the case and the researcher nurse. A review examining the effectiveness of interventions using THC concluded that they can relieve patients' emotional tensions, improve their self- confidence and emotional well-being, and enhance nurses' job satisfaction and involvement in care (Wei et al., 2019). Another review stated that THC positively contributed to patients' recovery processes in nursing studies (Kabasakal & Kitis, 2021). As a result of the nursing process carried out with this case, the important findings of the present case report are that the agitation of the patient was reduced with the interventions during the hospitalisation process, he was informed about the breathing exercises that he could do for anger management, and he apologised to the nurse for his aggressive and destructive behaviours with the recovery of his well-being. The subsidence of the patient's grandiose delusions and suspicions is assessed as a tangible indicator of the outcome of the treatment and care provided.

Table 1: Mental condition assessment of the patient admitted to the psychiatry clinic

General Appearance and Behaviour	He is 171 cm (68.4 kg), maintains eye contact in communication, and his clothes are clean and appropriate for his gender and the hospital setting.
Consciousness	Open
Attention/perception	There is an occasional distraction.
Orientation	No orientation disorder.
Memory (Recollection)	No problems were observed in the recent and remote memory measurements.
Judgement defect	There is a judgement defect in the assessment of interpersonal relationships and circumstances.
Thinking content	There are heightened connotations - grandiose considerations and scepticism.
Speech traits	There is an increased amount of speech.
Facial expression	There is a furious mood due to involuntary hospitalisation.
Behaviour	Inability to stand still, restlessness, agitation
Social relations	It is known that he has difficulties in interpersonal relationships.
Treatment	Irregular use of medication. (Irregular use of psychotropic medications)
Sleeping	Complaint of frequent awakenings at night.
Diet	Salt-free diet due to kidney transplantation and hypertension.
Special observation	Adherence to treatment-sleeping- Adherence to ward rules-diet-observation room restriction requires special

When this was considered an evaluation of human-human interaction, it reflected as professional satisfaction for the researcher nurse.

Table 2: Evaluation of the case's therapeutic factors and clinical caritas processes according to the THC

1. A compassionate approach to self and the individual	-During the hospitalisation process of the individual, a sincere, patient, and insightful approach was adopted by taking care to be friendly. -The nurse introduced herself and the ward by calling the individual by name and orientated the individual to the place, time, and space. -After waiting patiently for the individual to calm down on admission, he was physically examined, and his mental condition was assessed. -His anger and anxiety were recognised, and an empathic attitude was adopted. -He was encouraged to express his concerns, thoughts, and feelings in order to resolve his problems. The nurse researcher presented her availability by describing how he could reach the nurse when he faced any problems in the clinic. -Each intervention (treatment process, restriction, rehabilitation activities, etc.) was described to the individual.
2. Instilling faith and hope and respecting the individual	-The individual who refused to be hospitalised was respected and informed, his intention to file a complaint was evaluated, and he was allowed to do so. -The patient was allowed to ask questions about his illness and hospitalisation process and encouraged to express his feelings and thoughts. -Hope was instilled in the patient that his discharge could be earlier if he adhered to the treatment. -He expressed his thoughts about marriage and moving to a separate house after discharge.
3. Being respectful to self and others	-Sincere interest and patience were demonstrated to him. -He was encouraged to express his feelings. -His general condition, wishes, and thoughts were assessed without any judgment.
4. Developing a helpful, reassuring, caring relationship	-A helpful and reassuring relationship was established with him individual. -He was told that he could trust the team members. - His relatives were reached and told to meet his needs. -The necessary care needs for his domestic problems were met in cooperation with him. -The diet was adjusted together with the dietician to meet his dietary needs. -His good self-care was promoted, observations about his general appearance were conveyed, and positive feedback was given. -Feedback was given for the positive attitudes and behaviours displayed by him in the clinic.
5. Accepting positive or negative emotions and promoting the expression	-The importance of expressing positive and negative emotions was explained to him, and he was encouraged to express them. -When he shared his concern about the complications that may

of emotions	develop after kidney transplantation, he was informed about the subject, which helped to alleviate his anxiety. He stated that his anxiety was alleviated after being informed about the subject.
6. Fostering creative problem-solving in care	-He was encouraged to ask questions in the process related to his care. -He shared how he coped with the extraordinary problems he faced. -Information was given about the diagnosis, treatment, and rehabilitation processes related to the psychiatric treatment process. -The importance of medication use and doctor follow-ups was explained, and the individual gave feedback about the problems he may suffer from and their solutions. -During the hospitalisation process in the clinic, he was allowed to participate in music recitals, handicraft occupational therapy, and gardening activities. - A practical training on breathing exercises was held. He was informed about how to do these exercises when he was anxious.
7. Providing learning and teaching in accordance with individual needs and comprehension styles	-He was informed about the disease. He was trained on the rational use of medication. He was trained about the effects and side effects of medication. The importance of the doctor's follow-up was explained. -The lack of information about the issues to be considered after kidney transplantation was eliminated. -The importance of diet was explained, and his adaptation was facilitated. -He was informed to apply to community mental health centres after discharge. -He was informed about how he could do breathing exercises for anger management in his daily life.
8. Building a recovery environment that respects individual integrity	-An environment that would positively affect the individual physically and psychologically was prepared. -Individual interviews were held in the interview room in the clinic. -The temperature, light, and ventilation of the individual's room were adjusted. The environment was cleaned and organised by clinical visits every morning. -He was kept alone during hospitalisation due to his scepticism and agitation. In the following days, a roommate was provided to allow him to communicate with other individuals. -The security of the general ward layout was arranged, and the necessary information was given to him. -He was told to use the nurse bell when he had any problem and that he could always reach the team members.
9. Respecting fundamental physical, psychological, and emotional needs	- His biopsychosocial needs were assessed. His family was contacted and asked to meet his needs in the clinic, and they were included in the care of the case. He and his family were informed about what to do for the necessary canteen needs. -Necessary non-pharmacological methods (lighting and sound control) related to sleep were tried, and pharmacological methods were used where they were insufficient. -He adapted to the ward and developed a sense of belonging by establishing healthy relationships with team members. Attention was paid to the privacy of the individual in every

	intervention. -The anxieties experienced during the treatment process were listened to impartially, and attempts were made to alleviate them.
10. Enabling the emergence of individual therapeutic powers / allowing existential or phenomenological spiritual powers	-The positive effect of the treatment adherence process on the quality of life was shared with him. -When the mental state of the case become stable, the spiritual beliefs about life and the support systems in life were shared in the interviews. -He stated that his father, with whom he previously claimed to have had a conflict, visited him from Istanbul, which made him feel valuable. -Interviews were held with him about the future, and his plans were respected.

DISCUSSION CONTIN.

Both the mental condition and the physiological state of the case related to the kidney require biopsychosocial evaluation and a holistic care. Accordingly, the dietician evaluated the patient's dietary requirements, and the necessary information was provided to him. Furthermore, the trainings on psychotropic drug use, breathing exercises, and BD show that the researcher nurse frequently plays the role of educator and counsellor in the care process provided by THC. The strength of the study is that the nurses involved in the care process have at least ten years of work experience and are also master's and doctoral students in the department of psychiatric nursing. The residence of family out of the city and communication restrictions can be considered as a limitation of the care process. However, the visit of the patient’s father from Istanbul, with whom the patient claimed to have previously had a conflict, made him feel valuable. During the discharge process, intra- family role relations were evaluated in the interview with the father and included in the process. Failure to directly mention the social relations and sexuality dimensions in THC and to address them in this case is considered as a limitation. The use of theories that are deemed to offer a more systematic approach together with THC may be recommended to render the care process more effective and holistic. The treatment of bipolar disorder should be carried out comprehensively and in cooperation with interdisciplinary teams (doctor, nurse, psychologist, and psychotherapist) due to the complexity of the psychopathological disorder (Kowalewski et al., 2021). Focusing only on the patient-nurse interaction in this case, as THC requires, can be considered a limitation of THC. On the other hand, the lack of a clear distinction between the therapeutic factors causes repetition in the reporting phase, which suggests that this may be another limitation of the theory (Kum, 2000).

Conclusion: A holistic approach with a compassionate, sincere, and reliable interaction was adopted based on the ten therapeutic factors in the THC in the care process of the patient who was being treated with the diagnosis of BD in the closed psychiatry ward. Nursing interventions were performed based on the THC, and the outcomes were evaluated. The utilisation of THC in the present case was concluded to be beneficial in providing interaction-oriented and systematic nursing care with a holistic approach. Also, the use of THC may facilitate the care process for nursing students. Since it is a human-to-human interaction-oriented theory, the recovery process of the case was defined as professional satisfaction by the researcher nurses. The limitation of the study is that the theory focused only on the interaction between the patient and the nurse and failed to address social and family role relations. Based on these outcomes, it is recommended to undertake studies in which the THC is utilised in conjunction with other disciplines and evaluated together with therapeutic factors, including intra-family and social relationships.

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