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Research Article

The Heptagon Framework of Vital Signs Web in Clinical Setting

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Abstract

Background: The Heptagon framework of the vital signs Web is a clinical and pioneering methodology that redesigns the clinical assessment of the new integrated vital signs Web by incorporating seven critical paradigms of the physiological state of patients.

Purpose: This Heptagon framework aims to (a) Describe the significance of each component of the vital signs web and (b) Describe the interrelationship among the Web and their characteristic relationships with diseases. (c) Analyze the Heptagon framework of the vital signs' Web for clinical practices, and (d) Examine the pathophysiology of each vital sign and its interconnections to diseases.

Methods: Rodgers's philosophical evolutionary concept analysis guided the model. It is a new methodological clinical approach to the vital signs Web of the human body in the context of multi-dimensional health conditions in the 21st century.

Findings: The Heptagon framework of the Vital Signs' Web is designed to strengthen critical and primary care using Rodgers' evolutionary concept analysis.

Conclusion: The conceptual framework is grounded on the theory of Rodgers' evolutionary concept development, and it offers a paradigm shift in how vital signs web are analyzed and interpreted during the initial management of care in clinics.

Keywords: Heptagon Framework, Vital Signs Web, Rodgers' Evolutionary Method

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Introduction

Vital signs are essential physiological functions of living organisms such as humans, animals, and plants (Rust & Totton, 2018). Continuous monitoring of vital signs is crucial in early detection and even predicting conditions that may affect the patient's well-being (Arlati, 2023; Kebe et al., 2020). Vital signs express the signs of internal malaise of the human body. Signs of internal malaise in vital signs trigger the patients to seek solutions by visiting healthcare facilities. These critical signs represent the primary sensory detectors of human body physiology abnormalities. These characteristics and attributes of the vital signs web are used as clinical tools to perform triage and assess acuity severity or chronicity of the disease in urgent care, primary care, or emergency departments (Cercone et al., 2023).

Nurses use the vital signs Web as an alert system of internal body abnormalities, while providers use them as direct identifiers of diagnosis of presumptive illnesses or diseases. Vital signs web orient or direct the provider in

his clinical framework approach and epitomize disease determinants as a precursor in the quest for signs of causal factors, stimuli, or organisms that change the internal normal process of the patient's body physiology.

The role, characteristics, and attributes of vital signs in clinical practices are fundamental to nursing and medical disciplines because they symbolize the clinical guidelines for each patient encounter. The greater the monitoring of vital signs on the Web, the greater the detection of early deterioration of the patient's health condition and the more significant the risk reduction. In the literature and daily practice, there needs to be more clinical attentiveness to the between and within the variance of the vital signs. The vital signs Web is one of the best essential clinical tools for the provider to comprehend and direct his presumptive and differential diagnoses. However, using Rodgers' evolutionary conceptual analysis method, this paper searches to describe and understand the profound implications of the characteristics and attributes of the vital signs, including their interdependent relationships and intertwined connectivity. This study paper sought to:

1. Describe the significance of each component of the vital signs,
2. Describe the interrelationship among the vital signs' variables and their characteristic relationships with some diseases in urgent care, primary care, or emergency department settings,
3. Analyze the Heptagon framework or diagram of the vital signs' Web for the use of clinical practices.
4. Examine the pathophysiology of each vital sign and its direct or indirect interconnections to diseases.

Theory Behind the Conceptual Framework of Vital Sign Web

The methodological method of conceptual analysis of Rodgers in 1993 is one of the research approaches in nursing. Rodgers (1993) developed a realistic and pragmatic method that elucidates a concept's attributes, antecedents, and consequences within a dynamic and evolving context. In the nursing paradigm, the understanding of the concept is cogitated to change over time related to the context, entailing a cyclical analysis process rather than a linear process (Rodgers, 1993). In this research study, for instance, the Heptagon vital sign web is considered a new concept and subsequently evolving as an ongoing and recurring process of refinement and re-evaluation during critical care and advanced practice. Rodger's concept analysis method uses several steps. Those steps include the selection of the concept vital signs web, the related concept vital signs web identification, the literature review of the concept vital signs web, the analysis of the attributes and consequences, and the development of the Heptagon of the vital signs' Web. Rodgers believes that a concept must be continually evaluated and that truth about a concept is dynamic with adaptability over time. So, the Pentagon vital signs evolved into the Heptagon vital signs web because pain and body mass index (BMI) are crucial in managing critical care patients, even primary care and skilled nursing patients.

Development of Heptagon Vital Signs Web.

Selection of the Concept Vital Signs Web

Vital signs Web are fundamental components of nursing and medical care. It is the first clinical tool that any caregiver or provider uses to assess the physiological change of patients' health conditions. The pioneering concept of the vital sign web is constructed within a Pentagon framework process, such as Temperature, blood pressure, pulse, oxygen saturation, and respiratory rate. However, pain and elevated BMI >30 kg/m2 remain a critical and constant health problem for many patients across the lifespan. Pain and elevated BMI become unpleasant physiological, emotional, and psychological experiences associated with actual and potential metabolic diseases in modern times. Inadequate pain and elevated BMI >30 kg/m2 control becomes a source of stress that significantly impacts the quality of life.

So, incorporating those two vital signs is imminent to reaching the optimum quality of life among patients in modern times. As a result, the full integration of those two vital signs into the traditional Pentagon vital signs web is imperative for the caregiver and providers at the critical and primary care levels. The situational and the context of care leads to the Heptagon framework of vital sign web instead of the Pentagon framework of vital sign web if Rodgers's evolutionary concept analysis of method implies the new concept of the Heptagon framework.

The Related Concept of Vital Signs Web Identification and its Potential Functional Contexts

The Vital Sign Variable Autonomy

Each vital sign variable is an essential tool for explanation of the change in our body condition. The nurse and provider may pay attention when the variable (e.g., Temperature) exceeds the upper limits. The provider uses it to uncover the presumptive direction of the causal agent or consequential outcomes if rapid intervention occurs. For instance, if the Temperature is 104 Fahrenheit or 40 degrees Celsius $(104^{\circ}\mathrm{F} - 32) \times {}^{5}/_{9} = 40$), pediatric patients have a higher probability of causal infection and higher consequential seizure. It will lead the provider to investigate causal agent details further by examining clinical key symptoms or

serum blood culture. The provider must also make critical decisions to mitigate the consequences of hyperpyrexia within the body. In summary, each vital sign variable on the Web is a function of Autonomy, and its lower and upper limited variation should be taken seriously to preclude severe damage.

The Interdependence Phenomena among Vital Signs Variables on the Web

The interdependence of the Vital sign variables is ineluctable, unpredictable, and predictable. The change in variable could engender the change in another variable and subsequently among them. It is a phenomenon of unforeseen and predictable events in vital signs. This phenomenon is associated with the causal factors and the consequential outcomes. To illustrate this phenomenon of unforeseeable and foreseeable, the variable heart rate is less than the lower limit (< 60 beats minutes) within an upper limit of systolic blood pressure (> 120 mmHg) in the state of average condition of the body and conversely. That phenomenon is foreseeable in some individuals' vital signs.

However, there is a phenomenon of unpredictability in vital signs. For example, a sudden decrease in oxygen saturation (SO_2) implies a change in respiration rate systematically by increasing into an upper limit (20 breaths per minute) and subsequently increasing the heart rate beyond the upper limit and likely decreasing the peripheral pulse into the lower limit. Another unforeseeable phenomenon occurs among the vital signs' variables, such as RR, SO_2, pain, and Temperature.

Hospital Setting Unforeseeable Analytical Phenomenon

$$\begin{bmatrix} RR & \cdots & Temp \\ \vdots & \ddots & \vdots \\ SO_2 & \cdots & Pain \end{bmatrix}; \begin{bmatrix} BP & \cdots & BMI \\ \vdots & \ddots & \vdots \\ HR & \cdots & RR \end{bmatrix}; \begin{bmatrix} RR & \cdots & SO_2 \\ \vdots & \ddots & \vdots \\ PP & \cdots & BP \end{bmatrix}; \begin{bmatrix} HR & \cdots & Pain \\ \vdots & \ddots & \vdots \\ PP & \cdots & RR \end{bmatrix};$$

$$\begin{bmatrix} BP & \cdots & BMI \\ \vdots & \ddots & \vdots \\ SO_2 & \cdots & RR \end{bmatrix}$$

Primary Care or Urgent Care Setting is an Unforeseeable Analytical Phenomenon

$$RR \leftrightarrow \quad \leftrightarrow PP \leftrightarrow \quad \leftrightarrow SO_2;\ Pain \cdots \quad \cdots PP \cdots \quad HR;\ BMI \leftrightarrow \quad \leftrightarrow BP \rightarrow \quad SO_2$$

$$;$$

$$SO_2 \leftrightarrow \quad \leftrightarrow RR \leftrightarrow \quad HR;\ Pain \leftrightarrow \quad \leftrightarrow HR \leftrightarrow \quad SO_2\ ;SO_2 \leftrightarrow \quad \leftrightarrow BP \leftrightarrow \quad RR$$

The Vital Signs' Variables' Interconnectivity to Several Causalities

The interconnectivity of the vital signs' variables to diverse causalities remains the evolutionary foundation of the clinical approach and the diagnostic tests. The change of each vital sign's variable is a response to the internal or external stressor, which may engender an acute or chronic illness if a rapid intervention does not occur to mitigate the variability. As the variability of one vital sign continues to increase exponentially, the interactive unforeseeable phenomenon emerges among them. The whole intra-physiological system of the vital sign web may collapse in a state of coma or vegetative state. Multiple variabilities among the vital sign web variables may occur during intra or extra-stressor effects. In that case, the unforeseeable phenomenon of intertwining changes among vital sign web variables increased, which required complex approaches to alleviate the changes. The best clinical complex approaches are uncovering the multiple intra and extra-stressors that stimulate the change and planning a complex intervention for each stressor. The intervention needs to intervene by treating the consequences before knowing the causalities.

Concept of Vital Signs Web Literature Review

Physiology and Pathophysiology of the Vital Signs Web

Self-regulation through maintaining homeostasis is a healthy human body's natural ability to maintain a stable internal environment and to correct abnormal conditions, thereby eliminating abnormal bodily processes. Vital signs Web are health indicators that enable healthcare providers to assess the body's ability to maintain homeostasis (Nwibor et al., 2023; Teixeira et al.,2015), often by correlating data points over a period. Current studies (Gupta et al., 2023; Gawlik, 2024; Tkacs & Herrmann, 2024) have continued to highlight the relationships between vital signs functions and the physical well-being of human beings. These vital

signs on the Web include Temperature (T), heart rate (HR), peripheral pulse (PP), respiration rate (RR), blood pressure (BP), pain, and Body mass index (BMI).

Physiology of the Temperature Regulation

The first variable of the vital signs web is the Temperature; in a healthy individual, the body temperature ranges from 36.5 C< x < 37.5 C or (97.7 F < x < 99.5 F). The human body's thermostat is in the preoptic area of the hypothalamus, regulating temperature homeostasis (Hymczak et al., 2021; Tabarean et al., 2010). A memory with sensors in the hypothalamus receives information from nerve cells (i.e., thermoreceptors) (Kamm et al., 2021). It processes the information regarding the core temperature while the peripheral and central thermoreceptors located in the skin and the viscera, spinal cord, and hypothalamus process the core temperature (Tabarean et al., 2010). Variations in body temperature, either internally through the nerve cells or externally through the skin, activate those thermoreceptors, which inform the preoptic area of the hypothalamus. The role mechanism of the preoptic area of the hypothalamus is to activate heat regulation to increase or decrease body temperature and return it to baseline (Bicego et al., 2007; Tabarean et al., 2010). Thermoregulation dysfunction is associated with age, such as in infants and elderly patients. A study found that elderly patients exhibited decreased chemosensitivity, causing delayed or insufficient responses to thermal changes and making them more susceptible to hypothermia or hyperthermia (Geneva et al., 2019). neonates and children quickly develop hypothermia or hyperthermia in response to the high sensitivity of peripheral and central thermoreceptors (Geneva et al., 2019)

Physiology of Heart Rate and Peripheral Pulse

Heart rate is the rate at which cardiac muscle contracts and relaxes in response to the natural pacemaker (SA node, VA node, and bundle branches of Purkinje fibers) (Tripathi, 2011). The pulse rate is the rate at which the arteries contract and relax in response to blood flow (See Figure 3)

Palpating the artery lightly against muscle or bone for a full minute provides a sensation of a complex cascade of actions that originated with an electrical impulse from the sinoatrial (SA) node, stimulating cardiac contraction. The contraction allows 60-70ml of blood to enter the aorta with each ventricular contraction before aortic distention allows the blood to flow into the distal ends of arteries (Armstrong et al., 2022).

Palpation of the pulse can be performed at various locations on the upper and lower extremities, wherever they are closest. The most common femoral, popliteal, posterior tibial, and dorsalis pedis arteries most commonly evaluate the rate, rhythm, intensity, and symmetry. Carotid pulses are assessed bilaterally for rhythm, intensity, quality, flexibility, and patency. Assessment of the peripheral pulse can be a good indicator of disease processes before it is easily detected physically on the outside (Aziz et al., 2022; Paraskevas & Shearman, 2023). Palpation occurs at various locations of the upper and lower extremities, including the radial, brachial, femoral, popliteal, posterior tibial, and dorsalis pedis arteries, and most commonly evaluates the rate, rhythm, intensity, and symmetry (Paraskevas & Shearman, 2023; Zimmerman & Williams, 2019). Beyond the palpation approach, the Doppler ultrasound is available to appropriately characterize the peripheral pulse waveform (Jerban et al., 2023). Peripheral pulses are clinically used to uncover specific vascular pathologies, including peripheral arterial disease, vasculitis, and congenital abnormalities.

Physiology of Respiration Rate

Exchanging oxygen (O_2) for carbon dioxide (CO_2) through a complex process via inhalation and exhalation in the lungs is part of respiration. Respiration contains three primary components, namely ventilation, perfusion, and diffusion. Normal metabolism and acid-base balance would cease without these components, and life in homeostasis is impossible without constant interference (Scorza & Maynard, 2024).

Though some breathing control is voluntary, most functions are automated and regulated by the central nervous system (CNS) as gas exchange occurs within the lungs. Breathing can be inhibited or suppressed in instances when a brainstem injury is present and in sedative or narcotic overdoses. Respirations are controlled by the pons and the medulla, located within the brain stem (Tkacs & Herrmann, 2024). Nerve impulses then transmit nerve impulses via the phrenic and other motor nerves to the diaphragm and intercostal muscles to control breathing. Our primary respiratory drive, central chemoreceptors within the brainstem, signals our body to adjust ventilation based indirectly on arterial CO_2 ($PaCO_2$) levels (Lewis et al., 2020). Should our primary respiratory drive fail, our secondary drive will kick in. This secondary drive, located outside the brainstem in the carotid and aortic arteries, is equipped with peripheral chemoreceptors. Contrary to the primary drive, this backup drive responds to low levels of O2 and, therefore, is more often referred to as a "hypoxic drive" and related to COPD patients. As the disease progresses, COPD patients in advanced stages grow numb to chronically elevated $PaCO_2$ levels and rely on the secondary drive for oxygenation (Scarlata & Incalzi, 2022).

The exchange of oxygen and carbon dioxide involves

moving air into and out of the lungs. This process is labeled ventilation. In a healthy adult, air flows in and out of alveoli approximately 10 to 12 times per minute. Blood circulates through capillaries as oxygen and carbon dioxide exchange, facilitating rich nutrient exchange. This process is called perfusion. Pulmonary circulation ensures the exchange of nutrition and oxygen transport via the capillary bed (Scarlata & Incalzi, (2022).

The last respiration component, diffusion, entails the movement of solutions (liquid or air) through the pulmonary capillary walls into the bloodstream. Carbon dioxide diffuses from the bloodstream into the alveoli as this movement is facilitated.

Physiology of the Blood Pressure

The regulation of the blood flow in the human body depends on the significant role of the vascular system. One of the functional units of the vascular system is the arterioles, which have constriction and dilatation characteristics. These two characteristics play a significant role in regulating blood flow. The greater the constriction of arterioles, the more significant the increase of resistance, the greater the decrease in blow flow to downstream capillaries, and the more significant decrease of blood pressure in the human body, respectively. However, the greater the dilatation of arterioles, the more significant the blood flow to downstream capillaries and the smaller the decrease in blood pressure (Pappano & Wier, 2018). Traditionally, the blood pressure is measured with a mercury-tube sphygmomanometer, which assesses the systolic and diastolic pressure within large arteries in the systemic circulation. According to the published article in the NIH/National Library of Medicine, "diastolic blood pressure (DBP) is the lowest pressure in an artery at the beginning of the cardiac cycle while the ventricles are relaxing and filling. DBP is directly proportional to total peripheral resistance (TPR). Also, the energy stored in the compliant aorta during systole is now released by the recoil of the aortic wall during diastole, thus increasing diastolic pressure. Systolic blood pressure (SBP) is the peak pressure in an artery at the end of the cardiac cycle while the ventricles are contracting"(Tripathi, 2011, p. 4; Gawlik, 2024).

Blood pressure provides a great indication of therapeutic decisions about health implications. It assists clinicians in gaining insight into cardiac output, peripheral vascular resistance, and other disease processes when correlated with data points gathered during the health assessment. For instance, nurses and providers use pulse and Mean Atrial Pressure (MAP) to assess BP homeostasis. The Pulse Pressure (PP) unit is in millimeter mercury (mmHg), which reflects the difference between SBP and DBP (PP_{mmHg}=SBP_{mmHg}-DBP_{mmHg}). The outcome of PP is proportional to the stroke volume and inversely $SV = \frac{Cardiac\ output}{heart\ rate}$proportional to the arteriole's constriction and dilatation.

In addition to the PP, the provider uses the MAP to measure the blood flow, the resistance, and the pressure within the arteries through the cardiac cycle. MAP Formula: $MAP = SV \times HR \times TPR = DP_{mmHg} + \frac{SBP_{mmHg} - DBP_{mmHg}}{3}$ with three variable parameters that play a significant role in pathophysiological issues of the human body. The total peripheral pressure variable seems to play more of a role as an internal force that maintains blood flow from the route of the aorta to the venous (Pappano & Wier, 2018).

Further, providers also use auscultation to assess heart sound S1 due to the closure of the mitral and tricuspid valves and heart sound S2 due to the closure of the aortic and pulmonary valves, which are normal heart sounds. However, other abnormal heart sounds, such as S3/S4 and Diastolic/Systolic heart murmurs, can be detected through auscultation. The American Heart Association provided guidelines regarding hypertension, elevated blood pressure readings, hypotension, and low blood pressure readings (American Heart Association [AHA], 2023; Hsu, 2023). Changes in blood pressure can be correlated with body responses through baroreceptors located within blood vessels. Activation by stretching the vessel sends information to the central nervous system to influence peripheral vascular resistance and cardiac output. Two forms of baroreceptors are significant regarding blood pressure: high-pressure baroreceptors and low-pressure baroreceptors (Rogers, 2023). Within the high-pressure system, the carotid baroreceptor increases and decreases blood pressure by sending signals via the glossopharyngeal nerve (CN IX).

Additionally, the aortic arch responds to elevated pressures by sending signals to the vagus nerve (CN X) (Pappano & Wier, 2018; Gawlik, 2024; Scarlata & Incalzi, 2022). Lastly, the antidiuretic hormone (ADH), synthesized in the hypothalamus, is well known for its effects on blood pressure. A decrease in blood volume decreases low-pressure baroreceptors, leading to increased ADH production. The same rings true in high-pressure baroreceptor environments, leading to increased production of ADH (Tkacs & Herrmann, 2024; Scorza & Maynard, 2024); Scarlata & Incalzi, 2022).

Physiology of Oxygen Saturation

The equation of oxygen saturation $SO_2 = Hb_{O_2} \pm Hb_{CO_2}$ is an essential first vital sign in patient management care. Oxygen desaturation ($DSO_2 = Hb_{O_2} < Hb_{CO_2}$ within the body causes hypoxemia and hypoxia, respectively. Hypoxemia and hypoxia can lead to acute and chronic

adverse effects conditions such as Brain confusion, restlessness, transient ischemia attack, and stroke; heart system with tachycardia; and skin system with bluish skin and lastly, lung with shortness of breathing (dyspnea) with a respiratory system (Barud, 2024). The greater the bond of hemoglobulin with oxygen, the greater the stability of oxygenation of the body's organ tissues. The greater the unbound of hemoglobulin with oxygen or bound hemoglobulin with carbon dioxide, the greater the instability of oxygenation of the body organ tissues. Clinical approaches such as patient statements about difficulty breathing and lung, heart, and skin physical examinations are the first step for nurses to identify acute changes conditions. Accurate measurement is based on a pulse oximeter and arterial blood sample to detect acute hypoxemia and hypoxia early. A research study found that central cyanosis, blue coloration of the tongue and mucous membranes, is the most reliable predictor of hypoxemia and hypoxia (Barud, 2024; Hanning & Alexander-Williams, 1995).

Physiology of the Pain

Pain is the sixth vital sign that intertwines with the human quality of life. There is no specific guideline to cure pain, and it cannot be standardized for all individuals with pain. A specific management and routine assessment may attenuate it. Routine assessment by patient self-report is a better measure of pain than nurses and provider assessments (Helfand & Freeman, 2009). Nurses and providers have found a clinical approach to capture pain intensity characteristics such as mild, moderate, and severe. However, the pain route remains unclear except for some specific diseases, including cancer, trauma or injury, and surgery (Gebke et al., 2023). Pain management is limited to the primary care or urgent care levels. However, it can be the starting point, the initial presumptive diagnosis, or the referral to the emergency department and pain specialists. Pain is classified as acute or chronic and has sensory and emotional components. Acute pain may be associated with tachycardia, increased blood pressure, and heart and respiratory rate (Shaikh et al., 2018; Zanza et al., 2023). Chronic pain may be associated with depression, mood change, fatigue, and sleep disorder. The literature highlighted that acute pain usually occurs in response to tissue injury, and its persistence may lead to chronicity (Nwonu, 2023). Acute pain results from the activation of peripheral pain receptors and their specific A-delta and C sensory nerve fibers (nociceptors), while chronic pain is the consequence of ongoing tissue injury or damage to or dysfunction of the peripheral or central nervous system (Watson & Sandroni, 2016; Zanza et al., 2023). In primary care, urgent care, or hospital units, including the emergency department, the most common tools of pain measurement are verbal description scales from none to severe, verbal numeric scales from zero to ten, and facial pain scales with seven or ten faces ranged from a neutral face to grimacing face (Gebke et al., 2023; Helfand & Freeman, 2009). A brief pain inventory may assess the pain intensity and disability caused by the pain.

Physiology of Body Mass Index

Underweight, overweight, and obesity are major health concerns worldwide and are spreading fast as a pandemic within the world population. Many people attempt to customize as a typical sign of culture or wealth with a silent negative consequential impact on daily life. The body mass index (BMI) is one of the appropriate methods for measuring and assessing the underweight, overweight, and obese category of patients at the primary care level. It is calculated from the patient's height and weight and estimates the human body fat, which gauges the risk for diseases. The lower or the higher the $BMI_{X_i} < BMI_{R=18..5-24.9}\ and\ BMI_{Y_i} > BMI_{R=18.5-24.9}$ the more significant risks for many health conditions, including cancer, protein, calorie malnutrition, high cholesterol, and triglycerides, gallstones, sleep apnea, breathing problems, hypertension, diabetes, joints, and degenerative disc diseases (Aggarwal & Chakole, 2023; Vrbikova & Hainer, 2009). However, the change of $BMI_{X_i} < BMI_{R=18.5-24.9}\ and\ BMI_{Y_i} > BMI_{R=18.5-24.9}$ is strongly associated with other vital signs on the Web, such as heart rate, peripheral pulse, blood pressure, and respiratory rate. Body Mass Index, as a seventh vital sign, plays a significant role in metabolic disease that is modifiable and treatable. Nurses and providers no longer pay much attention to the drastic change in BMI and its impact on the patient's quality of life. Point out that overweight, obesity, and morbid obesity with excess calories can be seen as an insult, stigma, discrimination, or prejudice to the patient's rights (Steele & Finucane, 2023). As a result, prevention and education still need to be emphasized.

Attributes and Consequences Analysis

Description and Interconnectedness

Human Body, Vital Signs Web, is a conceptual framework created by a Septagon paradigm with seven-sided closed polygon chain parameters. Each polygon chain parameter or variable represents a segment representing each vital sign. The Septagon represents the human body system on seven vital sign variables interacting, intertwining, and interconnecting, ensuring a holistic, comprehensive assessment of the patient's health conditions.

Interrelationships among Vital Signs Web Variables and Diseases

Each variable is associated with numerous diseases, and

this factual fact allows the provider to predict the severity of the disease. That is why the model presented in Figure 3 is not exclusive. For instance, a blood pressure variable is correlated with major cardiovascular diseases such as hypotension and pre-hypertension hypertension, including subsequent indirect or direct association with congestive heart failure, hyperthyroidism/hypothyroidism, and thyroid storm, pulmonary disease: alcoholism/cardiomyopathy, renal disease, cerebral vascular disease (Transit Ischemic Attack & stroke). The Heptagon framework of the VS depicts the likelihood of disease occurrences in each variable. During physical assessment, the provider uses the VS variable as a source of guidance to uncover the plausible differential diagnosis and the likelihood of the diagnosis. Abnormal vital signs web variables also tend to correlate to the physical examination. Vital signs Web could be associated with several symptoms relevant to conjecture a presumptive diagnosis and, subsequently, a diagnostic test.

A function of vital signs Web hypothesizes using time $a \leq f(vs) \leq b.$

a: a numeric value representing the lower limits.

b: a numeric value representing the upper limit.

c: f(vs) represents the function that characterizes each of the seven vital sign web variables (vs). For instance, using a temperature as a VS. the function provides:

F(vs) = [LVS – UVS] + T(t). = [LVS (t) – UVS (t)

F(Temp) = (36.4 -37.2) + T (1) = (D) (t). from 97°F (36.1°C) to 99°F (37.2°C). 36.1C < f (temp) <37.2

The Development of Heptagon on the Vital Signs Web

Origin of the Heptagon framework of VS (HF-VS) Web

The ***Heptagon Framework*** originated from the simple observation of the patients, nurses, and providers in clinical care settings, from hospital/post-acute to primary/ urgent care and, subsequently, skilled/home facilities. For each encounter with a patient or self-assessment within an abnormal situation or event, the first action or procedure of the nurse and provider is to evaluate the vital signs, which are the key elements to detect abnormalities from the internal physiological dimension of the patient's body physiology (Cercone et al., 2023). Each variability among the vital signs' variables leads the provider and the assessor to analyze, interpret, and proceed to in-depth connectivity of causal agents.

The traditional approach focused on the Pentagon Vital Signs Web; however, pain and body mass index are crucial vital signs that intertwine within the Pentagon Vital Signs Web of human pathophysiology. Each vital sign on the Web is interrelated by broken or full fine lines (See Figure 1). Each vital sign on the Web, known as a variable, is interconnected and associated with various diseases (See Figure 2). The connection between two vital signs on the Web by a full fine line determines their direct impacts. The direct impact means that if there is a change in one vital sign, an automatic change will occur in another vital sign.

However, the broken line indicates that change can occur in one vital sign, which does not necessarily entail a direct change in another (See Figures 1 & 2). Two vital signs on the Web are directly connected by a thick line, for instance, oxygen saturation (SO2) to respiratory rate (RR) and systolic /diastolic blood pressure (SBP/DBP) to heart rate and peripheral pulse (HR/PP). The Full thick lines indicate constant connections between these vital signs' variables, which are proportionately dependent on each other. The seven vital signs intertwined in connection represent a complex web within the human body that significantly impacts patient care (Figures 1 & 2). The interconnected nature of the Heptagon Framework enables early detection of subtle changes in the vital signs' Web, potentially indicating deterioration. So, understanding the vital signs web enables nurses and practitioners to strengthen their skills and provide quality care. The evolutionary Heptagon framework of the vital signs' Web emphasizes the importance of model-driven decision-making in clinical practices. The heptagon framework allows nurses and practitioners to identify patterns, trends, and connectedness within the vital signs' Web, empowering them to make more informed, accurate clinical decisions and practical approaches to care. It also prompts them to consider the patients 'contexts and customize care plans accordingly.

The intertwined Web of vital signs remains complex and needs critical thinking to seize the predictable clinical presumptive diagnosis. Each vital sign variable on the Web has the dual function of Autonomy and interdependency, and its variability is the response to internal and external stimuli or stressors. Each variability of VS obeys the interval rules in which any variation under the lower or upper limits requires severe attention and decision-making. Interval value has been set up for each variable of VS to facilitate a rapid descriptive interpretation before uncovering the causalities. The phenomenon of the consequence of the causalities is unpredictable, and the outcomes depend on the likelihood of adequate and immediate intervention of the nurse and the provider.

Significance of the Heptagon Vital Signs Web

The Heptagon framework of the Vital Signs' Web was designed to strengthen the nurses' and practitioners' clinical evidence-based practices in primary care, urgent

care, emergency departments, and skilled/ post-acute facilities. The Heptagon framework of the Vital Signs Web captures the essence of the clinical approach in predicting and monitoring internal human body deterioration and improvement. The goal of this Heptagon model was to reestablish the profound, significant role of each of the seven vital signs in critical care by sustaining providers' clinical approach. The quality of patient care depends on the initial clinical assessment of the mental, physical, and physiological dimensions in which the function of the vital signs' web interconnectedness remains significant or crucial. For nurses and providers mastering the function of the Heptagon framework of the vital signs' Web, it will be a sign of competency that not only plays a role in the quality of diagnosis but also improves the quality of care.

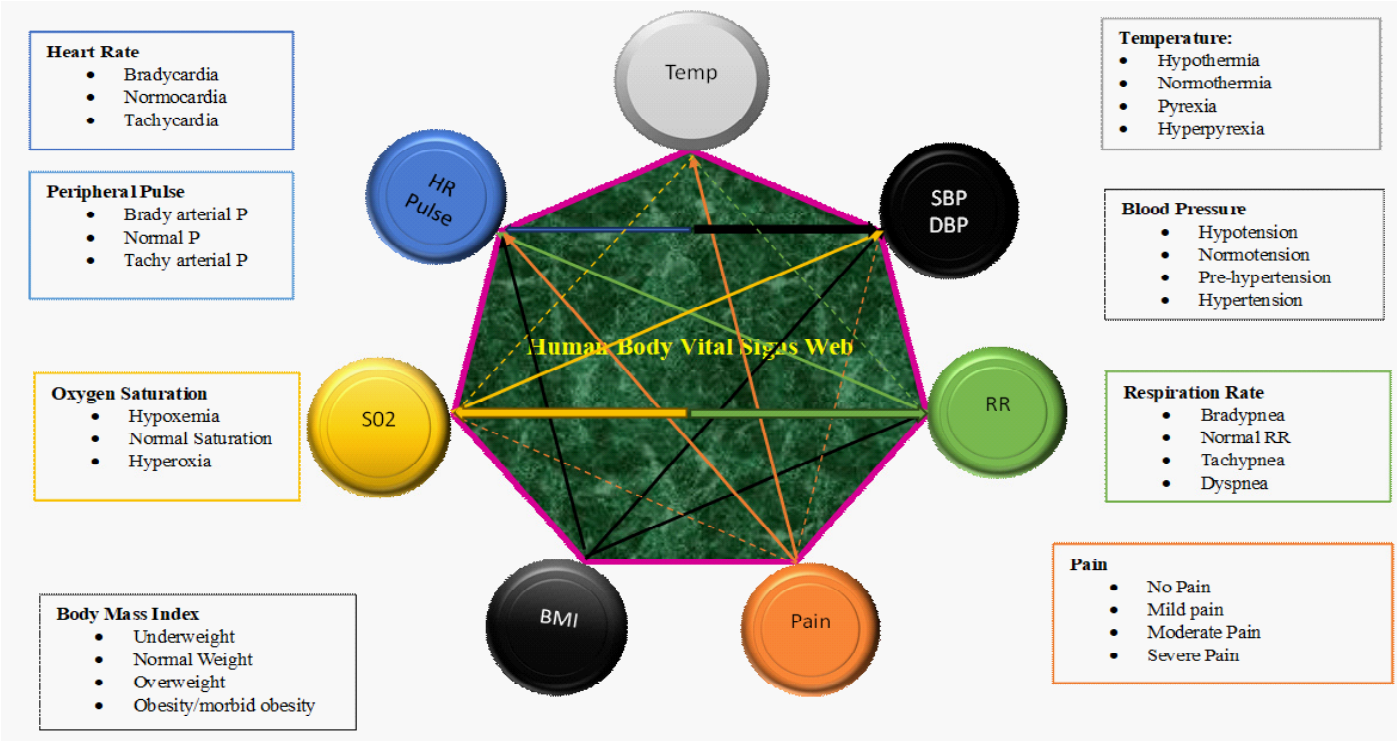

Figure 1. *Conceptual Heptagon Framework of Vital Signs Web (HF-VS-Web)*

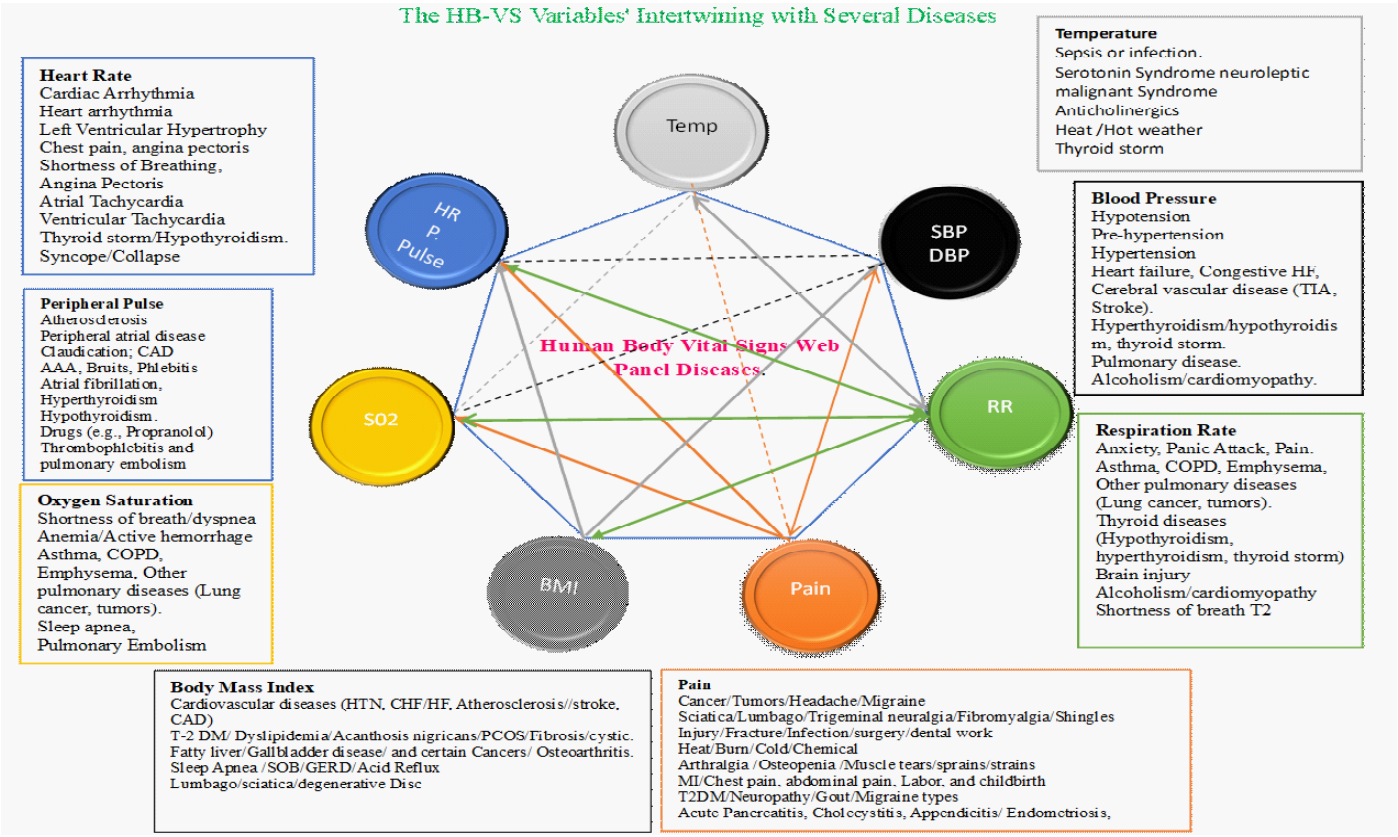

Figure 2. *Conceptual Heptagon Framework of Vital Signs Web (HF-VS-Web) with Connected Likely Diseases*

Figure 3. *The Difference between the heart rate and Pulse*

Significance for Nursing, Education, and Research

Significant for Nursing Research

Assessing and monitoring vital signs Web are fundamental components of nursing quantitative or qualitative research, including educating students in nursing and medical programs. Research on evidence-based clinical essays improves the quality of life if there is evidence of the vital signs' web homeostasis during and after the essays. In the clinical essay, the researcher examines the vital signs web stability trends during the intervention to predict the outcomes.

Significant for Advanced Clinical Practices

However, in clinical practices, nurses and practitioners constantly monitor and analyze the trends of vital signs' Web to predict the restoration of human body balance. In intensive care and emergency rooms, the heptagon framework of the vital signs' Web remains irrefutable and is a standardized communication tool among nurses and practitioners. It is the best tool to monitor and predict normal and abnormal changes in the physiological health conditions of patients.

The shared understanding of the vital signs' web interactions promotes more transparent communication and collaboration among healthcare caregivers, ultimately leading to more effective and coordinated patient care. Through the vital signs, practitioners analyze, interpret, plan, and initiate or redirect the treatment of the disease. The prevention of clinical outcome alteration depends upon the ability of intensive care nurses to detect and recognize an acute change in a patient's physiology through the computer monitor.

The seven vital signs variables in this heptagon framework or model remain a priority for the nurses and practicians in terms of monitoring and their effects of interconnectedness. Frequent monitoring of vital sign web parameters provides a real-time, dynamic picture of the patient's physiological health. It varies from med-surg unit to intensive care unit. Vital signs web monitoring is used more in the ICU, OR, and ER than in other units. Nurses and providers rely on Vital Signs Web to detect changes in condition or deterioration and facilitate an initiative-taking approach to patient care, minimizing the risk of complications. Each vital sign variable is promptly recorded, including time, patterns, and rates, analyzed, and interpreted.

Significant Nursing and Medical Education

The vital signs web is essential to understanding human physiology change and is fundamental to nursing and medical education. Trained nurses and practitioners use the vital signs Web to assess, interpret, and plan for intervention. Implementing the heptagon framework of the vital sign web in nursing and medical programs will enhance nursing students' competencies in assessment. Comprehending the interconnectivity of vital signs on the Web may strengthen and foster students' abilities to respond to critical care interventions at any practice level.

Conclusion

The Heptagon framework of the vital sign web represents a significant revolutionized model in advanced practice. This Heptagon framework is grounded on the theory of Rodgers' evolutionary concept development, and it offers a paradigm shift in how vital signs on the Web are analyzed and interpreted during the initial consultation and the management of care of patients in clinical settings. By embracing a comprehensive evolutionary approach from Rodgers, nurses and providers can strengthen their skills by using the Heptagon framework of the vital signs' Web, leading to more accurate diagnoses and tailored plans of care with subsequent improvement in patient outcomes in healthcare.

The primary goal is to strengthen the nurse's and providers' ability-based skills to use the Heptagon framework as a practical model to assess, interpret, diagnose, and initiate accurate care plans. The model may represent a transformative clinical approach for the nurses and providers. The Heptagon framework introduces a holistic assessment and a multi-dimensional early detection of complex conditions of a patient's physiological state. As healthcare continues to shift to competency-based education, the Heptagon Framework is a progressive inspiration, guiding nurses and providers toward a more holistic and comprehensive understanding of the complex interplay of vital signs Web in the quest for optimal patient outcomes.

Summary statement: Key points for policy, practice, and further research

Key points and knowledge gaps

- The traditional approach focused on the Pentagon vital signs web; however, pain and body mass index are crucial vital signs that intertwine within the Pentagon vital signs web of human pathophysiology. Using Rodgers' evolutionary concept analysis, the intertwined Web of vital signs remains complex and needs critical thinking to unveil the predictable clinical presumptive diagnosis.

Research findings/critical new information

- The goal of this Heptagon model was to reestablish the profound, significant role of each of the seven vital signs in critical care by sustaining providers' clinical approach. The quality of patient care depends on the initial clinical assessment of the mental, physical, and physiological dimensions in which the function of the vital signs' web interconnectedness remains significant or crucial.

The implications of change of policy/practice/research/education

- The Heptagon framework vital signs web is essential to understanding human physiology change and is fundamental to nursing and medical education. Comprehending the interconnectivity of vital signs on the Web may strengthen and foster students' abilities to respond to critical care interventions at any practice-level care.

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