BRAIN. Broad Research in Artificial Intelligence and Neuroscience
e-ISSN: 2067-3957 | p-ISSN: 2068-0473
Covered in: Web of Science (ESCI); EBSCO; JERIH PLUS (hkdir.no); IndexCopernicus; Google Scholar; SHERPA/RoMEO; ArticleReach Direct; WorldCat; CrossRef; Peeref; Bridge of Knowledge (mostwiedzy.pl); abcdindex.com; Editage; Ingenta Connect Publication; OALib; scite.ai; Scholar9; Scientific and Technical Information Portal; FID Move; ADVANCED SCIENCES INDEX (European Science Evaluation Centre, neredataltics.org); ivySCI; exaly.com; Journal Selector Tool (letpub.com); Citefactor.org; fatcat!; ZDB catalogue; Catalogue SUDOC (abes.fr); OpenAlex; Wikidata; The ISSN Portal; Socolar; KVK-Volltitel (kit.edu)
2026, Volume 17, Issue 1, pages: 410-433
Submitted: October 18th, 2025 | *Accepted for publication:* January 22nd, 2026

Postpartum Recovery and Work-Life Balance: Theoretical Neuroendocrine Implications of Traditional Nutritional Interventions

Lourdu Stepy P.
Research Scholar, School of Management Studies, Karunya Institute of Technology and Sciences, Coimbatore, India.
lourdustepy@karunya.edu.in,
https://orcid.org/0009-0003-0750-6039

Dolly Diana P.
Associate Professor, School of Management Studies, Karunya Institute of Technology and Sciences, Coimbatore, India.
dollydiana@karunya.edu,
https://orcid.org/0009-0007-0793-5211

A. Leo
Assistant Professor, Dept of Commerce and International Trade, Karunya Institute of Technology and Sciences, Coimbatore, India.
leoa@karunya.edu,
https://orcid.org/0000-0002-3757-533X

Shygil Joy
Assistant Professor, Dept of Commerce and International Trade, Karunya Institute of Technology and Sciences, Coimbatore, India.
shygiljoy@karunya.edu,
https://orcid.org/0000-0003-3500-3116

Fulvia Chiampo
Associate Professor, Department of Applied Science and Technology, Politecnico di Torino, Italy.
fulvia.chiampo@polito.it,
https://orcid.org/0000-0002-1170-4623

Abstract: *The research endeavour provides a detailed study of the perceived modulation of maternal well-being linked to neuroendocrine health and the subsequent effect on the work-life balance of women, specifically, the assessment of the effectiveness of a carefully designed postpartum health powder intended to improve the well-being of women. The research is carried out in a rigorous manner and begins with the production of the postpartum powder, based on the choice of botanicals traditionally recognized for their medicinal value in the context of maternal recovery.. Further steps assess the self-reported impact of the formulation on physiological symptoms and vitality. Data was obtained with the help of a structured questionnaire developed to measure the perception of women on physical health, mental health, work-life balance, and professional reintegration in the postpartum phase. The survey responses are then translated into quantitative measures and evaluated using SPSS where the identification of substantive patterns and interrelationships is performed. The findings obtained, which are presented in the form of detailed results and discussion, support the fact that the potential neuroendocrine support perceived from the supplement is related to increased psychological stability, reduced work-life conflict, and expanded ability to reconcile professional and family demands. The research therefore provides meaningful insights about the integrative models of maternal healthcare and the significance of specialized postpartum care in supporting the overall well-being of women and their socio-professional activities.*

Keywords: *neuroendocrine; postpartum powder; mental health; physical health; work-life balance; herbal powder; hormones.*

How to cite: Stepy, L. S. P., Diana, D. D. P., Leo, A., Joy, S., Chiampo, F., & Velammal, R. S. (2026). Postpartum Recovery and Work-Life Balance: Theoretical Neuroendocrine Implications of Traditional Nutritional Interventions. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience, 17*(1), 410-433. https://doi.org/10.70594/brain/17.1/28

R. Sakthi Velammal
Research Scholar, Dept of Commerce and International Trade, Karunya Institute of Technology and Sciences, Coimbatore, India.
rsakthi@karunya.edu.in,
https://orcid.org/0009-0003-9582-0940

1. Introduction

Pregnancy and the postpartum period are characterised by profound neuroendocrine fluctuations which have a strong impact on the maternal brain. The changes in the key hormones such as oestrogen, progesterone, oxytocin and prolactin cause structural and functional alterations in the neural circuits, thereby altering cognition, affect and stress tolerance. As much as these biological adaptations help in caregiving, they can also affect the attentional resources, memory consolidation, and emotional stability. These neurobiological changes are combined with work demands and job roles when women reenter the working environment; therefore, cognitive load, affective regulation, and decision-making ability may be temporarily compromised. Therefore, maternal-brain adaptations should be comprehensively studied to assess occupational balance in women. The postpartum healing in many cultures has long been recognized by traditional medical paradigms. The South Indian systems of medicine especially focus on recovery of somatic energy and mental sharpness after childbirth.

Some of the preparations like the Perukala Marunthu Podi are designed to support digestion, vitality and balance of the nervous system. These practices imply a complementary integrative view of maternal brain health that can be integrated with current neuroendocrine frameworks. In everyday life, the balance of work, family, rest and individual well-being is defined as occupational balance. For postpartum women, maintaining this balance is intimately linked to cognitive efficiency and emotional stability (Barba-Müller et al., 2019). This can increase susceptibility to the effects of stress, fatigue and emotional swings in the workplace by neuroendocrine alterations. The emotional changes of the maternal brain are one of the key factors in coping with professional expectations and caregiving roles (Bloch, Daly, & Rubinow, 2003). Ancient medicine practices focus on the healing of the mind and body using a holistic approach to recovery. The digestive herbs and nervine herbs that are used to make Perukala Marunthu Podi are traditionally said to boost energy and mental stability. These recipes are appreciated culturally as they help in post-birth strength and mental stability (Brummelte & Galea, 2016).

Synthesizing traditional wisdom with scientific evidence offers a more comprehensive approach to maternal health. This method takes into consideration biological processes as well as cultural healing practices. Consequently, this study adopts a holistic framework to examine the interplay between neuroendocrine fluctuations, maternal brain plasticity and traditional medicine in influencing women's occupational balance. (De Groot et al., 2006). Extensive research evidence demonstrates that pregnancy and the postpartum period cause considerable neuroendocrine modifications that restructure the maternal brain. Oestrogen, progesterone, oxytocin, and prolactin possess a rapid fluctuation, which affects the neural connectivity involved in emotion, cognition, and stress control (Glynn, 2010). Neuroimaging results can demonstrate plasticity of the brain structure and functions in the postpartum period, especially in the areas related to caregiving and emotional processing. Such adaptations are deemed biologically protective in terms of infant care and can also lead to temporary cognitive problems (Hoekzema et al., 2017). Nonetheless, orchestrated together with work requirements, these neural modulations can influence work efficiency (Kim et al., 2010). Hormonal withdrawal following childbirth has been linked to being vulnerable of mood by researchers. There is usually an increase in emotional sensitivity and stress reactivity. These results lay down the neurobiological basis to the occupational balance of the mother (Kim, Strathearn, & Swain, 2016).

There is a broad body of psychological and neuroscientific literature on cognitive and emotional adjustments of the maternal brain. A significant number of postpartum women complain of relying on concentration, memorization and multi-tasking skills (Monk, Lugo-Candelas, & Trumpff, 2019). Neuroendocrine shifts are also important in emotional regulation, which makes a person more susceptible to depression symptoms and anxiety. The hormonal changes alone and in combination with the psychosocial stressors are closely linked to postpartum depression and anxiety disorders (O'Hara & McCabe, 2013). These psychological issues have a direct impact on work and role balance. Existing literature indicates that maternal brain adaptations may last even after immediate postpartum. Cognitive fatigue can further be affected by stress due to workplace responsibilities. Stress at home might be increased by emotional labour in the workplace (Parsons et al., 2010). Biological recovery requirements are not often taken into account by social expectations of quick professional reintegration. Therefore, change with: neurocognitive and psychological adaptations have an important role in determining the occupational balance of women (Ross & McLean, 2006).

Occupational balance is described as the harmonious nature of work, family, rest and personal well-being. Studies have shown that neuroendocrine alterations that happen during the postpartum period have the potential of disrupting this balance among working women (Schiller, Meltzer-Brody, & Rubinow, 2015). Emotional exhaustion and elevated stress rates are general among the women who are back to work following the birth of a child. Research emphasizes that organizational inflexibility leads to cognitive and emotional stress in the workplace (Slomian et al., 2019). It has been demonstrated that occupational stress affects maternal mental health in a negative way. On the other hand, favorable working conditions lead to improved psychological well-beingAdaptive occupational policies are needed to prevent neurobiological vulnerability in the postpartum period (Kim, Strathearn, & Swain, 2016).

These findings emphasize the need to use holistic models, which can be implemented to maternal brain in the work environment. The various combinations of nutrition plays a significant role in sustaining the neuroendocrine balance in addition to brain health during the postpartum phase. Scientific studies have provided an indication that the quality of diet can influence emotional well-being and thinking abilities. Being a conventional postpartum nutrition, the attention has always centered on holistic healing (World Health Organization, 2014). The Traditional medicine of the South Indians includes recipes, such as Perukala Marunthu Podi that is believed to improve digestion, energy and mind sharpening. Studies on postpartum nutrition of plants have shown its effectiveness in reducing stress. The gut-brain axis has been attributed to emotional regulation by gut health (Xiong et al., 2007).

Conventional dietary treatment can thus indirectly help in the cognitive stability of the mother. Biomedical practices are complemented by cultural practices. Combining scientific research with traditional medicine adds to the knowledge on the recovery of the maternal brain. The recent literature promotes a holistic approach to postpartum maternal health based on the incorporation of the biological, psychological, occupational, and cultural aspects (Young & Korszun, 2010). Neuroendocrine adjustments are gradually being considered as key in maternal cognitive and emotional adjustments. The interaction between brain plasticity and environmental demands affect occupational balance (Wu & Jin, 2025). Research highlights the need to have long postpartum care on top of physical healing. Emotional resilience is promoted by social support and practices relevant to the culture. Conventional medicines like Perukala Marunthu Podi are the traditional forms of knowledge in the support of maternal health (Field, 2010). Oxytocin is an important hormone that mediates maternal attachment, emotion and stress alleviation. It is excreted when a child is being born, when a mother breastfeeds a child, and when a mother and an infant interact (Dennis & Ross, 2006).

Oxytocin increases social cognition and emotional sensitivity in the maternal brain. Neurobiological research associates oxytocin with anxiety reduction and emotional resilience (Chopra & Doiphode, 2002). This hormone aids adaptive caregiving actions and emotional sensitivity. Nevertheless, separation in the workplace with the infant could change oxytocin release patterns. Professional life can also increase emotional stress, thus limiting bonding time. Oxytocin has been identified as a significant stress-buffering mechanism. It is also essential in researching the work-life balance of postpartum women (Pandey, Rastogi, & Rawat, 2013). Prolactin, while primarily associated with lactation, also significantly modulates maternal cognition and behaviour. Higher levels of prolactin facilitate parental nurturant behaviour and emotional sensitivities. This hormone modulates brain areas associated with motivation and caregiving. In some women, elevated prolactin levels have been associated with prolactin leading to fatigue and decreased alertness. In the context of early return to work, these effects could affect workplace performance (Hazra et al., 2019). The levels of cognitive endurance and energy could vary according to the changes in prolactin. It may be difficult to balance breastfeeding requirements with professional responsibilities. Studies indicate that prolactin is a factor in the preference of caregiving over outward activities.

This compensatory process can be incompatible with the professional requirements. Therefore, prolactin has an indirect but significant effect on occupational balance. The main stress hormone is cortisol, which is highly modulated during pregnancy and postpartum. Disturbance of the cortisol levels has been linked to emotional distress and anxiety (Sarris et al., 2015). Postpartum mothers are susceptible to stress-induced cortisol elevation. Cortisol can also be increased by occupational stress. Extended cortisol levels have adverse effects on memory and emotional control. Studies associate high cortisol with poor executive performance. Mother's sensitivity to stress on the brain is thus enhanced biologically after delivery. Favorable surroundings contribute to the regulation of cortisol reactions. Old-fashioned recovery methods focus on relaxation and less stress. Regulation of cortisol is therefore important in maintaining cognitive and occupational well-being of the mother. Postpartum women may experience heightened cortisol responses to stress. Occupational stress can further elevate cortisol levels. Prolonged cortisol elevation negatively impacts memory and emotional regulation. Research links high cortisol to reduced executive functioning. Maternal brain sensitivity to stress is therefore biologically heightened postpartum. Supportive environments help moderate cortisol responses. Traditional recovery practices emphasize rest and stress reduction.

The subdivision of science that examines how the nervous system interacts with the endocrine system in controlling physiological procedures is known as neuroendocrinology. It details the mechanism by which the brain regulates hormone release by use of unique organs like the hypothalamus and the pituitary gland. The neuroendocrine mechanisms are very important in the control of homeostasis, stress, growth, reproduction, and metabolism. Released hormones in the blood are what impact the behaviour, mood, cognition of the brain, and their working. On the other hand, the neural signals are able to cause a quick change in the endocrine reactions to both internal and external stimuli. The neuroendocrinology is particularly significant in the explanation of life stages like pregnancy, postpartum period, puberty and aging. The disturbance of neuroendocrine systems is linked with such disorders as depression, anxiety, thyroid dysfunction, and infertility. It is a discipline that combines neuroscience, physiology, psychology and molecular biology. There has been an increase in neuroendocrinology, which has enhanced knowledge of the interactions between mind and body. In general, neuroendocrinology is a science that establishes a relationship between biological processes and behaviour and health outcomes.

1.1. Research Gap Identified:

In spite of the study containing a detailed conceptual discussion on maternal neuroendocrine modulation and work-life balance, there is a major gap in research in the form of missing experimental rigor and causal validation. The study is based more on the self-reported questionnaire data and no control, placebo, or no-intervention group is used, and it is not possible to establish causality for the observed outcomes that were identified by the postpartum powder. Moreover, theoretical arguments about hormonal effects are not supplemented by objective biochemical data like serum cortisol, prolactin levels in serum or the level of thyroid hormones. This lack of physiological stress indicators, cognitive performance assessments and sleep measures leaves a discrepancy between neuroendocrine theory and empirical validation. Consequently, the conclusions are mostly driven by the perceived benefits as opposed to biologically verified results, limiting the study contribution to evidence-based maternal health research.

The other significant gap is the validity of the measurement and the depth of the statistical analysis. The self-administered questionnaire is not psychometrically validated using validated scales or reported reliability coefficients like Cronbach alpha and, therefore, questions the construct validity and measurement accuracy. Also, the widespread application of several univariate ANOVAs without multivariate modeling enhances the chances of inflated Type I error and ignores the relationship between the health, psychological and occupational variables. The chemical composition of the postpartum powder is defined as theoretical molecular formulas instead of being determined in the laboratory with laboratory-confirmed concentration determined by using standard analytical methods like GC–MS or HPLC. The study, therefore, does not go further to combine the field of formulation chemistry, physiological outcomes, and occupational behaviour into one empirical framework and more rigorous, multidisciplinary and methodologically sound research is needed in the future.

2. Proposed Methodology

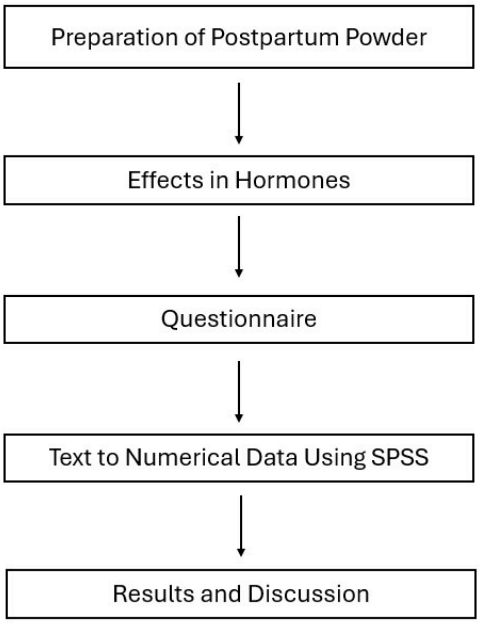

Figure 1. Proposed Methodology

The chart outlines a research system that is planned to determine the effects of a postpartum powder on the health of women, as well as to determine their work-life balance. The process begins with the development of the powder, whereby we selectively blend traditional or non-traditional ingredients that are nutritionally derived and wondered in a specific manner to produce a conception that will promote the process of postnatal recovery. Then we consider the impact that the powder has on the hormonal processes, with special consideration to its ability to maintain hormonal balance during the postpartum phase. Hormonal regulation plays a very important role because it determines physical recovery, emotional stability, and renewal of energy reserves in women after childbirth. As a result, a questionnaire is designed to bring out the perceptions of women as far as health promotion, overall well-being and work-life balance are concerned as an outcome of powder consumption. The subjective experiences are translated into measurable indicators using the instrument.

The data collected is then used and transcribed into a numerical format with the help of SPSS and thus enables the data to undergo rigorous statistical analysis. The data obtained is thus coded and scaled with care, so as to guarantee the accuracy of the obtained data, as well as consistency. The SPSS package will then be used to test the inter-variable correlations i.e., the variables to be analysed are age, perceived health improvement, work-life equilibrium. The last stage is related to the presentation and discussion of the findings; this stage is connected with the synthesis of statistical findings. Here, the section clarifies the effects of postpartum powder in the regulation of hormonal balance as well as daily functioning. Moreover, it creates a connection between better health outcomes and better work-life balance. The exposition compares the empirical results with the existing literature. On balance, the chart displays a rational, consistent development of the product formulation towards the empirical analysis and, therefore, a compliance of the methodological rigor and provides a substantive interpretation of the results.

3. Preparation of postpartum Powder

Table 1. Chemical Component of Postpartum Powder

S. No	Ingredient	Active Compound	Chemical Formula	Function in Postpartum Care
1.	Ajwain (*Trachyspermum ammi*)	Thymol	$C_{10}H_{14}O$	Antimicrobial, antispasmodic, aids digestion, reduces gas
2.	Ajwain	γ-Terpinene	$C_{10}H_{16}$	Antioxidant, anti-inflammatory, supports metabolic recovery
3.	Ajwain	p-Cymene	$C_{10}H_{14}$	Carminative, supports gut health and nutrient absorption
4.	Turmeric (*Curcuma longa*)	Curcumin	$C_{21}H_{20}O_6$	Anti-inflammatory, antioxidant, supports tissue repair
5.	Asafoetida (*Ferula assa-foetida*)	Diallyl sulfide	$C_6H_{10}S$	Digestive stimulant, antimicrobial, reduces bloating
6.	Asafoetida	2-Butyl-propenyl disulfide	$C_7H_{14}S_2$	Antioxidant, supports gut microbial balance
7.	Asafoetida	Ferulic acid	$C_{10}H_{10}O_4$	Anti-inflammatory, antioxidant, tissue recovery
8.	Asafoetida	Umbelliferone	$C_9H_6O_3$	Antioxidant, supports metabolic processes
9.	Cumin (*Cuminum cyminum*)	Cuminaldehyde	$C_{10}H_{12}O$	Digestive support, anti-inflammatory, antioxidant
10.	Cumin	Linalool	$C_{10}H_{18}O$	Antioxidant, supports emotional and digestive balance
11.	Cumin	Terpenes	$C_{10}H_{16}$	Anti-inflammatory, supports gut motility
12.	Black Cumin (*Nigella sativa*)	Thymoquinone	$C_{10}H_{12}O_2$	Antioxidant, anti-inflammatory, neuroprotective
13.	Black Cumin	α-Hederin	$C_{41}H_{66}O_{12}$	Immune support, adaptogenic, tissue recovery
14.	Long Pepper (*Piper longum*)	Piperine	$C_{17}H_{19}NO_3$	Digestive stimulant, anti-inflammatory, enhances nutrient bioavailability
15.	Mustard (*Brassica juncea*)	Sinalbin (Glucosinolate)	$C_{14}H_{19}NO_{10}S_2$	Digestive aid, antimicrobial, supports detoxification
16.	Mustard	Allyl isothiocyanate	C_4H_5NS	Anti-inflammatory, stimulates digestion, gut motility
17.	White/Black Pepper (*Piper nigrum*)	Piperine	$C_{17}H_{19}NO_3$	Digestive stimulant, antioxidant, supports metabolism
18.	Shatavari (*Asparagus racemosus*)	Shatavarin I	$C_{51}H_{86}O_{23}$	Hormonal balance, lactation support, adaptogenic
19.	Shatavari	Shatavarin IV	$C_{45}H_{74}O_{17}$	Antioxidant, immune support, stress modulation

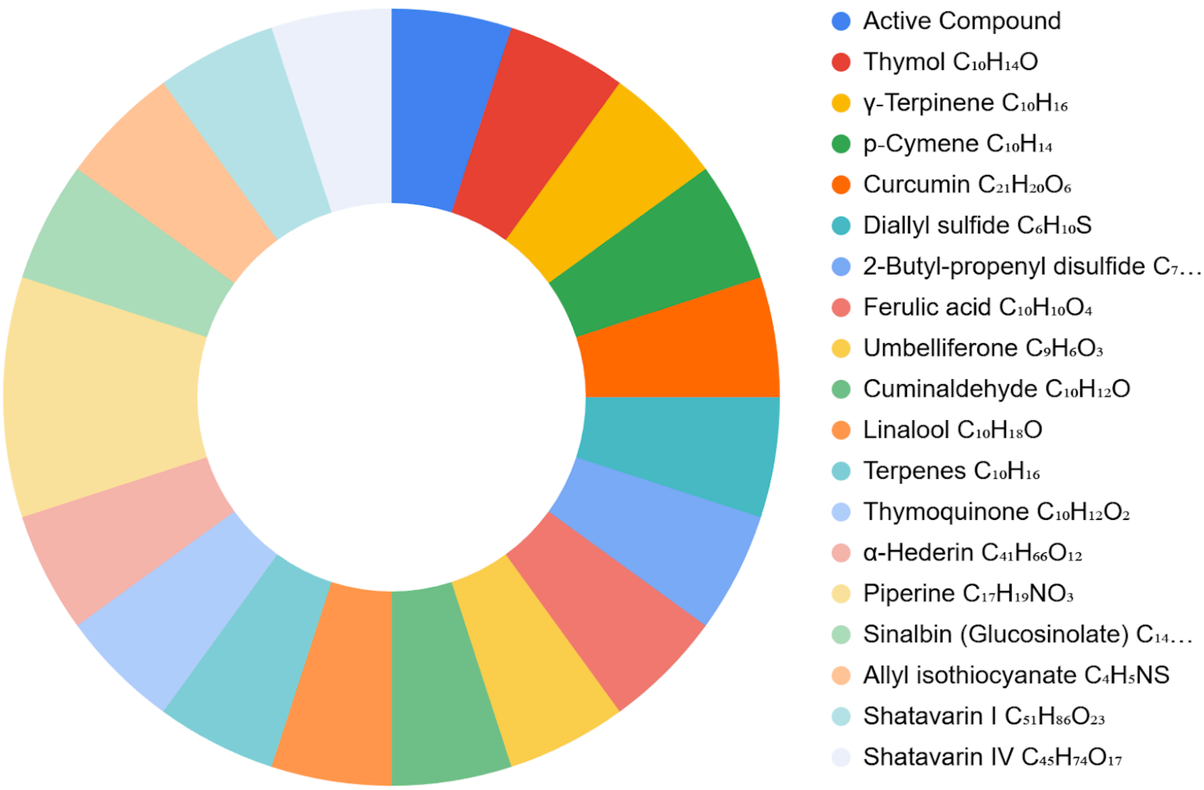

Figure 2. Formula for this postpartum powder

The first stage of the preparation process is the careful cleaning of all the raw botanicals which are: ajwain, turmeric, asafoetida, cumin, black cumin, long pepper, mustard, pepper, and shatavari roots. Individual ingredients have been carefully washed to remove any particle dust and other unwanted impurities, hence preserving the integrity of bioactive structures in the individual specimens. After cleansing these ingredients are shade-dried separately. Through this, they save thermolabile phytochemicals and retain the medicinal promise of each species, preventing the loss of nutrients that otherwise would be caused by direct exposure to sunlight. Ajwain, cumin, black cumin, mustard seeds, long pepper and pepper are then subjected to a mild dry-roasting process after exposure to controlled and low heat conditions. Meanwhile, turmeric roots and shatavari roots are either dried in the sun or shade till it becomes moist free. Asafoetida is traditionally detoxified by being dissolved in warm water or milk, and also undergoes a second drying stage. After roasting or drying, every ingredient is allowed to cool to ambient temperature, thus eliminating the presence of thermal shock, which could otherwise have changed the structural matrix of the plant material.

The herbs are then cooled and finally ground using hygienic and calibrated grinders to form discrete powders. All of the resultant powders are sieved separately through progressively finer sieves in order to obtain a consistent particle distribution and a smooth homogenous textural profile. Using standard pharmacopeial guidelines, each powder is measured using state-of-the-art equipment, ensuring the right proportions are made to correspond to time-tested blends. The constituents measured are mixed systematically and active compounds are evenly distributed through blending to ensure a homogeneous composite mixture. The blended mixture can also be subjected to a marginal slow-heating step, which is also used to extend the shelf-life by eliminating any remaining microbial activity without destabilizing the bioactive matrix. Lastly, the final product of the postpartum formulation is packaged in an airtight and desiccated container, which is not subjected to direct ingression of moisture and sunlight, hence maintaining its therapeutic benefit even in long-term storage. The powder is fully cooled and ready to be used, which is normally used in the postpartum period, in aqueous solutions like warm water, dairy-based fluids or herbal decoctions.

The study sign could be reinforced to increase its internal validity and incorporate several comparison groups. The participants can be separated into: an Intervention Group, a Placebo Group and a No-Intervention Control Group. The Intervention Group receives the postpartum health powder. The Placebo Group is given a placebo powder that has a similar color, texture and taste. The No-Intervention Control Group receives postnatal care of powder-free quality. The three-arm format ensures that one can distinguish between actual physiological effects, the placebo response, and even natural postpartum healing. An inert placebo made of food-grade (e.g. roasted rice flour or maltodextrin) materials in a powder form should be formulated. The placebo is to be: Organoleptically comparable (look, taste, feel), Contained with known bioactive phytochemicals Dosed and scheduled identically to the intervention powder. This makes it blind and diminishes expectancy bias in subjective results. A computer-generated randomization sequence should be used to assign the participants to study groups randomly. It can be done through allocation concealment via sealed envelopes or coded containers. Randomization reduces: Selection bias. To control for confounding factors like age, parity, or baseline health status Heart Rate Variability (HRV) analysis should be included. Time-domain (RMSSD, SDNN). Frequency-domain (LF/HF ratio). During the resting condition, HRV recordings can be made with validated wearable ECG or chest-strap sensors. The quality and quantity of sleep should be measured objectively with: Actigraphy or wearable sleep trackers. Measures: sleep duration, sleep hygiene, and sleep fragmentation. These data assist in the correlation of hormonal control and cognitive recovery with functional outcomes, which occur in real life. The non- volatile bioactive compounds that should be quantified with the help of High-Performance Liquid Chromatography (HPLC) include: Curcumin, Piperine, Ferulic acid. Reporting in inferred molecular formula should be discouraged in favor of reporting actual concentrations (mg/g of powder).

4. Effects on Hormones

Post-Pregnancy Hormones

1. Oestrogen & Progesterone
2. Oxytocin
3. Prolactin
4. Cortisol (Stress Hormone)
5. Thyroid Hormones

4.1. Oestrogen & Progesterone

The role of oestrogen and progesterone in postnatal recovery in the female body remains despite the fact that their levels decline significantly during the postpartum period. Oestrogen stimulates endometrial regeneration, maintains osteoblastic activity to maintain bone density, enhances vascular perfusion, and protects the structural integrity of vaginal and pelvic tissues, and also leads to affective equilibrium and neurocognitive functioning. The sudden postpartum drop of these hormones may trigger mood swings, anxiety, exhaustion, and sleep disorders, making them absolutely essential in the overall post-pregnancy health.

Structure of Oestrogen & Progesterone:

- Both are steroid hormones
- Synthesized from cholesterol
- Contain a four-ring carbon (steroid) nucleus
- Lipid-soluble, allowing them to pass easily through cell membranes
- Act by binding to intracellular hormone receptors
- Regulate gene expression and cellular function

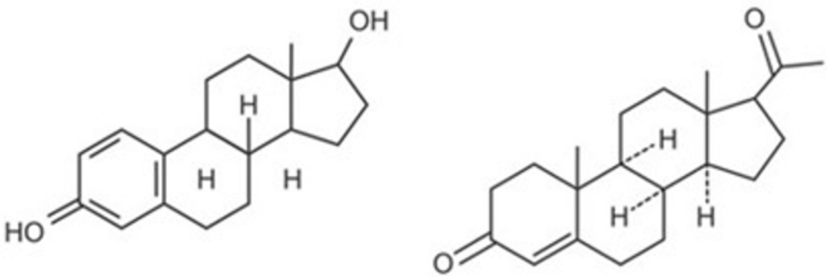

Figure 3. Structure of oestrogen & progesterone

4.2. Oxytocin

Oxytocin is a vital hormone in postpartum women that helps to achieve physiological and psychological stability. It is also emitted in large measures during parturition and lactation, which helps the uterus to resume its pregestational size and thus reducing the amount of blood loss after delivery. Oxytocin strengthens the maternal-infant bond, generates feelings of calm and trust, eliminates stress and anxiety, and supports the let-down reflex when breastfeeding.

Structure of Oxytocin:

- Peptide hormone
- Composed of 9 amino acids (nonapeptide)
- Synthesized in the hypothalamus
- Stored and released by the posterior pituitary gland
- Contains a cyclic (ring) structure formed by a disulfide bond
- Water-soluble and acts by binding to cell surface receptors

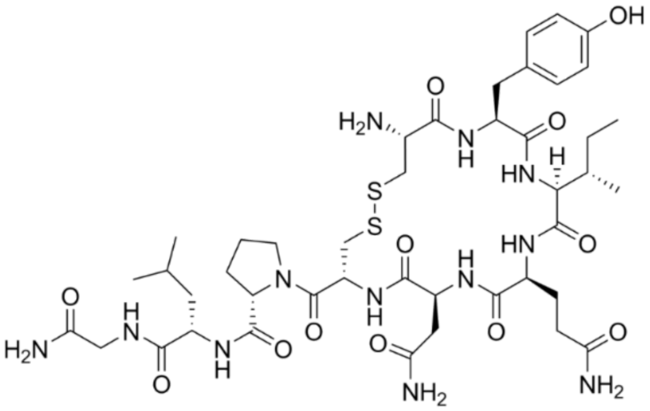

Figure 4: Structure of Oxytocin

4.3. Prolactin

Prolactin is a critical endocrine mediator in the postpartum physiological environment that is largely involved in lactogenesis and the overall range of maternal adaptation after parturition. The hormone coordinates the production and the release of milk in the mammary alveolar epithelium hence guaranteeing the nutritional sufficiency of the neonate and lactational adherence in breastfeeding. At the same time, prolactin has a short-term inhibitory effect on ovulation, which provides the maternal organism with a necessary recovery period after conception. Furthermore, it stimulates better maternal attachment and maternal nurturing preferences, but extreme rise in prolactin levels can lead to somnolence and loss of vitality - a common postpartum effect.

Structure of Prolactin:

- Protein (peptide) hormone
- Composed of approximately 199 amino acids
- Synthesized and secreted by the anterior pituitary gland
- Water-soluble in nature
- Acts through cell surface receptors
- Regulates gene expression via intracellular signaling pathways

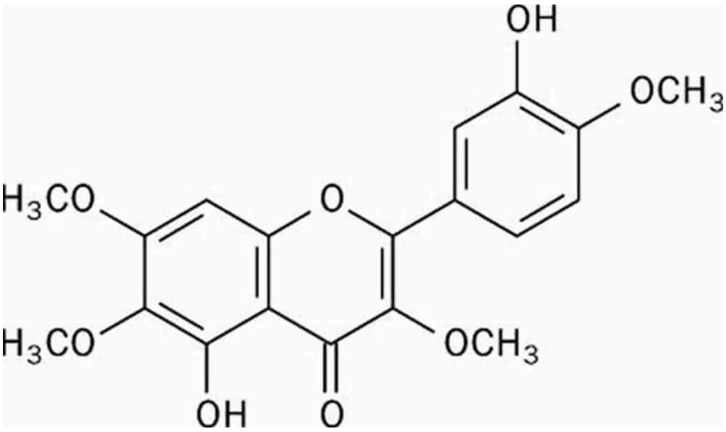

Figure 5: Structure of prolactin

4.4 Cortisol (Stress Hormone)

The cortisol is a necessary hormone of stress which enables the postpartum women to adjust to the physical and emotional requirements of motherhood. It aids energy production by regulating glucose metabolism, aids in controlling inflammation as well as aids the body in its reaction to stress. During the postpartum period, cortisol assists the mother to restore sleep and heal but over a prolonged period, the high levels of cortisol because of chronic stress can be harmful by affecting mood, immunity and energy levels thus leading to anxiety, irritability and fatigue. An optimal level of cortisol is a factor in the general wellness of a mother and her postpartum.

Structure of Cortisol:

- Steroid hormone
- Synthesized from cholesterol
- Produced by the adrenal cortex
- Contains a four-ring steroid nucleus
- Lipid-soluble and can cross cell membranes
- Acts by binding to intracellular glucocorticoid receptors

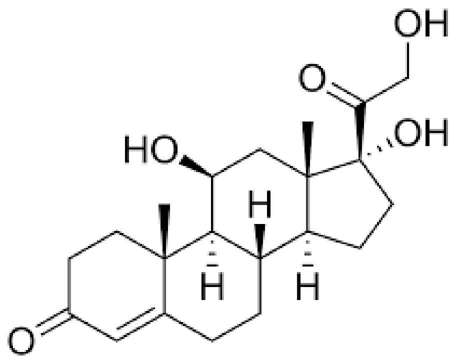

Figure 6. Structure of Cortisol

4.5. Thyroid Hormones

The thyroid hormones are important in ensuring that the metabolism and the energy levels in the after-pregnancy women are maintained. They control the metabolism of the body, help to maintain the temperature and affect the heart rate and digestion. After childbirth, some women may experience temporary thyroid dysfunction, which can lead to symptoms such as fatigue, weight changes, mood disturbances, anxiety, or depression. Balanced thyroid hormone levels are essential for physical recovery, emotional stability, and overall maternal well-being during the postpartum period.

Structure of Thyroid Hormones:

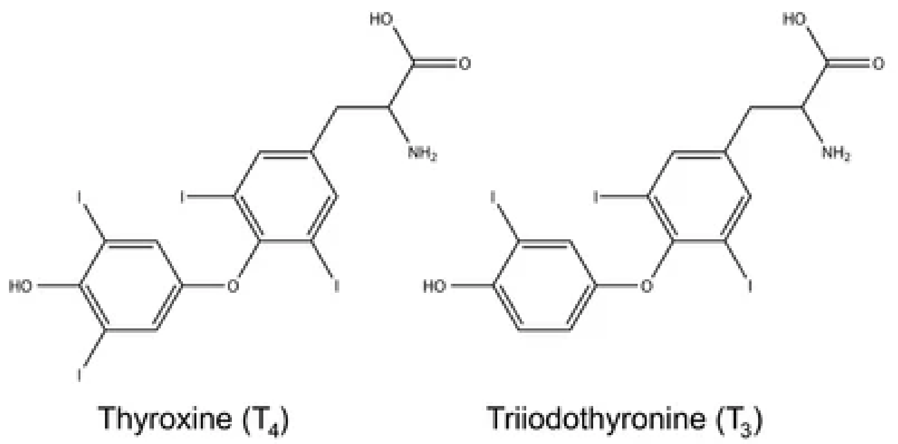

Figure 7: Structure of thyroid hormones

- Amine hormones
- derived from the amino acid tyrosine
- Two main forms: Thyroxine (T4) and Triiodothyronine (T3)
- Contain iodine atoms (T3 has three, T4 has four)
- Synthesized in the thyroid gland
- Lipid-soluble in nature
- Act by binding to intracellular nuclear receptors

Neurohormones are chemical substances produced by specialized neurons that control physiological processes by influencing distant target organs. They do not diffuse across synapses like neurotransmitters; instead, they enter the bloodstream as well as mixing properties of neurotransmitters and hormones. The neurohormones are crucial in the management of the stress responses, reproduction, growth and metabolism. Examples include oxytocin, vasopressin and corticotropin-releasing hormone (CRH). These substances aid in the organization of communication between the brain and the endocrine system. The neurohormones control emotions, mood, and behaviour. They play a critical role in ensuring internal homeostasis. Imbalances of neurohormones may be the cause of multiple neurological and endocrine diseases.

Neurohormones are chemical substances released within the body that are produced by specialized nerve cells in the body (neurons) and therefore, they can be compared to hormones since they are released into the blood to control body functions in the distant target organs. The neurohormones are distinct from neurotransmitters, which have localized effects in synapses. Hypothalamus neurosecretory neurons release the neurohormones. The neurohormones released by these neurons may go directly into the bloodstream via the posterior pituitary gland (e.g., oxytocin and vasopressin) or into the hypophyseal portal system, which in turn controls the release of hormones by the anterior pituitary gland. Accordingly, the hypothalamus serves as the major connection between the endocrine system and the nervous system.

The postpartum phase is marked by intense neuroendocrine changes of the hypothalamic-pituitary-gonadal (HPG) axis. The hypothalamus releases a hormone known as gonadotropin-releasing hormone (GnRH) that is predominantly involved in the regulation of the release of luteinizing hormone (LH) and follicle-stimulating hormone (FSH) by the anterior pituitary gland. After the birth of the child, the activity of this axis is suppressed temporarily and the course of recovery varies greatly in the case of breastfeeding and non-breastfeeding of the woman. High levels of prolactin, which are induced by suckling in breastfeeding women, have an inhibitory action on hypothalamic GnRH pulsatility. Low GnRH secretion causes inhibited LH and, to a smaller degree, FSH secretion. This causes a delay in ovulation and menstrual cycles are absent or abnormal, a condition referred to as lactational amenorrhea. LH pulsatility is especially reduced and it does not allow follicular maturation and ovulation. The FSH levels can also normalize sooner than LH and ovulation is not achieved without an LH surge. This adaptive neuroendocrine response is a maternal energy-conservative contraceptive that has a temporary contraceptive effect but is a natural phenomenon in the course of exclusive breastfeeding.

The gut-brain axis is a complex, two-way communication system between the gastrointestinal system and the central nervous system that involves neural, endocrine, immune, and metabolic pathways. This axis entails co-ordinated gut microbiota, enteric nervous system, vagus nerve, hypothalamic-pituitary-adrenal (HPA) axis and other neuroendocrine mediators. Physiological, hormonal, and psychological changes in the postpartum period can seriously change the intestinal microbial composition and, as a result, affect emotional regulation, stress responsiveness, and cognitive functions. Gut microbiota regulates neuroendocrine functions by synthesizing bioactive products in the form of short-chain fatty acids, neurotransmitter precursors, and neuroinflammatory mediators. Such compounds may induce effects on the brain via direct circulation or indirectly by stimulating the vagal afferent pathways. Changes in gut permeability and intestinal microbial diversity in the postpartum period could contribute to systemic inflammation and release of cortisol which is associated with mood changes, fatigue, and stress sensitivity. On the contrary, a normal intestinal microbiome is conducive to optimal neuroendocrine signaling, immune regulation and mood stability.

The gut-brain axis is also important in controlling the stress response through the HPA axis. The gut-derived signals can regulate the release of corticotropin-releasing hormone by the hypothalamus and hence affect cortisol secretion. The traditional dietary preparations used in postpartum care based on the presence of digestive and carminative herbs could improve gut health, improve the absorption of nutrients, and alleviate gastrointestinal discomfort. These interventions could indirectly aid neuroendocrine balance, cognitive clarity, and psychological well-being through the facilitation of better occupational functioning and work-life balance in postpartum women by improving gut function.

5. Data Collection Using Five-Point Scale Questionnaire

A standardized series of 10 questions is used to gather mental health information from participants at the start of the session (Table 2).

The researcher has collected data from selected private bank women employees immediately after the childbirth (0 to 5 months) through questionnaires in the southern part of Tamil Nadu, Based on Morgan's sample size formula. In inferential statistics, the formula for confidence interval is

Unlimited population: $CI = \hat{p} \pm z \times \sqrt{p(1-p)}/n$

Finite population: $CI = \hat{p} \pm z \times \frac{\sqrt{\hat{p}(1-\hat{p})}}{n} \times \frac{\sqrt{N-n}}{\sqrt{N-1}}$

where

- z is z score
- p̂ is sample proportion
- n and n' are sample sizes
- N is the population size

Table 2. Five-Point Scale Questionnaire

S.No	Questionnaire	Strongly Agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Strongly Disagree (5)
1	Frequent consumption of the health drink after childbirth has greatly helped me in terms of physiological recovery after childbirth.					
2	Regular taking of the postpartum health drink has also resulted in a significant boost in my general vitality.					
3	The postpartum health drink has played a critical role in alleviating fatigue and body weakness in the postnatal stage.					
4	I feel that the postpartum health drink supplements my hormonal balance and emotional wellness.					
5	Consumption of the postpartum health beverage has influenced my general psychological state positively.					
6	I am in a better position to handle the postnatal stress after taking the postpartum health drink.					
7	The postpartum health drink also allows me to maintain my high concentration and vigilance in my daily endeavors.					
8	The enhanced health after the intake of the postpartum health drink will enable me to combine the professional and family commitments well simultaneously.					
9	Due to the improved physical and mental health, I also have a lower work-life conflict.					
10	Generally, the postpartum health drink has played a positive role in my work-life balance when coming back to work.					

The size of the population is 8,500. In that, based on the Morgan sample size formula 300 samples were identified with confidence level 98%, margin of error 5%, and population proportion 50%. Here simple random sampling techniques was also used to identify the samples from the population.

The questionnaire was analysed for reliability and Cronbach's alpha value of 0.754 of the 10 items scale is an acceptable result in terms of internal consistency. This finding implies that the questionnaire items are correlated enough and assess the same underlying construct in a consistent and consistent manner. Cronbach's alpha combination of more than the generally accepted value of 0.70 indicates that the instrument is reliable to use in research and it can be further statistically analysed. Thus, the scale may be discussed as reliable to measure the perceptions of the participants concerning the postpartum health, psychological wellbeing, and work-life balance. The reliability obtained helps in interpreting the study findings with fair confidence using the questionnaire.

Table 3. Reliability Statistics (Cronbach's alpha)

Case Processing Summary			
		N	%
Cases	Valid	301	100.0
	Excluded[a]	0	.0
	Total	301	100.0
a. Listwise deletion based on all variables in the procedure.			

Reliability Statistics	
Cronbach's Alpha	N of Items
.754	10

5. Results and Discussion

H1: Empirical data indicates that there is a statistically significant relationship between chronological age and perceived improvement of physical health after taking the postpartum health drink.

Table 4. H1 ANOVA

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Frequent consumption of the health drink after childbirth has greatly helped me in terms of physiological recovery after childbirth.	Between Groups	2.604	3	.868	2.851	.038
	Within Groups	90.116	296	.304		
	Total	92.720	299			
The postpartum health drink has played a critical role in alleviating fatigue and body weakness in the postnatal stage.	Between Groups	2.852	3	.951	2.684	.047
	Within Groups	104.868	296	.354		
	Total	107.720	299			

The above statistical method is used to establish the existence of significant differences between age groups in terms of the perceptions of women on the benefits that the intake of postpartum health drinks provides them. With regards to the claim that Frequent consumption of the health drink after childbirth has significantly assisted me in physiological recovery after childbirth, ANOVA result showed the F value of 2.851, and the significant value, p = 0.038. Since this p-value is less than the standard alpha 0.05 level, it is correct to state that there is statistically significant difference in perceived physiological recovery in the groups of people studied in terms of age. Likewise, in the case of the statement, the postpartum health drink has been very instrumental in the reduction of fatigue and body weakness during the postnatal phase, the ANOVA gave, F = 2.684 with a p -value of 0.047.

The above p-value is also under the cut-off point of 0.05, which proves that there is a significant difference in how age groups view fatigue reduction and body strength improvement. Together, the results of the ANOVA indicate the central role of age in influencing the perceptions of women on the health benefits they view in taking postpartum health drinks. The women in very different age groups provide different ratings that relate to physiological recovery and the alleviation of fatigue. These results help support the hypothesis that age is a salient predictor of postpartum recovery trajectories and, therefore, the need to continue post-hoc studies to identify the particular age groups that stand out the most.

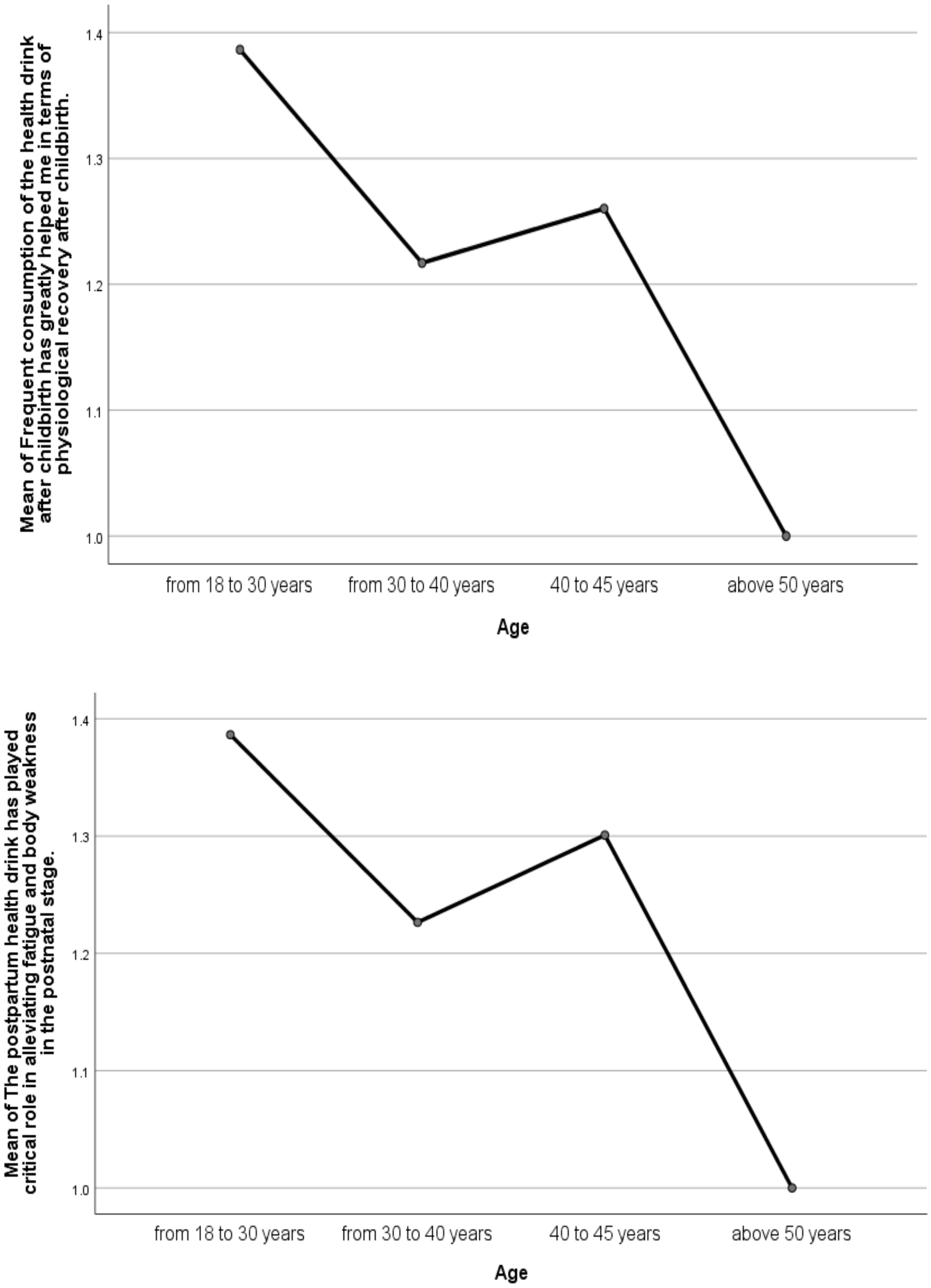

Figure 8. Graphical representation of H1 ANOVA

The line charts show mean scores of perceptions of different age groups with regards to the perceived benefits of postpartum health drinks intake. On the chart of physiological recovery following childbirth, the women aged between 18 and 30 years give the highest information on the mean. It means that younger women find the most significant gain of the physiological recovery due to the regular use of the postpartum health drink. The average score indicates that there is a reduced mean score in the 30 years to 40 years and the age range 40–45 years indicates a slight increase on the mean score. Nevertheless, there is a sharp decline in the number of women that are more than 50 years old and this indicates that the perceived benefits are relatively low among women in this age bracket.

The second chart illustrates perceptions with reference to fatigue and body weakness reduction throughout the postnatal phase. The same trend has been noted in the respect that women within the age group of 18-30 years have the highest mean value of agreeing that the health drink assists them in relieving fatigue. The average score is lower among women of the age bracket 30 to 40 years, increases moderately among women of the age bracket 40 to 45 years and the increase in the mean score is very high among women of the age bracket 50 and above. All in all, the two charts indicate clearly that younger postpartum women feel they have more health benefits on the postpartum health drink, than older women. The fact that the mean scores were decreasing with age indicates that the age factor affected perceived effectiveness of health drinks in recovery of physiological functions and reducing fatigue.

H2: The younger group of postpartum women undergoes a significantly higher increase in their energy levels as well as lessening fatigue than their older counterparts as a result of taking the postpartum health drink.

Table5. H2 ANOVA

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Regular taking of the postpartum health drink has also resulted in a significant boost in my general vitality.	Between Groups	3.060	3	1.020	3.223	.023
	Within Groups	93.686	296	.317		
	Total	96.747	299			
The after-birth health drink also allows me to maintain my high concentration and vigilance in my daily endeavors	Between Groups	2.417	3	.806	3.174	.025
	Within Groups	75.130	296	.254		
	Total	77.547	299			

The ANOVA table looks at the presence of existing differences in the perceptions of women based on their age with regard to the cognitive and vitality-related benefits of consuming a postpartum health drink. In the case of the statement Regular taking of the postpartum health drink has also led to a considerable increase in my overall vitality, the analysis will give out F value of 3.223 with a significance value of 0.023. The p-value is below 0.05, which makes the result statistically significant. This implies that women who consume the postpartum health drink in various age groups will differ a great deal regarding their feeling of improvement on general vitality. In the same way, to the statement saying the after-birth health drink also enables me to sustain a high concentration and vigilance in my daily activities, the ANOVA outcome is F 3.174 with p -value 0.025.

It is also a confirmation of the statistically significant difference among age groups with regards to the perceived benefits of concentration and alertness. In general, the results indicate that age plays an important role in influencing the perception of women with regards to the enhancement of vitality and cognitive functioning when postpartum health drinks are consumed. The women in the various age groups have different degrees of energy improvement, concentration, and focus improvement. This finding would substantiate the perspective that age is another significant factor in postnatal recovery experiences, and the subsequent post-hoc examination would assist in determining the application of which age groups exhibit the most significant differences.

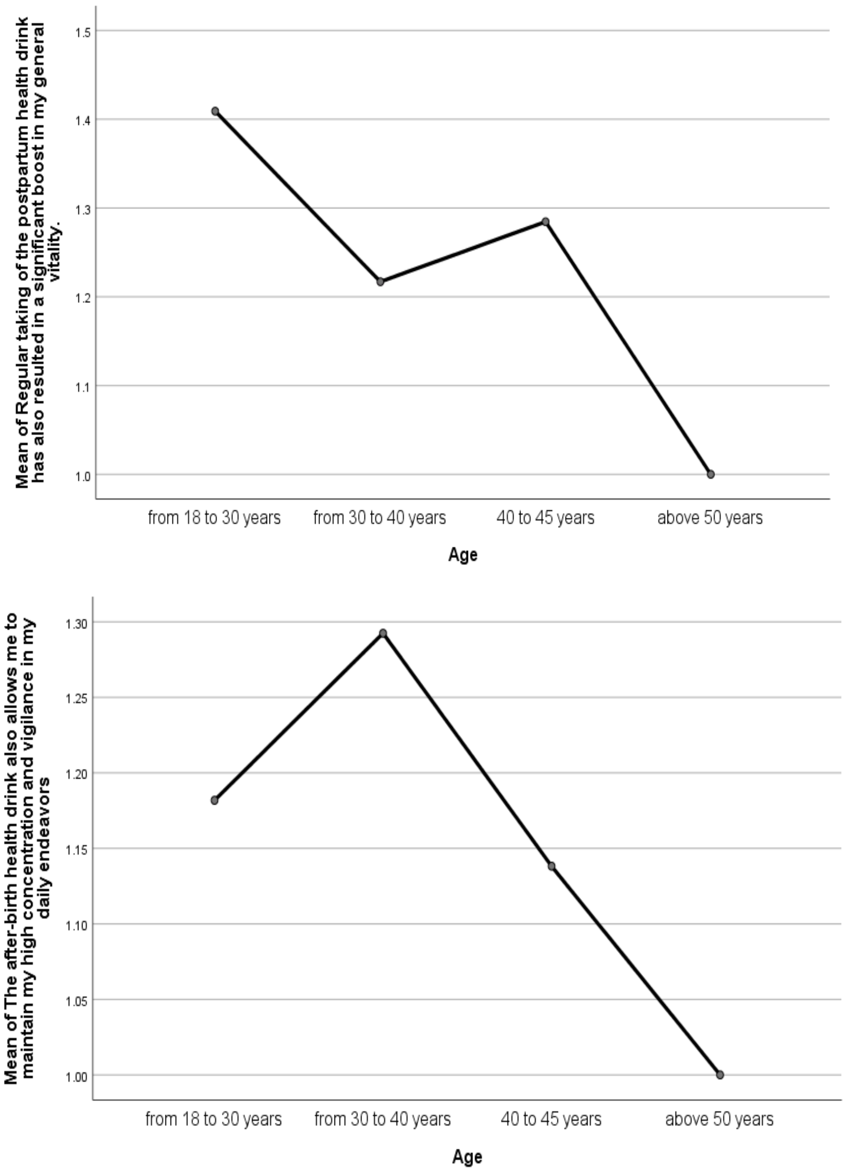

Figure 9. Graphical representation of H2 ANOVA

The line charts provided illustrate age-related differences in the mean perception score of women in relation to the so-called benefits of the postpartum drinking of health drinks in the context of overall vitality and mental functioning. In the chart 1 that concerns the general vitality, the age group of women between 18 and 30 has the highest mean score, thus showing a strong perception that frequent consumption of the postpartum health drink has a significant impact of improving overall vitality. There is a consequent decrease in women of between 30 and 40 years of age then a slight alleviation in the 40-45 years age group and then a sharp fall in the women who are above 50 years old. This trend highlights the idea that the younger women experience or feel the stronger vitality power of the health drink as compared to the older ones. The second chart is devoted to the feelings of women concerning concentration and vigilance in their activities.

In this case, the highest mean score is found in the age bracket of 30-40 years indicating that this age group feels the most significant improvement in the focus and alertness after taking the postpartum health drink. There is a mean value of moderate highs among women in the age category of 18-30, and the conspicuous decrease is found in the 40-45 group of women, and the lowest mean score appears in the group of women above 50 years of age, which suggests a perceived low cognitive value of the group. Together, the two visual representations demonstrate that age plays a significant role toward the perceived benefits of the postpartum health drink. The younger and middle-aged women exhibit more positive results on vitality and cognitive functioning as compared to older women who have lower advantages. These visual patterns go in line with the findings of the ANOVA, thus justifying the conclusion that there are significant age effect differences in the post-natal health recovery and the functional well-being after the consumption of the postpartum health drink.

H3: The chronological age is a substantial factor in perceived enhancement of mental and emotional state after consumption of the postpartum health drink.

Table 6. H3 ANOVA

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
I feel that the after-childbirth health drink supplements my hormonal balance and emotional wellness.	Between Groups	4.031	3	1.344	3.002	.031
	Within Groups	132.515	296	.448		
	Total	136.547	299			
Consumption of the postpartum health beverage has influenced my general psychological state positively.	Between Groups	2.604	3	.868	2.851	.038
	Within Groups	90.116	296	.304		
	Total	92.720	299			
I am in a better position to handle the postnatal stress after taking the postpartum health drink.	Between Groups	2.704	3	.901	2.867	.037
	Within Groups	93.043	296	.314		
	Total	95.747	299			

The ANOVA table analysis offers a strict evaluation on the existence of significant differences in the perceptions of the psychological and emotional benefits of the consumption of a postpartum health drink based on age in women. The F-test determines the comparison of the differences between the intergroup means to the variation expected within the groups by breaking down the overall variability in the score of perception into parts that can be attributed to age group, and those that can be attributed to the error variance among the groups. With regards to the fact that the after-childbirth health drink supplements my hormonal balance and emotional well-being, the findings have shown the F value of 3.002 with p-value of 0.031. Since this p-value is less than the traditional 0.05 alpha, the null hypothesis which posits that the means are equal across the age groups is rejected. This implies that women of different age groups have significant differences in their perceived hormonal balance and emotional wellbeing after the consumption of the postpartum health drink. Likewise, in case of the item, that is, it is in consumption of the postpartum health beverage which has had a positive impact on my overall psychological state, the ANOVA provides the value of $F = 2.851$ and p-value = 0.038.

This is additional support about a statistically significant difference between age groups with regard to the perception of psychological improvement that can be attributed to the beverage. The postpartum health drink variable, which is represented as an item, I am in a better position to handle postnatal stress has an F value of 2.867 and a significance value of 0.037, which is statistically significant and shows that there is a statistically significant difference between the age groups in terms of their perceived stress-management ability. Collectively, these findings show that age has a substantive effect on the views of women regarding their emotional wellness, psychological health and their ability to cope with stress in the immediate aftermath of the postpartum consumption of health drinks. The levels of emotional stability and psychological resilience of women in the postnatal period differ among the representatives of different age groups. These results support the idea that age is also a critical predictor of postnatal mental health outcomes, and additional post-hoc tests would be helpful in identifying the age groups that deviate most significantly.

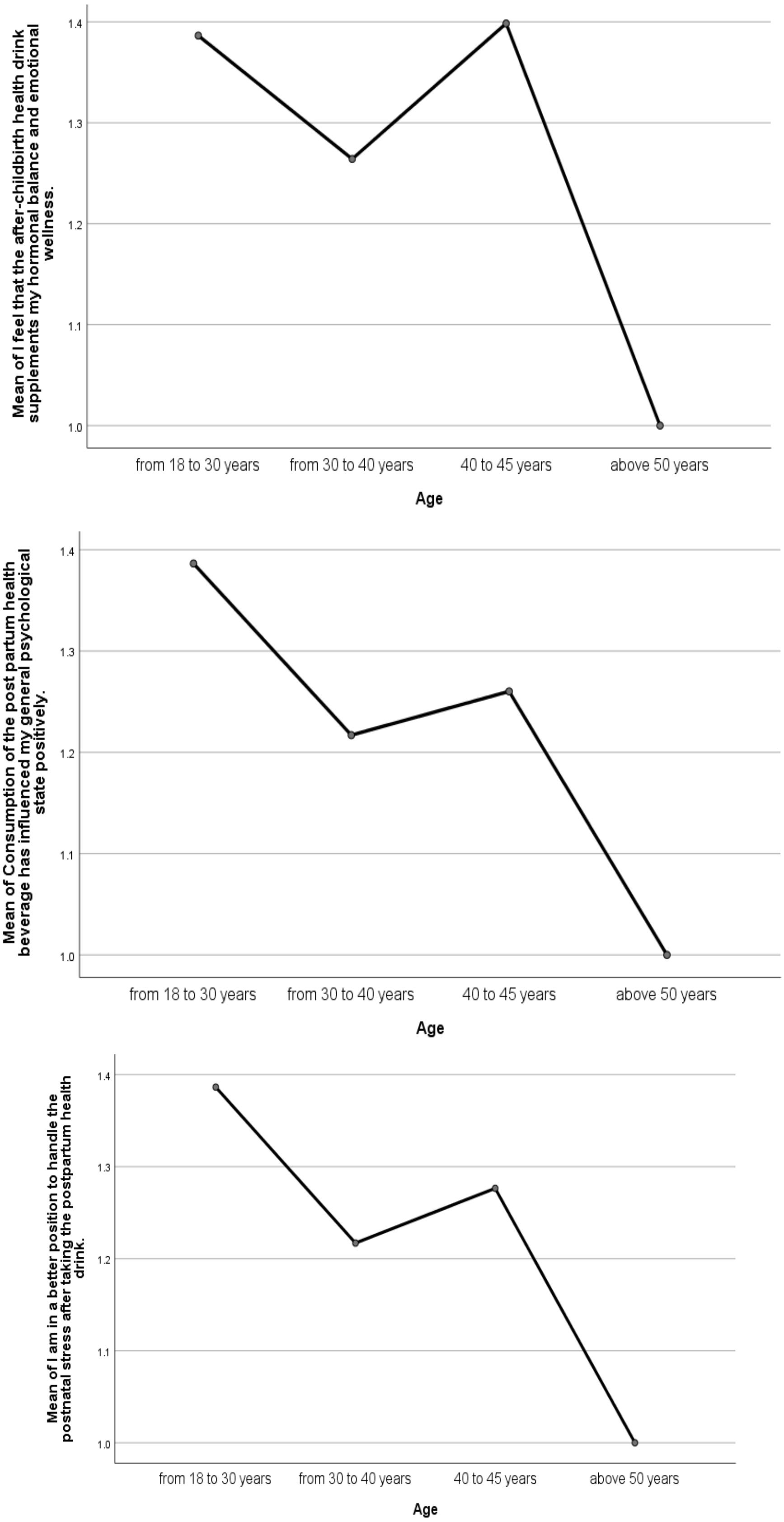

Figure 10. Graphical representation of H3 ANOVA

The succession of line charts outlines age-specific changes in mean score of perception related to women in regard to emotional, psychological, and stress-related benefits provided by a postpartum health beverage. In chart 1, which is the hormonal balance and emotional health, women with age 18-30 years are the most prevalent in terms of mean score, which means that they are in strong agreement that the postpartum health beverage enhances emotional health. The mean score falls marginally in the 30-40 years category, increases slightly in 40-45 years of women and declines drastically in those who are older than 50 years. This indicates that younger and middle-aged women find emotional and hormonal benefits to be significant than older women. The second chart reflects the perceptions that are associated with a positive effect on overall psychological condition. The best mean score is found in the women within the age group of 18-30 years and then the mean score decreases in the 30-40age group. Moderate rise is observed in the 40-45 years and women with ages above 50 years record the lowest mean. Such a trend shows that younger women have stronger perceived psychological benefits of the postpartum health beverage.

The third chart shows the perceptions of women on their ability to deal with the postnatal stress when they take the health beverage. Women in the 1830 years age category are again the highest in the mean scores indicating the capacity to cope better with stress. The scores decrease in women aged 30-40 years, increase marginally in women aged 40-45 years, and reduce largely in women older than 50 years. On the whole, the figures clearly confirm that age is an important factor to be considered in the perceptions of emotional wellbeing, psychological health, and stress management after the intake of the postpartum health beverage. Women who are younger than 30- and middle-aged report more positive effects, and women who are older report relatively less benefits. These visual patterns are in line with the ANOVA results hence justifying the conclusion that there are substantial age-based differences in postnatal emotional and psychological recovery.

H4: The older postpartum cohort of women report a greater improvement in their work-life balance because of the improved health after taking the postpartum health drink as compared to the younger women.

Table 7: H4 ANOVA

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
The enhanced health after the intake of the postpartum health drink will enable me to combine the professional and family commitments well simultaneously.	Between Groups	3.812	3	1.271	3.856	.010
	Within Groups	97.534	296	.330		
	Total	101.347	299			
Due to the improved physical and mental health, I also have a lower work-life conflict.	Between Groups	3.154	3	1.051	2.824	.039
	Within Groups	110.193	296	.372		
	Total	113.347	299			
Generally, the postpartum health drink has played a positive role in my working-life balance when coming back to work.	Between Groups	5.221	3	1.740	2.778	.041
	Within Groups	185.459	296	.627		
	Total	190.680	299			

The results indicate that the perceptions of respondents of the postpartum health drink differ significantly in the four groups under study in all the three dimensions. Particularly, the difference between the perceptions of the groups of the drink to help them realize the combination of professional and family life, F (3, 296) = 3.856, p =.010; the degree to which the positive effects of the drink on physical and mental health decrease work-life conflict, F (3, 296) = 2.824, p =. 039; and the overall beneficial role of the drink in work-life balance upon returning to work, F (3, 296) = 2 All the p-values are below 0.05, so the null hypotheses are dismissed concerning all the outcomes, proving that the perception of the benefits of the postpartum health drink regarding wellbeing and work life balance differ significantly across the groups.

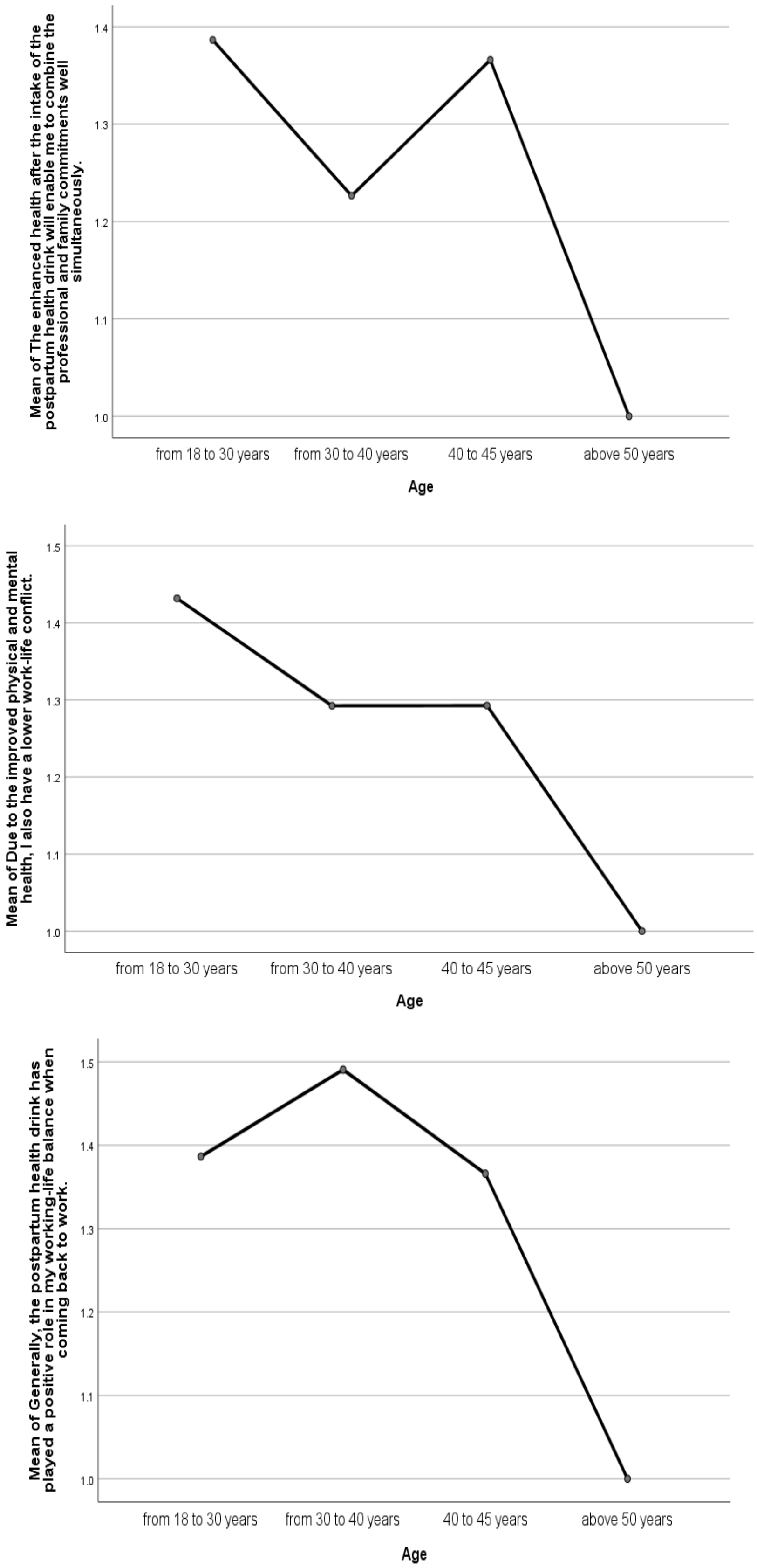

Figure 11. Graphical representation of H4 ANOVA

The line graphs illustrate age-related changes in respondents' perceptions with regard to the use of a postpartum health drink in three dimensions. With respect to the ability to balance between professional and family life, the agreement is maximum among women aged between 18-30 and

40-45, slightly lower among women aged 30-40, and dropping drastically after 50 years of age. A similar declining pattern is seen in the opinion that improved physical and mental health alleviates work-life conflict, and minimal support among the individuals above 50. With regard to the overall beneficial impact of the postpartum health drink on work-life balance when returning to the workforce, the 30–40 age bracket ranks highest, followed by the 18–30 group, and finally the 40–45 group, which reported the lowest perception. Overall, the statistics indicate that younger and middle-aged respondents perceive more benefits in the postpartum health drink, and the perceived benefits would decline significantly in the respondents who are above fifty years old.

In addition to reporting *p-values*, the study should report effect sizes to quantify the magnitude of observed differences.

Recommended Metrics:

- η^2 (Eta squared) or partial η^2 for ANOVA results
- Cohen's d for pairwise comparisons

Effect sizes provide practical interpretation of findings beyond statistical significance and allow comparison with previous studies. Reporting Confidence Intervals (CIs). All key estimates (mean differences, regression coefficients) should be accompanied by 95% confidence intervals (CI). $F(3, 296) = 2.85$, $p = .038$, partial $\eta^2 = .028$, 95% CI [0.10, 0.42] Confidence intervals improve transparency by indicating the precision and stability of the estimated effects. Whenever a one-way ANOVA yields a statistically significant result, post hoc tests should be conducted to identify which specific age groups differ.

- Tukey's HSD (equal variances assumed)
- Games–Howell test (unequal variances)

Post hoc analyses prevent overinterpretation of omnibus ANOVA results and clarify group-level differences. ANOVA results should be reported following APA statistical reporting standards, ensuring consistency and clarity.

Correct ANOVA Format:

- F (df_between, df_within) = value, p = value
- Include effect size and CI where possible

Example:

$F(3, 296) = 3.22$, $p = .023$, partial $\eta^2 = .032$

Before conducting ANOVA, the following assumptions should be formally tested and reported: Normality: Shapiro–Wilk test and Q–Q plots, Homogeneity of variances: Levene's test, Independence: ensured by study design. Bonferroni or Holm–Bonferroni adjustments, Family-wise error rate control. Multiple linear regression models may be used to assess the independent and combined effects of predictors such as:

- Age
- Duration of postpartum period
- Frequency of powder consumption

Advantages:

- Adjusts for confounding variables
- Provides standardized β coefficients
- Allows interaction effects to be tested

Regression or multivariate models can integrate both: Objective physiological markers (e.g., cortisol, HRV), Subjective questionnaire scores. This strengthens causal interpretation and reduces reliance on self-reported outcomes alone. Statistical analyses should explicitly report:

- Software version (e.g., SPSS v29 / R v4.x)
- Alpha level used
- Missing data handling procedures

Transparent reporting improves reproducibility and peer-review confidence.

6. Conclusion

The current research indicates that specific postpartum interventions may be significant in improving maternal well-being and facilitating the work balance of a woman by potentially modulating neuroendocrine processes. The results affirm that the specially developed postpartum health powder created on the basis of traditionally known botanical ingredients plays a significant role in enhancing physical recuperation, psychological well-being, and workplace-domestic conflict among postpartum women. The correlation between maternal health and professional reintegration is so close in the systematic analysis of self-reported physiological responses and self-reported experiences of women. Moreover, the fact that SPSS-based structured quantitative analysis was used enhances the validity of the identified relationships and contributes to significant understanding of how integrative healthcare models can be used to overcome both biological and socio-professional issues that women experience after childbirth. Overall, this research suggests the importance of comprehensive postpartum care methods, which include physiological support of psychological and professional well-being, which in turn will result in the development of more efficient maternal health programs and policies.

References

Barba-Müller, E., Craddock, S., Carmona, S., & Hoekzema, E. (2019). Brain plasticity in pregnancy and the postpartum period: Links to maternal caregiving and mental health. *Archives of Women's Mental Health, 22*(2), 289–299. https://doi.org/10.1007/s00737-018-0889-z

Bloch, M., Daly, R. C., & Rubinow, D. R. (2003). Endocrine factors in the etiology of postpartum depression. *Comprehensive Psychiatry, 44*(3), 234–246. https://doi.org/10.1016/S0010-440X(03)00034-8

Brummelte, S., & Galea, L. A. M. (2016). Postpartum depression: Etiology, treatment and consequences for maternal care. *Hormones and Behavior, 77*, 153–166. https://doi.org/10.1016/j.yhbeh.2015.08.008

Chopra, A., & Doiphode, V. V. (2002). Ayurvedic medicine: Core concept and clinical practice. *Medical Clinics of North America, 86*(1), 75–89. https://doi.org/10.1016/S0025-7125(03)00073-7

De Groot, R. H. M., Vuurman, E. F. P. M., Hornstra, G., & Jolles, J. (2006). Differences in cognitive performance during pregnancy and early motherhood. *Psychological Medicine, 36*(5), 679–688. https://doi.org/10.1017/S0033291706007380

Dennis, C. L., & Ross, L. (2006). Women's perceptions of partner support and conflict in the development of postpartum depressive symptoms. *Journal of Advanced Nursing, 56*(1), 47–61. https://doi.org/10.1111/j.1365-2648.2006.04059.x

Field, T. (2010). Postpartum depression effects on early interactions. *Infant Behavior and Development, 33*(1), 1–6. https://doi.org/10.1016/j.infbeh.2009.10.005

Glynn, L. M. (2010). Giving birth to a new brain: Hormone exposures of pregnancy influence human memory. *Psychoneuroendocrinology, 35*(8), 1148–1155. https://doi.org/10.1016/j.psyneuen.2010.01.015

Hazra, A. K., Chakraborty, B., Mitra, A., & Sur, T. K. (2019). A rapid HPTLC method to estimate piperine in Ayurvedic formulations. *Journal of Ayurveda and Integrative Medicine, 10*(4), 248–254. https://doi.org/10.1016/j.jaim.2017.07.006

Hoekzema, E., Barba-Müller, E., Pozzobon, C., Picado, M., Lucco, F., García-García, D., Soliva, J. C., Tobeña, A., Desco, M., Crone, E. A., Ballesteros, A., Carmona, S., & Vilarroya, O. (2017). Pregnancy leads to long-lasting changes in human brain structure. *Nature Neuroscience, 20*(2), 287–296. https://doi.org/10.1038/nn.4458

Kim, P., Leckman, J. F., Mayes, L. C., Feldman, R., Wang, X., & Swain, J. E. (2010). The plasticity of human maternal brain. *Behavioral Neuroscience, 124*(5), 695–700. https://doi.org/10.1037/a0020884

Kim, P., Strathearn, L., & Swain, J. E. (2016). The maternal brain and its plasticity in humans. *Hormones and Behavior, 77*, 113–123. https://doi.org/10.1016/j.yhbeh.2015.08.001

Monk, C., Lugo-Candelas, C., & Trumpff, C. (2019). Prenatal Developmental Origins of Future Psychopathology: Mechanisms and Pathways. *Annual review of clinical psychology*, *15*, 317–344. https://doi.org/10.1146/annurev-clinpsy-050718-095539

O'Hara, M. W., & McCabe, J. E. (2013). Postpartum depression: Current status and future directions. *Annual Review of Clinical Psychology, 9*, 379–407. https://doi.org/10.1146/annurev-clinpsy-050212-185612

Pandey, M. M., Rastogi, S., & Rawat, A. K. (2013). Indian traditional ayurvedic system of medicine and nutritional supplementation. *Evidence-based complementary and alternative medicine : eCAM*, *2013*, 376327. https://doi.org/10.1155/2013/376327

Parsons, C. E., Young, K. S., Murray, L., Stein, A., & Kringelbach, M. L. (2010). The functional neuroanatomy of the evolving parent–infant relationship. *Progress in Neurobiology, 91*(3), 220–241. https://doi.org/10.1016/j.pneurobio.2010.03.001

Ross, L. E., & McLean, L. M. (2006). Anxiety disorders during pregnancy and the postpartum period. *Journal of Clinical Psychiatry, 67*(8), 1285–1298. https://doi.org/10.4088/JCP.v67n0818

Sarris, J., Logan, A. C., Akbaraly, T. N., Amminger, G. P., Balanzá-Martínez, V., Freeman, M. P., Hibbeln, J., Matsuoka, Y., Mischoulon, D., Mizoue, T., Nanri, A., Nishi, D., Ramsey, D., Rucklidge, J. J., Sanchez-Villegas, A., Scholey, A., Su, K. P., & Jacka, F. N. (2015). Nutritional medicine as mainstream in psychiatry. *The Lancet Psychiatry, 2*(3), 271–274. https://doi.org/10.1016/S2215-0366(14)00051-0

Schiller, C. E., Meltzer-Brody, S., & Rubinow, D. R. (2015). The role of reproductive hormones in postpartum depression. *CNS Spectrums, 20*(1), 48–59. https://doi.org/10.1017/S1092852914000480

Slomian, J., Honvo, G., Emonts, P., Reginster, J. Y., & Bruyère, O. (2019). Consequences of maternal postpartum depression: A systematic review of maternal and infant outcomes. *Women's Health, 15*, 1745506519844044. https://doi.org/10.1177/1745506519844044

Xiong, X., Buekens, P., Fraser, W. D., Beck, J., & Offenbacher, S. (2007). Periodontal disease and adverse pregnancy outcomes. *American Journal of Obstetrics and Gynecology, 198*(2), 135.e1–135.e7. https://doi.org/10.1111/j.1471-0528.2005.00827.x

Young, E. A., & Korszun, A. (2010). Sex, trauma, stress hormones and depression. *Molecular Psychiatry, 15*(1), 23–28. https://doi.org/10.1038/mp.2009.94

World Health Organization. (2014). *WHO recommendations on postnatal care of the mother and newborn*.

Wu, X., & Jin, R. (2025). Effects of postpartum hormonal changes on the immune system and their role in recovery. *Acta Biochimica Polonica, 72*, Article 14241. https://doi.org/10.3389/abp.2025.14241