DRIVEN BUT DRAINED: IMPLICATION OF JD-R THEORY ON EMOTIONAL EXHAUSTION AND JOB ENGAGEMENT AND EXPLORING THEIR IMPACT ON JOB SATISFACTION IN CLINICAL RESEARCH ASSOCIATES

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Dedication

To my parents—

Papa, I know you're watching from the heavens today, smiling that quiet, proud smile of yours. This was your dream long before it was mine. Every step I took, every challenge I faced, I carried your hopes in my heart. Though you're not here in person, your presence has never left me. You live in every lesson you taught, every value you instilled, and in the strength you passed down to me. I know you would have smiled in tears today and said—*"Proud of you, beta"*

Mom—thank you for your endless prayers, your sleepless nights, your comforting words, and yes, the countless cups of tea and coffee that kept me going. When I wanted to give up, you reminded me of who I am. You never stopped believing in me—even when I doubted myself. Your quiet sacrifices and endless faith built the foundation I stand on today. When I lost hope, you wrapped me in yours. Your love, quiet yet powerful, has been the heartbeat of this journey. I would not have made it through without you.

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To my little niece—your innocent laughter brought joy to my toughest days. You reminded me of life's simple, beautiful moments when the weight of this journey grew heavy.

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ABSTRACT

DRIVEN BUT DRAINED: IMPLICATION OF JD-R THEORY ON CRA BURNOUT AND ITS IMPACT ON JOB ENGAGEMENT AND PSYCHOLOGICAL WELL-BEING IN PHARMACEUTICAL AND CLINICAL RESEARCH ORGANIZATIONS

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Clinical Research Associates (CRAs) serve as the frontline warriors of clinical research—ensuring the integrity, quality, and safety of trials before life-saving medicines reach the market and ultimately, our homes. Their emotional well-being and job satisfaction are therefore not just individual concerns but critical pillars of effective clinical trial operations.

This study explores the impact of job demands and job resources on emotional exhaustion, job engagement, and job satisfaction among CRAs in India. Anchored in the Job Demands–Resources (JD-R) model, a convergent mixed-methods approach was adopted, combining quantitative data from 403 CRAs with qualitative insights drawn from 15 semi-structured, exploratory interviews.

The quantitative analysis, conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM), revealed that job demands—specifically workload, role ambiguity, and role conflict—were significant positive predictors of emotional

exhaustion. In contrast, job resources such as job autonomy and the nature of work significantly enhanced job engagement. Notably, contingent rewards demonstrated a surprising negative relationship with engagement. Emotional exhaustion had a strong negative impact on job satisfaction, while job engagement emerged as a robust positive predictor. Interestingly, emotional exhaustion did not significantly affect job engagement—contradicting previous literature—and supervisor support had no significant direct effect on engagement, although significant impacts job satisfaction.

Qualitative findings enriched the statistical outcomes, offering deeper insight into CRA experiences. Participants described emotional fatigue arising from overlapping responsibilities, unrealistic expectations, and blurred role boundaries. However, many maintained engagement through meaningful work, autonomy, and a strong sense of professional identity. Feelings of favoritism and a lack of transparency in reward systems eroded motivation, while supportive supervisors who demonstrated empathy and empowerment—rather than rigid control—were seen as instrumental to well-being.

The study affirms the core tenets of the JD-R model while surfacing important contextual nuances—particularly the buffering role of intrinsic motivation and the critical importance of perceived fairness. It calls for clinical research organizations to cultivate work environments grounded in role clarity, autonomy, equitable recognition, and psychological safety. The study concludes with practical recommendations for managerial strategy and future research, offering both conceptual contributions and actionable insights into fostering CRA well-being in high-pressure, mission-critical settings.

Keywords: Job Demands, Job Resources, Emotional Exhaustion, Job Engagement, Job Satisfaction, Workload, Role Conflict, Role Ambiguity, Supervisor Support, Nature of Work, Job Autonomy, Contingent Rewards, Clinical Research, Burnout, Clinical Research Associates, JD-R Model, Mixed Methods

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ABBREVIATIONS

CRA – Clinical Research Associate

JD-R – Job Demands–Resources

EE – Emotional Exhaustion

JE – Job Engagement

JS – Job Satisfaction

RA – Role Ambiguity

RC – Role Conflict

WL – Workload

SS – Supervisor Support

JA – Job Autonomy

CR – Contingent Rewards

NW – Nature of Work

CRO – Clinical Research Organization

PLS-SEM – Partial Least Squares Structural Equation Modeling

AVE – Average Variance Extracted

R^2 – Coefficient of Determination

IRB – Institutional Review Board

SD – Standard Deviation

ICH GCP – International Conference on Harmonisation - Good Clinical Practice

CHAPTER I

INTRODUCTION

1.1 Background

According to the Clinical Trial Registry India (CTRI), a total of 54,547 clinical trials are currently registered and ongoing in India (Clinical Trials Registry - India (CTRI), 2025). This growth has led to an increasing number of clinical research professionals within the industry, particularly clinical research associates (CRAs). CRAs—are working tirelessly to ensure the success and integrity of clinical trials. These professionals are continuously traveling to sites, meticulously reviewing vast volumes of clinical data, and managing interactions with multiple stakeholders. The demands of their role are intense and unrelenting, often leading to significant levels of stress. This underscores a pressing need for the industry to acknowledge and address the risk of burnout among CRAs. Their well-being cannot be overlooked, and the findings of this research serve as a timely alarm for organizations to take proactive measures in safeguarding the mental and emotional health of these vital contributors to clinical development.

According to ICH GCP (International Conference on Harmonisation - Good Clinical Practice), a "Clinical Research Associate is a professional responsible for monitoring and overseeing clinical trial sites to ensure that all aspects of a study are conducted ethically, scientifically sound, and in compliance with the study protocol and applicable regulatory guidelines, including data integrity and patient safety, all while adhering to the principles of GCP standards." (ICH GCP, 2016)

The demanding nature of the work of the Clinical research associates can lead to significant job burnout, impacting their job satisfaction. Recent research was conducted

on the CRAs in China and it was found out that occupational burnout among CRAs there is high. (Fu, Z., Yuan, Y. and Jiang, M, 2021)

However, there is very limited research in the CRAs Burnout with respect to job demands and job resources in India with a highly prevalent clinical trial industry. Additionally, the relationship between emotional exhaustion, job engagement and job satisfaction among CRAs requires further exploration.

In the evolving landscape of clinical research, the role of clinical research professionals has become increasingly pivotal. These individuals are at the forefront of designing, conducting, and managing clinical trials that are essential for healthcare advancements. Among all clinical research professionals there is an army of clinical research associates (CRA) who are the front-line warriors in the clinical trial operations, indirectly involved with the clinical trial patients and directly involved with the clinical trial data generated.

Despite their critical contributions in the field of clinical research, there is a paucity of research focusing on their occupational well-being.

The Job Demands–Resources (JD-R) model provides a comprehensive framework to understand how job characteristics influence employee well-being. According to this model, job demands (e.g., workload, role conflict, role ambiguity) can lead to strain and burnout, whereas job resources (e.g., supervisor support, autonomy, contingent rewards, meaningful work) can enhance motivation and engagement (Demerouti et al., 2001)

This study applies the Job Demands–Resources (JD-R) model to investigate how specific work-related factors influence emotional exhaustion, job engagement, and job satisfaction among clinical research associates—a workforce that remains underexplored in occupational health literature.

The research distinguishes between job demands (workload, role conflict, role ambiguity), which are expected to increase emotional exhaustion, and job resources (supervisor support, autonomy, contingent rewards, nature of work), which are expected to reduce emotional exhaustion and enhance engagement and satisfaction.

The study examines:

- *The direct effects of job demands on emotional exhaustion,*
- *The motivational impact of job resources on engagement,*
- *The relationship between emotional exhaustion and engagement,*
- *And how both emotional exhaustion and engagement influence job satisfaction.*

Clinical research as per ICH GCP (Good Clinical Practice) is the process of designing, conducting, monitoring, and reporting clinical trials. Clinical research is a stressful job considering that it has safety of patients involved and a huge amount of clinical data associated with it. (ICH GCP, 2016)

While we usually use the term stress Hans Seyle described stress as “nonspecific response of the body to any demand” Tan, S. and Yip, A. (2018), burnout is defined as a syndrome resulting from chronic workplace stress that has not been successfully managed. Burnout not only affects their psychological wellbeing but also impacts job satisfaction. (WHO, 2024)

The Job Demand-Resource (JD-R) theory provides a framework for understanding how job demands and resources interact to influence burnout. According to this theory, high job demands exhaust employees' mental and physical resources, leading to burnout, while job resources help mitigate these effects by providing support and motivation (Bakker & Demerouti, 2007). Applying JDR theory to the context of

CRAs, we can hypothesize that the identified stressors (job demands) may increase burnout, while job resources such as autonomy and support may help reduce it.

CRAs share several job characteristics with healthcare professionals, project managers, and biotech employees, including high responsibility, regulatory pressures, and the need for meticulous attention to detail. Studies on healthcare professionals indicate that role conflict, role ambiguity, and role overload are significant stressors (Maslach & Leiter, 2016). Similarly, project managers often deal with high workloads, tight deadlines, and frequent travel, which contribute to burnout (Schaufeli et al., 2009). These parallels provide a basis for understanding the potential stressors in the lives of CRAs.

Literature was reviewed and stressors which were common among the CRAs and other industry and healthcare professionals were analyzed further. The key stressors in the form of job demands and the job resources for the research were derived from the themes available in literature and the same were rediscussed and confirmed during the qualitative interviews. These Job demands and Job resources are categorized as Independent Variables and Job Satisfaction and Burnout are under Dependent Variables (Table 1)

Table 1: Study Variables

Independent Variables		**Dependent Variables**
Job Demands	**Job Resources**	
1. Role Conflict 2. Role Ambiguity 3. Workload	1. Autonomy 2. Supervisor Support 3. Nature of Work (Meaningful Work) 4. Contingent Rewards	1. Emotional Exhaustion 2. Job Engagement 3. Job Satisfaction

1.1.1 An Overview of Stress and Burnout

While the terms stress and burnout are used interchangeably, they are distinct concepts in the context of occupational health psychology. Stress is a psychological and physiological response to external pressures or demands, known as stressors. It occurs when an individual perceives that they do not have the resources to cope with these demands. Stress arises when individuals perceive that they cannot adequately cope with the demands being made on them or with threats to their well-being. (Lazarus, 1966). Stress results from an imbalance between demands and resources. (Lazarus and Folkman 1984).

Definitions of Stress:

Selye's Definition of Stress: One of the earliest definitions of stress was proposed by Hans Selye in 1956 (Selye, 1956). According to Selye, "stress is a non-specific response to any demand." This definition highlights the fact that stress is not limited to work-related factors but can be triggered by various demands placed on an individual. These demands can come from personal, social, or professional spheres of life and can have a significant impact on an individual's well-being.

French, Rogers, and Cobb's Definition of Stress: French, Rogers, and Cobb (1974) offer another perspective on stress in organizations. They define stress as a "misfit between a person's skills and abilities and the demands of the job, as well as a misfit in terms of a person's needs supplied by the environment." This definition emphasizes the importance of alignment between an individual's capabilities and the requirements of their role. When there is a significant disparity between the two, it can lead to stress and dissatisfaction.

McGrath Definition of Stress: McGrath (1976) defines stress in terms of a set of conditions having stress in it: "Stress involves an interaction of person and environment. Something happens "out there" which presents a person with a demand, or a constraint or an opportunity for behaviour."

Beehr and Newman's Definition of Job Stress: Beehr and Newman (1978) focus specifically on job-related stress and provide a comprehensive definition. They describe job stress as "a condition wherein job-related factors interact with the worker to change their psychological or physiological condition. This interaction can either disrupt or enhance an individual's well-being, affecting their mind and/or body." This definition acknowledges the complex interplay between work-related factors and an individual's overall state of being.

Burnout

Burnout has emerged as a significant concern in occupational health, particularly within high-stress professions. Christina Maslach and Susan E. Jackson (1981) defined burnout as a psychological syndrome resulting from chronic workplace stress, characterized by three dimensions: emotional exhaustion, depersonalization, and reduced personal accomplishment. Emotional exhaustion, the central component, refers to feelings of being emotionally overextended and depleted of one’s emotional resources. (Maslach and Jackson, 1981)

Wilmar Schaufeli and Enzmann (1998) described burnout as a state of physical, emotional, and mental exhaustion caused by long-term involvement in emotionally demanding situations. (Schaufeli and Enzmann, 1998) Michael Leiter further emphasized that burnout involves emotional depletion and loss of motivation due to prolonged exposure to chronic emotional and interpersonal stressors. (Leiter and Maslach, 2003)

Among the three dimensions, emotional exhaustion is often considered the most critical, as it directly impacts individuals' ability to function effectively in their roles. In the context of clinical research associates, who frequently navigate complex protocols, tight deadlines, and high-stakes responsibilities, emotional exhaustion can significantly effect their job satisfaction.

Given its centrality in the burnout experience and its direct relevance to the demanding nature of clinical research roles, this study focuses on emotional exhaustion to explore its antecedents and consequences within this professional group.

Burnout is a state of emotional, physical, and mental exhaustion caused by prolonged exposure to stress, particularly in the workplace. It is characterized by feelings of depletion, detachment, and a sense of ineffectiveness. (Maslach and Jackson, 1981) Burnout as defined by Pines "emotional and physical exhaustion syndrome which includes a reduction of personal skills, negative attitudes to work, and a loss of interest in patients" (Pines and Maslach, 1978)

Understanding the dynamics of burnout and job satisfaction among clinical research associates necessitates a robust theoretical and methodological foundation. The Job Demands–Resources (JD-R) model serves as a comprehensive framework to examine how job characteristics influence employee well-being and performance. Simultaneously, the Maslach Burnout Inventory (MBI) provides a validated tool to measure burnout, particularly its core component, emotional exhaustion.

The JD-R model posits that every occupation has its unique risk factors associated with job stress, which can be categorized into two general groups: job demands and job resources. Job demands refer to physical, psychological, social, or organizational aspects of the job that require sustained effort and are associated with physiological and

psychological costs. Conversely, job resources are aspects of the job that help achieve work goals, reduce job demands, and stimulate personal growth and development.

To measure burnout within this framework, the MBI is employed, which assesses three dimensions: emotional exhaustion, depersonalization, and reduced personal accomplishment. Among these, emotional exhaustion is often considered the central component, reflecting feelings of being emotionally overextended and depleted of one's emotional resources . Given the high-pressure environment of clinical research, focusing on emotional exhaustion provides critical insights into the well-being of CRAs in this field.

Dimensions of Burnout- Job burnout was first conceptualized by Freudenberger (1974) and later expanded by Maslach and Jackson (1981). The Maslach Burnout Inventory (MBI), as developed by Maslach et al. (1996), was employed to measure job burnout across three dimensions: emotional exhaustion, depersonalization and professional efficacy. (Maslach, Schaufeli and Leiter, 2001)

-Emotional Exhaustion: Feelings of being emotionally drained, overwhelmed and depleted of emotional resources and work. As per (Maslach and Jackson, 1981) a principal aspect of Burnout is emotional exhaustion. When people feel that their emotional resources are depleted, they no longer can balance their psychological level and therefore this research has mainly focused on this aspect.(Maslach, Schaufeli and Leiter, 2001) In this research we have focused on this aspect of emotional exhaustion.

- Depersonalization (Cynicism): Development of a cynical attitude towards work and a detached response to various aspects of the job. (Maslach, Schaufeli and Leiter, 2001)

- Reduced Personal Accomplishment: A decline in feelings of competence and achievement at work. (Maslach, Schaufeli and Leiter, 2001)

Where stress is a reaction to a particular situation or task and can be both positive (eustress) and negative (distress) burnout is the result of prolonged exposure to chronic stress and is inherently negative. While stress is a common and often manageable aspect of work life, burnout represents a more severe and chronic condition that requires comprehensive strategies to address. (Leiter and Maslach, 2003)

1.1.2 Job Demands

Within the framework of the Job Demands–Resources (JD-R) model, job demands are defined as the physical, psychological, social, or organizational aspects of a job that require sustained effort or skills and are associated with physiological and psychological costs (Demerouti et al., 2001). High job demands are frequently linked with increased levels of strain and burnout, particularly emotional exhaustion, the core component of burnout (Maslach and Jackson, 1981).

This study focuses on three key job demands: role conflict, role ambiguity, and workload, all of which are highly relevant in the context of clinical research operations.

Role conflict refers to the extent to which an employee receives incompatible instructions or expectations from multiple sources, making it difficult to comply with all demands simultaneously. It generates psychological tension and confusion, especially in cross-functional, highly regulated environments such as clinical research, where expectations from sponsors, sites, and internal teams often compete (Rizzo, House and Lirtzman, 1970). High role conflict has been shown to correlate with increased emotional exhaustion and reduced job satisfaction (Eatough et al., 2011).

Role ambiguity involves a lack of clarity about duties, performance expectations, or authority boundaries (Rizzo, House and Lirtzman, 1970). Employees uncertain about what is expected of them are more likely to experience job-related anxiety and

frustration. Role ambiguity has been consistently associated with higher levels of stress and emotional exhaustion, as well as lower levels of engagement and satisfaction (Kahn et al., 1964; Schaubroeck et al., 1989).

Workload, as conceptualized by Karasek (1979), refers to quantitative demands, including the amount and pace of work. High workloads, especially under strict timelines and resource limitations, are a primary antecedent of burnout. In clinical operations, constant deadlines, documentation requirements, and coordination responsibilities exacerbate this pressure, often leading to mental fatigue and disengagement (Bakker et al., 2003; Schaufeli and Bakker, 2004).

The interplay between these job demands can amplify emotional exhaustion, particularly when resources to buffer their effects are insufficient. The JD-R model posits that prolonged exposure to elevated job demands depletes an employee's energy, contributing directly to emotional exhaustion and indirectly to diminished job satisfaction and motivation (Bakker and Demerouti, 2007). Understanding the individual and collective effects of role conflict, ambiguity, and workload is therefore essential for addressing burnout and improving the overall well-being of clinical research associates.

1.1.3 Job Resources

In the context of the Job Demands–Resources (JD-R) model, job resources are defined as those physical, psychological, social, or organizational aspects of a job that help employees achieve work goals, reduce job demands, and promote personal growth and development (Demerouti et al., 2001; Bakker and Demerouti, 2007). While job demands contribute to strain and emotional exhaustion, job resources serve a buffering function, mitigating the negative impact of high workload and pressure, especially in demanding professions such as clinical research.

This study focuses on four key job resources: supervisor support, autonomy, contingent rewards, and the nature of work—all of which have been empirically linked to both reduced emotional exhaustion and enhanced job engagement and satisfaction.

Supervisor support refers to the perception that one's immediate superior values their contributions, cares about their well-being, and is available for guidance. High levels of perceived supervisor support have been shown to significantly reduce emotional strain and enhance psychological safety, which in turn increases both engagement and satisfaction (Rhoades and Eisenberger, 2002).

Job autonomy defined as the degree to which employees have discretion in how they perform their tasks—has been widely associated with increased intrinsic motivation and engagement. Employees with higher autonomy report a greater sense of ownership and pride in their work, leading to higher job satisfaction and reduced burnout symptoms (Gözükara and Çolakoğlu, 2016; Morgeson and Humphrey, 2006).

Contingent rewards, which reflect the perception of being fairly and appropriately rewarded for one's efforts, are essential for reinforcing positive work behaviors. The absence of recognition and fair compensation is closely linked with emotional fatigue, while consistent, meaningful rewards are predictive of stronger job commitment and satisfaction (Spector, 1985; Eisenberger et al., 1997).

Finally, the nature of work—the degree to which employees find their tasks meaningful, engaging, and aligned with their values—plays a critical role in shaping affective commitment and engagement. When employees perceive their work as purposeful and fulfilling, they are more likely to be resilient in the face of demands and report lower levels of emotional exhaustion (Hackman and Oldham, 1980; Spector, 1985).

Empirical research consistently shows that an increase in job resources not only promotes job satisfaction and engagement but also serves as a protective factor against the adverse effects of high job demands (Bakker et al., 2005; Xanthopoulou et al., 2007). In this way, the availability of adequate job resources becomes not only a motivational force but also a critical buffer that moderates the relationship between job demands and burnout.

Resources play a crucial role not only in helping individuals manage job demands but also hold intrinsic value. This perspective aligns with the job characteristics theory proposed by Hackman and Oldham (1980), which highlights the motivational benefits of job resources at the task level—such as autonomy, feedback, and task significance. Furthermore, this aligns with the broader concept of conservation of resources (COR) theory developed by Hobfoll (2001), which posits that the fundamental motivation for humans is to preserve and accumulate resources. Consequently, resources are esteemed either for their inherent value or as tools for achieving or safeguarding other valued assets. Job resources can be categorized at various levels within an organization, including organizational resources (e.g., compensation, career advancement, job stability), interpersonal and social relations (e.g., support from supervisors and colleagues, team dynamics), work organization (e.g., clarity of roles, involvement in decision-making), and task-level resources (e.g., skill variety, task identity, task significance, autonomy, and performance feedback).

1.1.4 Job Engagement

Job engagement, as conceptualized by Rich, Lepine and Crawford (2010), refers to the investment of an individual's physical, emotional, and cognitive energies into their work roles. Engaged employees exhibit high levels of enthusiasm, focused attention, and

active participation in their tasks. Unlike related constructs such as job involvement or organizational commitment, job engagement emphasizes the full self-presence of the employee while performing work duties, making it a more holistic and motivational construct.

Kahn (1990), one of the earliest scholars in this area, described engagement as the harnessing of the self to one's work roles—where individuals express themselves physically, cognitively, and emotionally during role performance. Building on this foundation, Rich et al. (2010) proposed a multidimensional view of engagement, encompassing physical engagement (effort), emotional engagement (enthusiasm), and cognitive engagement (absorption/focus). These dimensions provide a comprehensive understanding of how employees connect with their work both mentally and behaviourally.

Job engagement is a crucial mediator between job resources and organizational outcomes. Numerous studies have found that employees who experience support, autonomy, recognition, and meaningful work are more likely to feel engaged, which in turn leads to higher levels of job satisfaction, performance, and retention (Bakker and Demerouti, 2008; Saks, 2006). Engaged individuals are also more resilient to stress and demonstrate proactive coping behaviour that help reduce the likelihood of emotional exhaustion (Schaufeli et al., 2002).

Importantly, job engagement has been positively associated with job satisfaction, suggesting that employees who are fully absorbed and emotionally invested in their work derive greater fulfillment from it (Christian, Garza and Slaughter, 2011). Engaged workers tend to experience their jobs as meaningful and rewarding, which naturally enhances their overall satisfaction with their roles. In the context of clinical research, where professionals must navigate high workloads and regulatory challenges, fostering

engagement through enriched job resources can serve as a key strategy for improving morale and satisfaction.

1.1.5 Job Satisfaction

Job satisfaction is one of the most widely studied outcomes in organizational psychology and refers to an individual's overall affective evaluation of their job or job experiences (Locke, 1976). It reflects how well an employee's expectations and values align with the realities of their job. High job satisfaction has been linked to greater organizational commitment, productivity, and retention, while low satisfaction is often a precursor to burnout, disengagement, and turnover intentions (Spector, 1997).

In the Job Demands–Resources (JD-R) model, job satisfaction is often seen as a downstream outcome shaped by a balance between demands and resources (Bakker and Demerouti, 2007). High job demands, such as workload, role conflict, and role ambiguity, are consistently associated with reduced job satisfaction due to their strain-inducing nature (Karasek, 1979; Rizzo, House and Lirtzman, 1970). For example, excessive workload can lead to time pressure and frustration, while unclear or conflicting job roles hinder employees' ability to perform effectively—both of which reduce satisfaction with the work experience.

Conversely, job resources have a strong positive correlation with job satisfaction. Factors such as autonomy, supervisor support, contingent rewards, and the intrinsic nature of work enhance employees' sense of purpose, competence, and recognition (Spector, 1985; Rhoades and Eisenberger, 2002). When employees perceive their work as meaningful, are adequately supported, and feel rewarded for their contributions, their satisfaction with the job naturally increases (Hackman and Oldham, 1980).

Emotional exhaustion, the core component of burnout, has a negative relationship with job satisfaction. Exhausted employees feel detached and depleted, which leads to a decline in positive attitudes toward their work (Maslach and Jackson, 1981; Lee and Ashforth, 1996). Numerous studies have demonstrated that emotional exhaustion not only reduces work engagement but also undermines satisfaction by eroding psychological well-being (Schaufeli and Bakker, 2004).

On the other hand, job engagement—a motivational state characterized by energy, enthusiasm, and focus—has been consistently linked to higher job satisfaction (Rich, Lepine and Crawford, 2010; Christian, Garza and Slaughter, 2011). Engaged employees are more likely to view their jobs as fulfilling and are less susceptible to burnout-related dissatisfaction.

Taken together, prior research suggests that job satisfaction is not only a direct outcome of job characteristics but also an integrative reflection of how employees experience demands, access resources, and manage emotional energy. Understanding these interconnections is particularly important in high-pressure environments such as clinical research, where sustained job satisfaction is essential to performance, ethical responsibility, and employee retention.

1.1.6 An Overview of the Clinical Research Industry and Clinical Trials

The clinical research industry works for the advancement of medical science, driving the development of new treatments and therapies through rigorous scientific investigation. This industry encompasses a wide range of activities, including the design and conduct of clinical trials, data management, regulatory compliance, and post-market surveillance. The collaborative efforts of pharmaceutical companies, contract research organizations (CROs), regulatory bodies, and healthcare providers ensure that new

medical interventions are both safe and effective for patient use. The industry's commitment to innovation and adherence to stringent ethical standards has been instrumental in improving patient outcomes and enhancing the overall quality of healthcare. (Thiers, Sinskey and Berndt, 2008)

Clinical trials are essential for advancing medical knowledge and improving patient care by evaluating the safety and efficacy of new treatments, drugs, and medical devices. These studies are conducted in multiple phases, each designed to answer specific research questions and ensure that the interventions are both safe and effective for human use. Phase I trials assess safety and dosage, Phase II trials evaluate efficacy and side effects, Phase III trials compare the new intervention to existing treatments, and Phase IV trials monitor long-term effects post-approval. The rigorous process of clinical trials helps in identifying the best therapeutic options and contributes to evidence-based medicine. (Djulbegovic and Hozo, 2007)

1.1.7 An Overview of Pharmaceutical Company and Contract Research Organization (CRO)

A pharmaceutical company is an entity that discovers, develops, produces, and markets drugs or pharmaceutical products for use as medications. These companies conduct extensive research and development to bring new drugs to market, often involving clinical trials to evaluate the safety and efficacy of these products.

A Clinical Research Organization (CRO) is an entity that provides support to the pharmaceutical, biotechnology, and medical device industries in the form of research services outsourced on a contract basis. These organizations conduct various activities, including clinical trials, data management, regulatory submissions, and other research-related functions.

In the context of clinical trials, a CRO may be contracted by a pharmaceutical company to manage and conduct various aspects of the trial, such as recruiting and monitoring participants, collecting and analyzing data, and ensuring compliance with regulatory requirements. The pharmaceutical company oversees the overall drug development process, including designing the clinical trial, obtaining regulatory approval, and marketing the resulting drug or treatment, follow ups and phone calls.

This study aims to investigate the impact of job demands and job resources on the burnout and job engagement of Clinical research associates, and to explore how they relate to job satisfaction.

1.1.8 Job of a CRA and why is it demanding?

According to ICH GCP, monitoring is defined as "The act of overseeing the progress of a clinical trial and ensuring that it is conducted, recorded, and reported in accordance with the protocol, Standard Operating Procedures (SOPs), Good Clinical Practice (GCP), and the applicable regulatory requirement(s)." (ICH GCP, 2016)

Clinical Research Associates (CRAs) play an important role in the management and oversight of clinical trials, ensuring that these studies are conducted in compliance with regulatory requirements and ethical standards. There are different types of monitoring like on-site monitoring, central monitoring, remote monitoring, risk-based monitoring etc. The visits can generally be divided into site selection visits, site initiation visits, interim visits, and a final close-out visit. Each visit is followed by production of a report which sometimes becomes tedious. A CRA goes through various stressors in the day to day life that are excessive travel hours, too frequent travel visits, extensive work hours, unfair work demands, toxic and demanding workplace, lack of training for the job, lack of autonomy, overstepping, unfair distribution of work, disruption of work life

balance, unfair management, bad leadership, multiple communications, management of multiple stakeholders, too many or untimely handovers, role ambiguity, improper delegation of work, conflicting roles, work pressure, multitasking, maintaining data accuracy, meeting patient enrolment targets, inadequate site staff, multiple phone calls, meetings and emails, deadlines, job insecurity, lack of organizational justice and no/ few work from home policies at times.

1.1.9 Understanding Clinical Research Operations and Its Demands

Clinical research operations refer to the end-to-end processes involved in the planning, execution, monitoring, and completion of clinical trials, which are essential for evaluating the safety and efficacy of new drugs, medical devices, and therapeutic interventions. These operations span a wide range of activities including protocol development, site selection, patient recruitment, regulatory compliance, data collection and management, safety reporting, and trial monitoring, often coordinated across international teams and multiple stakeholders such as sponsors, Contract Research Organizations (CROs), hospitals, and regulatory bodies.

The field is inherently demanding due to its high level of complexity, responsibility, and accountability. Clinical trials must adhere to strict ethical and scientific standards as mandated by regulatory authorities such as the U.S. FDA, EMA, and ICMR. These operations are time-sensitive, cost-intensive, and error-intolerant, requiring professionals to consistently meet tight deadlines, ensure data accuracy, manage protocol deviations, and safeguard participant safety—all while ensuring compliance with Good Clinical Practice (GCP) guidelines and evolving regulatory landscapes.

For Clinical Research Associates (CRAs) this translates into intense workloads, frequent travel, multitasking across sites and systems, and constant pressure to maintain

quality and timelines. The need for cross-functional collaboration, rapid decision-making, and handling of unforeseen challenges such as protocol amendments, patient dropouts, or adverse event reporting adds to the mental and emotional strain.

In recent years, with the acceleration of clinical trials in response to global health emergencies, technological disruptions, and decentralized trial models, the scope and pace of clinical research operations have further intensified, often outpacing the growth of support infrastructure. This imbalance contributes to heightened stress levels, emotional exhaustion, and declining job satisfaction—making it critical to study the psychosocial experiences of professionals within this high-stakes industry.

1.2 Research Problem

1.2.1 Academic Problem

Despite the critical importance of CRAs in the clinical research industry, there exists a notable gap in academic literature regarding the factors contributing to emotional exhaustion and job satisfaction within this professional group. While existing research has explored burnout and job satisfaction in broader organizational contexts, the unique working conditions that CRAs face have not been extensively studied. This lack of empirical evidence limits our understanding of how specific job demands and resources influence emotional exhaustion, job engagement, and overall job satisfaction for CRAs. Moreover, the interplay between these factors remains underexplored, presenting a significant opportunity for academic inquiry to shed light on the nuances of this profession and inform better management practices.

1.2.2 Industry Problem

In the clinical research industry, the well-being of Clinical Research Associates is of paramount importance, as high levels of emotional exhaustion can lead to decreased job satisfaction, increased turnover, and compromised research quality. Operating under constant pressure to meet regulatory standards and deadlines, CRAs are increasingly at risk of burnout. However, the industry's capabilities to address these challenges have not been well documented. Organizational strategies to mitigate stress and enhance job resources are crucial in fostering healthier work environments. Despite the availability of programs aimed at employee well-being, there is limited evidence on their effectiveness in addressing the unique needs of CRAs. Consequently, industry stakeholders lack the critical insights needed to develop targeted interventions that could significantly improve employee satisfaction and performance. Without a comprehensive understanding of the factors contributing to burnout and strategies for improvement, organizations risk high turnover rates and reduced operational effectiveness in an already demanding field.

By investigating the emotional exhaustion and job satisfaction of Clinical Research Associates through both academic and industry perspectives, this research aims to fill the gap in knowledge and provide actionable insights that can benefit both the academic community and the clinical research industry. Ultimately, the findings will contribute to the development of targeted strategies that enhance the working conditions of CRAs, ensuring their well-being and promoting a more sustainable workforce in clinical research industry.

1.3 Purpose of Research

The purpose of this study is:

- To examine how job demands and job resources influence emotional exhaustion, job engagement, and job satisfaction among clinical research associates.
- To address the gap in literature concerning burnout and motivation in this high-stress yet under-studied occupational group.
- To determine whether Job demands like Workload, Role Conflict and Role Ambiguity are responsible for job burnout in CRAs.
- To understand whether burnout can be mitigated by introducing job resources like autonomy, supervisor support, rewards, and nature of work.
- To study the impact of job resources on job satisfaction through job engagement as well as the impact of emotional exhaustion on job satisfaction.
- To study the relationship between emotional exhaustion, job engagement and job satisfaction.

1.4 Significance of the Study

This study holds both theoretical and practical significance. From a theoretical perspective, it contributes to the growing body of literature on the Job Demands–Resources (JD-R) model by applying it to a relatively underexplored professional group: CRAs working in clinical operations. Most existing studies applying the JD-R framework focus on healthcare, education, and corporate sectors, with limited research on its application within the clinical trials domain—a field marked by high cognitive load, ethical complexity, and time-sensitive demands.

By empirically examining how specific job demands (role conflict, role ambiguity, and workload) and job resources (supervisor support, autonomy, contingent rewards, and nature of work) influence emotional exhaustion, job engagement, and job

satisfaction, this study offers a comprehensive, context-specific understanding of burnout and engagement in this field.

Practically, the findings can help clinical research organizations (CROs), sponsor companies, SMOs, and hospitals to identify key psychosocial factors affecting their workforce. Understanding these relationships will allow organizations to design targeted interventions, such as improving supervisor support, clarifying role expectations, or providing more autonomy—strategies that may reduce emotional exhaustion, foster engagement, and improve overall job satisfaction.

Ultimately, by identifying the burnout and job satisfaction of the CRAs, this study aims to support better workforce planning, retention strategies, and well-being initiatives in the clinical research industry, thereby indirectly contributing to the efficiency and ethical conduct of clinical trials, which depend on the dedication and mental resilience of these professionals.

1.5a Objectives

The primary objective of this study is to explore the relationships between job demands, job resources, emotional exhaustion, job engagement, and job satisfaction among CRAs using the Job Demands–Resources (JD-R) model as the theoretical framework. Specifically, the study aims:

- To examine the impact of job demands—namely, role conflict, role ambiguity, and workload—on emotional exhaustion in CRAs in India.
- To analyze the effect of job resources—supervisor support, autonomy, contingent rewards, and nature of work—on emotional exhaustion in CRAs in India.
- To determine the relationship between job resources and job engagement.
- To explore the influence of emotional exhaustion on job engagement.

- To assess the effect of emotional exhaustion on job satisfaction.
- To evaluate the relationship between job engagement and job satisfaction.
- To test an integrated structural model that explains how job demands and job resources collectively influence emotional exhaustion, job engagement, and job satisfaction using Partial Least Squares Structural Equation Modeling (PLS-SEM).

1.5b Research Questions

1. Is there a presence of emotional exhaustion among CRAs in India?

2. To what extent do job demands (role conflict, role ambiguity, and workload) predict emotional exhaustion in CRAs?

3. How do job resources (supervisor support, autonomy, contingent rewards, and nature of work) relate to job engagement in this context?

4. What is the impact of emotional exhaustion on job engagement?

5. How do emotional exhaustion and job engagement influence job satisfaction?

6. How well does an integrated model of job demands and job resources explain emotional exhaustion, job engagement, and job satisfaction among CRAs?

1.5c Hypotheses

H1. Job Demands have statistically significant relationship with emotional exhaustion.

H1a. Workload has statistically significant relationship with emotional exhaustion.

H1b. Role Conflict has statistically significant relationship with emotional exhaustion.

H1c. Role Ambiguity has statistically significant relationship with emotional exhaustion.

H2. Job resources have statistically significant relationship with job engagement.

H2a. Supervisor Support has statistically significant relationship with job engagement.

H2b. Job Autonomy has statistically significant relationship with job engagement.

H2c. Contingent Rewards have statistically significant relationship with job engagement.

H2d. Nature of Work has statistically significant relationship with job engagement.

H3. Emotional exhaustion have statistically significant relationship with job engagement

H4. Emotional exhaustion has statistically significant relationship with job satisfaction

H5. Job engagement has a statistically significant relationship with job satisfaction

CHAPTER II

REVIEW OF LITERATURE

2.1 Theoretical Framework

2.1.1 Job Demands–Resources (JD-R) Model

The Job Demands-Resources (JD-R) model, first introduced by Demerouti, Bakker, Nachreiner, and Schaufeli in 2001, has become a widely accepted framework for understanding employee well-being and performance in the workplace. This model posits that job demands and job resources are the two primary factors influencing burnout and engagement among employees.

Job demands are the physical, psychological, social, or organizational aspects of a job that require sustained physical or mental effort and are associated with physiological and psychological costs. In contrast, job resources such as supervisor support, autonomy, contingent rewards, and the nature of work are the physical, psychological, social, or organizational aspects of the job that help achieve work goals, reduce job demands, stimulate personal growth and development and mitigate emotional exhaustion (Demerouti et al., 2001, Bakker & Demerouti, 2007).

According to the model, high job demands can lead to exhaustion, while a lack of job resources can lead to disengagement. Conversely, the presence of sufficient job resources can mitigate the negative impact of job demands and enhance employee engagement and performance.

The Job Demands–Resources (JD-R) model serves as a foundational framework for understanding how various job characteristics influence employee well-being and performance. It posits that every occupation has its specific risk factors associated with job stress, which can be categorized into two broad groups: job demands and job

resources (Demerouti et al., 2001). The balance between these demands and resources is crucial in determining outcomes such as burnout, engagement, and job satisfaction.

Emotional exhaustion, a core component of burnout, is characterized by feelings of being emotionally overextended and depleted of emotional resources (Maslach & Jackson, 1981).

A recent study by Allam et al. (2024) explored post-COVID turnover intentions among CRAs within Contract Research Organizations (CROs). The research identified workload pressure, insufficient managerial support, and lack of recognition as key contributors to burnout, which in turn led to decreased job satisfaction and higher turnover intentions. These findings align with the JD-R model, which posits that excessive job demands coupled with insufficient job resources result in emotional exhaustion and job dissatisfaction. (Demerouti et al., 2001; Bakker & Demerouti, 2007).

Empirical studies confirm that as emotional exhaustion increases, engagement significantly decreases (Hakanen et al., 2006; Leiter & Maslach, 2004), showing that burnout and engagement are inversely related. Exhausted employees often disengage from their tasks, both emotionally and cognitively.

When employees are emotionally depleted, they lack the energy and motivation to remain engaged at work. Several longitudinal studies (e.g., Hakanen et al., 2008) confirm that emotional exhaustion predicts lower levels of work engagement over time, indicating that burnout directly undermines motivational outcomes. According to the dual process of the JD-R model, emotional exhaustion reduces the energy available for engagement (Bakker & Demerouti, 2007).

The proposed research model is grounded in the Job Demands–Resources (JD-R) theory, which posits that every occupation involves certain job demands and job resources that influence employee well-being and outcomes. In this study, job demands

are represented by three constructs: *role conflict, role ambiguity, and workload*, while job resources include *supervisor support, autonomy, contingent rewards, and nature of work*. These variables are hypothesized to impact two key psychological states—emotional exhaustion and job engagement—which in turn influence the ultimate outcome of interest: job satisfaction.

This study was driven by the urgent need to understand and address burnout—specifically emotional exhaustion—in the clinical research setting, using the Job Demands–Resources (JD-R) model as a theoretical framework. By examining the impact of job demands and job resources on emotional exhaustion, job engagement, and job satisfaction, this research aims to contribute not only to the academic discourse but also to the practical well-being of a highly skilled but often overlooked professional community.

Han, J. et al. (2020) in his variation of the JD-R model integrates emotional exhaustion and job satisfaction as key outcomes, mediated by job engagement. It aligns closely with the current study's focus by demonstrating how job resources not only reduce exhaustion but also elevate satisfaction through engagement.

The present study is underpinned by the Job Demands–Resources (JD-R) model, a comprehensive and flexible framework for understanding employee well-being, burnout, and motivation in a wide range of occupational contexts (Demerouti et al., 2001; Bakker and Demerouti, 2007). The foundational JD-R model (Demerouti et al., 2001) in Figure 1 depicts how job demands and job resources interact to influence burnout and performance. Job demands such as workload and role conflict are seen as drivers of emotional exhaustion, while resources like autonomy and support act as buffers and promote job engagement. This model forms the theoretical basis for the present study, offering a dual-process framework—the health impairment path and the motivational

path—to understand outcomes like job satisfaction and disengagement in clinical research professionals.

In this study, job demands are represented by workload, role ambiguity, and role conflict—factors that are particularly relevant in the high-pressure environment of clinical research operations. According to the health impairment process proposed by the JD-R model, excessive or chronic job demands deplete employees' energy and lead to emotional exhaustion, which is considered the core dimension of burnout (Maslach and Jackson, 1981). Numerous studies have supported this pathway, showing that unmanageable demands significantly increase the risk of burnout and reduce job satisfaction (Schaufeli and Taris, 2014; Karasek, 1979).

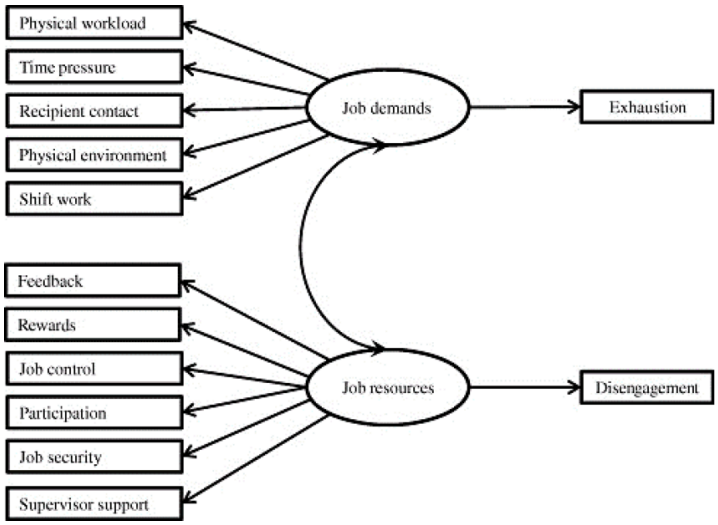


Figure 1. The Job Demands-Resources Model of Burnout (Source: Demerouti et al., 2001) Bakker, A.B., van Emmerik, H. and van Riet, P. (2008)

The current study focuses on four job resources: autonomy, supervisor support, contingent rewards, and the nature of work. According to the motivational process within the JD-R model, these resources foster employee engagement, which in turn leads to

higher job satisfaction and performance (Xanthopoulou et al., 2007; Rich, Lepine and Crawford, 2010). Job resources also act as buffers, weakening the negative impact of high demands on emotional exhaustion (Bakker et al., 2005).

Research has shown that the JD-R model is applicable across various occupational settings and cultures, making it a versatile tool for both researchers and practitioners. Studies have demonstrated that the model can be used to identify and mitigate burnout risks, promote employee well-being, and enhance organizational effectiveness.

2.1.2 Maslach Burnout Inventory (MBI)

The Maslach Burnout Inventory (MBI), developed by Maslach and Jackson (1981), is the most widely used instrument for assessing burnout in occupational settings. Grounded in the stress-strain framework, the MBI conceptualizes burnout as a multidimensional syndrome consisting of three key components: emotional exhaustion, depersonalization (or cynicism), and reduced personal accomplishment. Emotional exhaustion refers to the feeling of being emotionally overextended and depleted of one's emotional resources, and is widely recognized as the core component of burnout. Depersonalization captures a sense of emotional detachment or callousness toward recipients of one's work, often observed in caregiving or human service professions. The third dimension, reduced personal accomplishment, reflects a decline in feelings of competence, achievement, and effectiveness at work. Figure 2 conceptualizes burnout as comprising three dimensions: emotional exhaustion, depersonalization, and reduced personal accomplishment (Maslach & Jackson, 1981). In this study, emotional exhaustion is selected as the core dimension, given its consistent predictive power in burnout-related outcomes, and its prominence in JD-R-based burnout research.

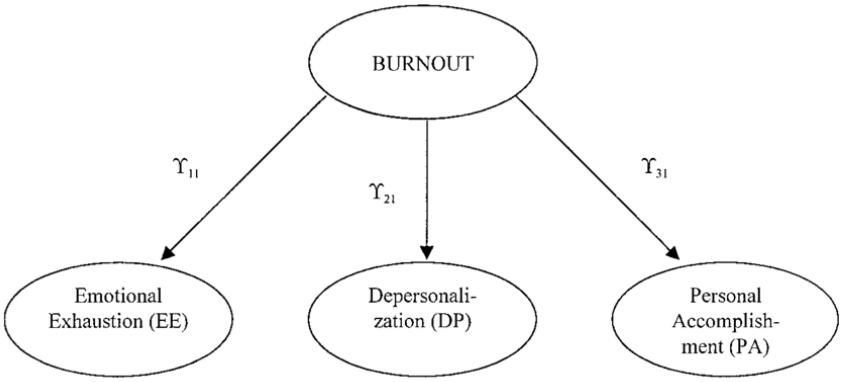


Figure 2. Maslach Burnout Inventory. The Dimensionality of the Maslach Burnout Inventory across Small Business Owners and Educators

Out of all 3 dimensions of burnout, emotional exhaustion has received the most empirical attention due to its strong and consistent relationship with job demands, such as workload and role conflict, and its predictive value for negative outcomes like job dissatisfaction, disengagement, and health impairment (Maslach et al., 2001). As such, the present study focuses on emotional exhaustion as the primary indicator of burnout, in alignment with research suggesting it to be the most relevant and generalizable across occupations (Schaufeli and Taris, 2014). This focus allows for a more precise examination of how specific job demands and resources impact well-being within the demanding environment of clinical research operations.

Lizano in their study on all 3 dimensions emphasizes the downstream impact of burnout (especially emotional exhaustion) on worker well-being, including mental health, job satisfaction, and turnover (Figure 3). It supports the inclusion of emotional exhaustion and job satisfaction as dependent variables in this study and reinforces the importance of studying burnout in high-demand environments like clinical research.

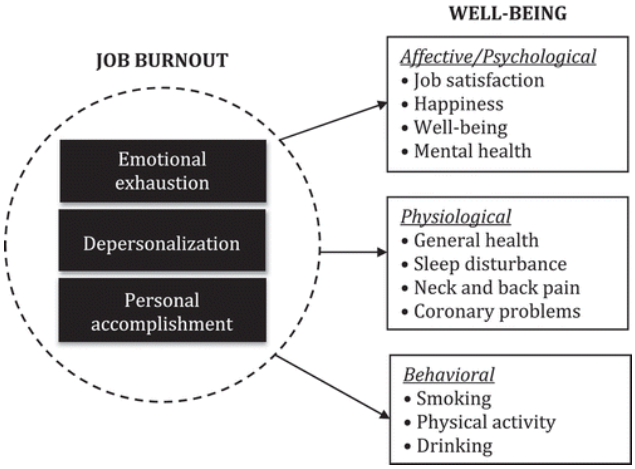


Figure 3. The impact of job burnout dimensions on worker well-being. Lizano, E.L. (2015)

Emotional exhaustion is the central component of burnout and is often triggered by excessive and prolonged work-related stress (Maslach & Jackson, 1986). According to the JD-R model (Demerouti et al., 2001), job demands such as workload, role conflict, and role ambiguity are primary predictors of emotional exhaustion.

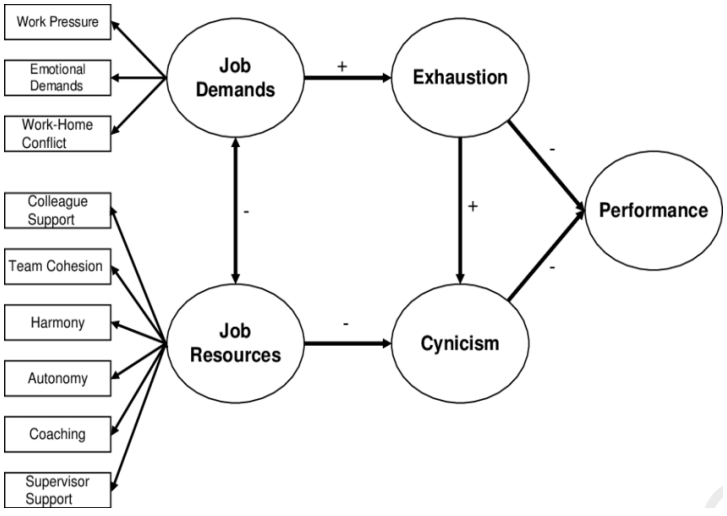


Figure 4. The Job Demands-Resources model. Bakker, A.B., van Emmerik, H. and van Riet, P. (2008)

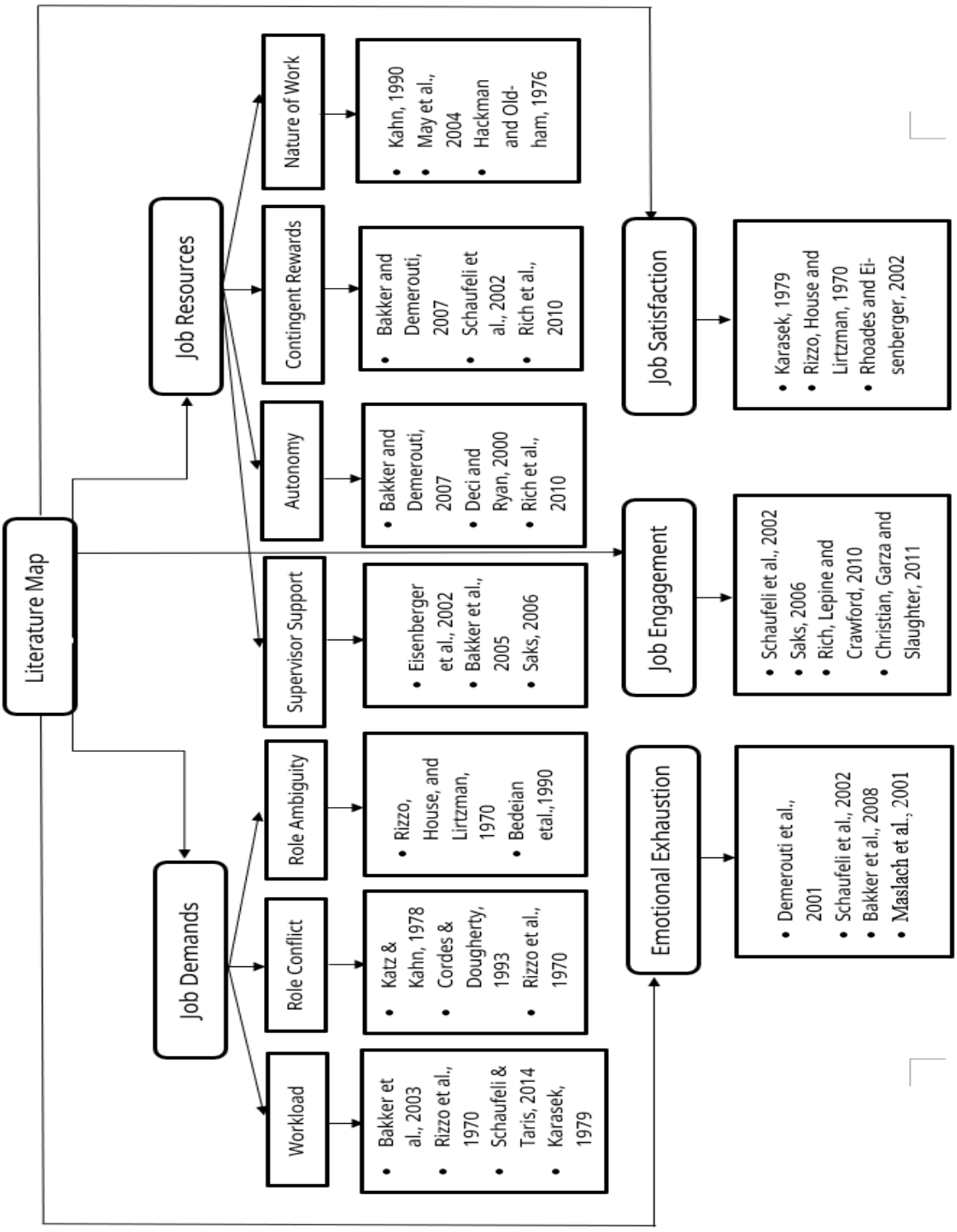


Figure 5. Literature Map of the Study

JD-R Model Based on Schaufeli (2004) and Bakker & Demerouti (2008) highlights the bidirectional relationships between demands, resources, burnout, and engagement, extending the JD-R model's flexibility across professions (Figure 6).

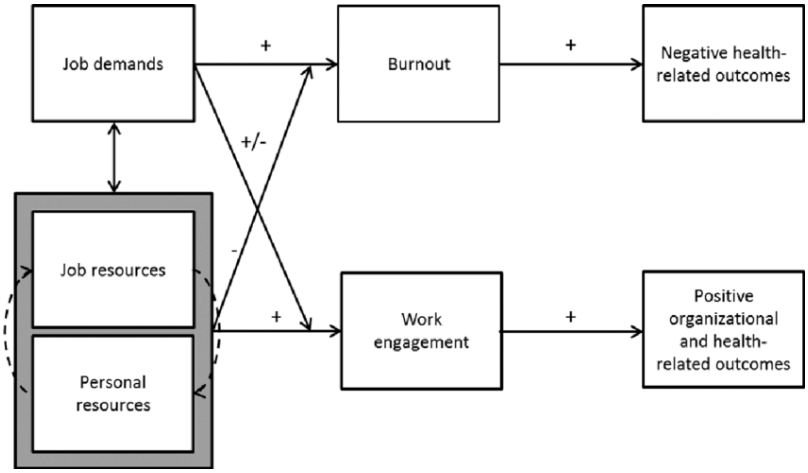


Figure 6. Job Demands-Resources (JDR) model based on Schaufeli (2004) and Bakker and Demerouti (2008)

Applied here, it supports the study's approach of testing clinical research professionals, where intense job demands threaten well-being, and personal and organizational resources may act as protective factors. Han's variation of the JD-R model integrates emotional exhaustion and job satisfaction as key outcomes, mediated by job engagement. It aligns closely with the current study's focus by demonstrating how job resources not only reduce exhaustion but also elevate satisfaction through engagement (Han, J. *et al.* (2020) (Figure 7) This model reinforces the mediating role of emotional exhaustion and engagement in explaining employee outcomes under different work conditions.

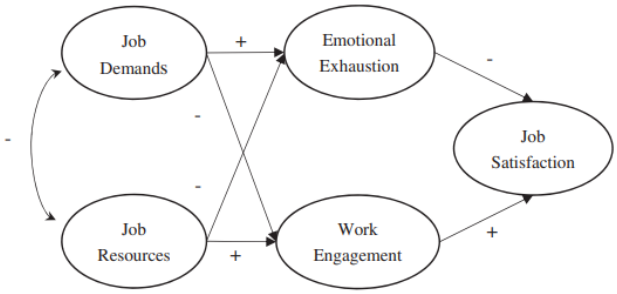


Figure 7. JDR Work Engagement, Emotional Exhaustion, Job Satisfaction model (Han, J. *et al.* (2020)

Lizano and Barak in their study on public child welfare workers proved that job burnout dimensions significantly affect job satisfaction in child welfare workers (Figure 8). This model emphasizes the downstream impact of burnout (especially emotional exhaustion) on worker well-being, including mental health, job satisfaction, and turnover. It supports the inclusion of emotional exhaustion and job satisfaction as dependent variables in this study and reinforces the importance of studying burnout in high-demand environments like clinical research (Lizano and Mor Barak, 2015).

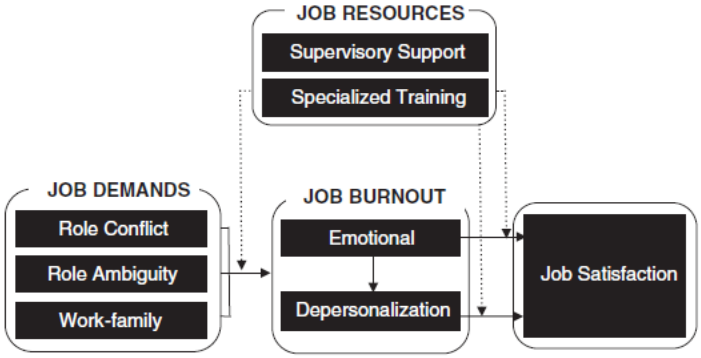


Figure 8. Model of JDR-Emotional Exhaustion-Job satisfaction (Lizano and Mor Barak, 2015)

2.1.3 Conservation of Resources (COR) Theory

Job resources particularly influence motivation or work engagement when job demands are high. This assumption is based on the premises of the conservation of resources (COR) theory. The Conservation of Resources (COR) Theory, proposed by Hobfoll (1989), is a widely recognized framework for understanding stress and burnout. According to COR theory, individuals strive to obtain, retain, and protect their resources—which include objects, conditions, personal characteristics, and energies that are valued and necessary for achieving work-related goals. Stress arises when there is a threat of resource loss, actual loss of resources, or when individuals invest resources without receiving adequate returns (Hobfoll, 1989; 2001).

This theory aligns closely with the Job Demands–Resources (JD-R) model, particularly in explaining the health impairment pathway. COR theory supports the notion that excessive job demands (such as high workload, role conflict, and ambiguity) lead to the depletion of emotional and psychological resources, ultimately resulting in emotional exhaustion—the core component of burnout. In high-stakes fields like clinical research, where professionals are under constant pressure to meet deadlines, ensure regulatory compliance, and manage cross-functional expectations, the risk of resource loss is particularly high.

Conversely, the presence of job resources—such as supervisor support, autonomy, contingent rewards, and a meaningful nature of work—acts as a protective mechanism. COR theory posits that these resources not only help in preventing resource loss but also enable individuals to build resource reserves, fostering resilience and psychological well-being (Halbesleben et al., 2014). When employees perceive their resources to be sufficient or increasing, they are more likely to experience higher levels of job engagement and greater job satisfaction (Hobfoll et al., 2018).

Importantly, COR theory provides additional explanatory power in this study by emphasizing the resource investment principle—the idea that employees must invest resources (e.g., time, energy, effort) to protect against future loss, recover from losses, or gain new resources. This principle explains why some clinical research professionals remain engaged despite high demands: they invest strategically in supportive resources, such as nurturing professional relationships or building competence, to avoid emotional exhaustion and maintain job satisfaction.

Thus, COR theory complements the JD-R framework in this research by offering a resource-centered lens through which to understand the causes of emotional exhaustion and the motivation behind engagement and satisfaction. It also justifies the dual role of job resources as both direct contributors to positive outcomes and buffers against job demand-induced strain.

2.2 Research Gaps and Variable Identification

This study addresses three major gaps identified from the literature.

Firstly, much of the existing research utilizing JD-R theory tends to focus on healthcare providers or general organizational settings. There is a lack of tailored studies that investigate the dynamics in clinical research sector in the burnout literature.

Secondly, limited literature exists on examining the relationships between job demands, resources, emotional exhaustion, job engagement, and job satisfaction within the population of CRAs who work in specialized environments with unique demands and resources.

Thirdly, there is a need for mixed methods research as most studies may rely heavily on quantitative data. Qualitative studies that explore CRAs' experiences in-depth

could provide rich insights into how they interpret their work demands and resources, emotional exhaustion, and engagement levels.

Fourthly, the specific combination of constructs and pathways explored in this study—particularly within the framework of the JD–R theory has not been examined has not been previously explored in relation to Clinical Research Associates.

In order to bridge above stated gaps a mixed method approach was adopted.

First, a semi-structured interview questionnaire was developed to conduct individual interviews with 15 Clinical Research Associates (CRAs). The purpose of these interviews was to identify specific job demands that CRAs perceive as stressors and to explore whether these demands contribute to emotional exhaustion. Additionally, the interviews aimed to uncover job resources that CRAs view as motivational factors and examine their role in facilitating job engagement. Furthermore, the study sought to determine the extent to which these variables impact the CRAs' levels of job satisfaction.

Second, following the interviews, several constructs were identified and categorized. Job demands included Workload, Role Conflict, and Role Ambiguity. Job resources encompassed Supervisor Support, Contingent Rewards, Nature of Work, and Job Autonomy. These identified job demands and job resources were designated as the independent variables, while the dependent variables were established as emotional exhaustion, job engagement, and job satisfaction.

Third, to ensure the validity of the identified job demands and job resources, a panel of experts from the clinical research field was consulted. This expert group provided feedback on whether the identified constructs significantly impact emotional exhaustion, job engagement, and job satisfaction.

Finally, a quantitative survey questionnaire was developed based on the literature and structured using a 5-point Likert scale. This survey was then distributed to a larger

sample of 500 CRAs to gather quantitative data on the relationships between the identified variables.

2.3 Conceptual Model of the Study and Hypothesis Development

This study is grounded in the Job Demands–Resources (JD-R) model, which proves that employee well-being is influenced by the dynamic balance between job demands and job resources. In this context, job demands such as workload, role conflict, and role ambiguity are seen as stress-inducing factors that can lead to emotional exhaustion, a critical dimension of burnout. In contrast, job resources — including supervisor support, autonomy, contingent rewards, and the nature of work — are viewed as motivational elements that enhance job engagement and job satisfaction, while also mitigating the negative effects of excessive demands.

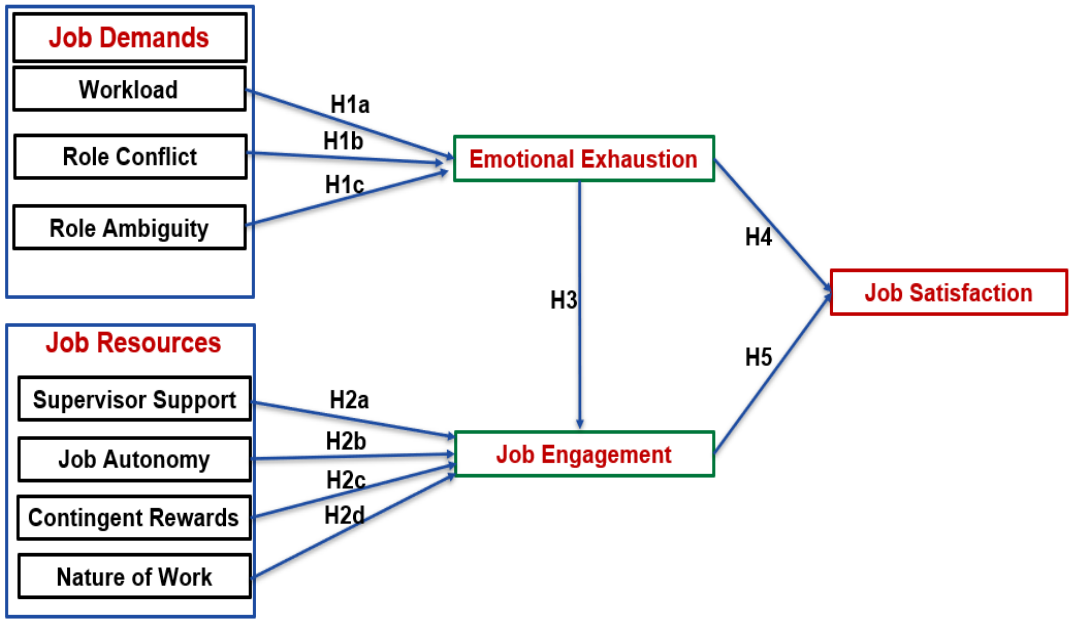


Figure 9. Conceptual Model of the Study

The conceptual model (Figure 9) proposes the following relationships:

• Job Demands (workload, role conflict, role ambiguity) have statistically significant relationship with emotional exhaustion (Hypothesis 1a, 1b, 1c, 1d)

• Job Resources (supervisor support, autonomy, contingent rewards, nature of work) have statistically significant relationship with job engagement (Hypothesis 2a, 2b, 2c, 2d)

• Emotional exhaustion has a statistically significant relationship with job engagement and job satisfaction (Hypothesis 3 and 4 respectively)

• Job engagement has a statistically significant relationship with job satisfaction (Hypothesis 5)

2.3.1 H1: Job demands have statistically significant relationship with emotional exhaustion

2.3.1.1 H1a. Workload has statistically significant relationship with emotional exhaustion

Workload refers to the intensity and volume of tasks required within a limited timeframe, which consistently shows a positive correlation with emotional fatigue (Bakker et al., 2003). Role conflict (receiving incompatible expectations) and role ambiguity (unclear job responsibilities) also lead to psychological strain, uncertainty, and emotional depletion (Rizzo et al., 1970; Schaufeli & Taris, 2014).

According to the health impairment process proposed by the JD-R model, excessive or chronic job demands deplete employees' energy and lead to emotional exhaustion, which is considered the core dimension of burnout (Maslach and Jackson, 1981). Numerous studies have supported this pathway, showing that unmanageable

demands significantly increase the risk of burnout and reduce job satisfaction (Schaufeli and Taris, 2014; Karasek, 1979).

Greenglass, Esther & Burke, Ronald & Fiksenbaum, Lisa. (2001) in their study on nurses found a significant association between high workload and burnout among nurses. High workload was closely linked to increased levels of emotional exhaustion, a core component of burnout. The findings suggest that reducing workload through better staffing and workload management can help mitigate burnout.

Workload is consistently identified as a primary job demand contributing to employee strain. High workload requires sustained physical and mental effort, leading to exhaustion and reduced job performance (Bakker et al., 2004). High workload, defined as excessive work demands and time pressure, has been consistently linked to increased emotional exhaustion.

Similarly, a study by Van Jaarsveld et al. (2010) demonstrated that high workload mediated the relationship between customer incivility and employee emotional exhaustion. In the healthcare sector, Khan et al. (2020) reported that increased workload among academicians led to higher levels of emotional exhaustion and ill health. These findings underscore the detrimental impact of excessive workload on employees' emotional well-being.

Workload is one of the most consistently reported predictors of emotional exhaustion, particularly when employees face sustained pressure to complete tasks under strict deadlines, without adequate resources or recovery time. In healthcare, high workload has been repeatedly linked to burnout among nurses and physicians. For instance, Shanafelt et al. (2015) found that workload pressure was the most significant contributor to emotional exhaustion and depersonalization among U.S. physicians. Similarly, Van Bogaert et al. (2014) identified workload as the primary job demand

responsible for burnout and reduced satisfaction among nurses. In the education sector, Skaalvik and Skaalvik (2010) reported that perceived workload was the strongest predictor of emotional exhaustion among school teachers, largely due to the combination of classroom management, administrative work, and emotional labor. In hospitality, Karatepe (2008) demonstrated that front-line hotel employees experiencing excessive customer demands and long working hours were more emotionally exhausted, particularly in high-contact roles. Call center and customer service employees also report severe emotional exhaustion from repetitive workload and emotional display rules, as shown by Brotheridge and Grandey (2002). In the technology sector, Moore (2000) found that IT professionals faced cognitive overload and mental fatigue due to heavy workloads and project deadlines, leading to increased emotional exhaustion and intention to quit. The banking and retail sectors reflect similar findings, where long working hours, sales targets, and lack of autonomy translate into high emotional strain (Yavas, Babakus and Karatepe, 2013). Across these industries, workload has been shown to initiate the health impairment process in the JD-R model, where prolonged strain depletes emotional and psychological resources (Bakker and Demerouti, 2007). Additionally, COR theory (Hobfoll, 1989) supports that continuous workload drains personal resources, increasing vulnerability to exhaustion and burnout. These cross-industry studies collectively affirm that high workload is a universal and potent predictor of emotional exhaustion, necessitating workload management as a key intervention strategy for employee well-being.

2.3.1.2 H1b. Role Conflict has statistically significant relationship with emotional exhaustion.

H1c. Role Ambiguity has statistically significant relationship with emotional exhaustion.

Role stress is defined as the overall stress experienced by an individual due to various role-related factors, including role conflict and role ambiguity. According to the study these role stressors negatively impact employees' psychological wellbeing and overall job performance.

As per the study by Rizzo et al “Role conflict refers to the degree of incongruity or incompatibility of expectations associated with a role. It arises when an individual is expected to perform behaviors that are mutually incompatible." The study identified multiple sources of role conflict, including conflicting expectations from different supervisors, conflicting job requirements, and conflicts between job demands and personal values Role conflict occurs when employees are required to perform two or more incompatible behaviours, and role ambiguity occurs when employees are unclear as to what behaviours they are required to perform (Katz & Kahn, 1978).

Role conflict and role ambiguity have been shown to be associated with higher levels of burnout and to predict increases in burnout over time (O¨ rtqvist & Wincent, 2010; Cordes & Dougherty, 1993)

Role ambiguity refers to the degree to which clear information is lacking regarding the expectations associated with a role and the methods for fulfilling known role expectations. The study highlighted that role ambiguity can lead to confusion, anxiety, and difficulty in job performance, as employees are unsure about what is expected of them.

Role conflict occurs when there are incompatible demands placed upon an employee, leading to stress and strain. Rizzo et al. (1970) identified role conflict as a significant source of job stress. In a study focusing on faculty members, Al-Harthy et al.

(2022) found that role conflict was positively associated with emotional exhaustion and turnover intentions. Similarly, Khan et al. (2020) reported that role conflict among academicians significantly contributed to emotional exhaustion and ill health. These studies highlight the importance of addressing role conflict to mitigate emotional exhaustion.

The role stressor measure comprises two scales—a six-item role ambiguity scale and a six-item role conflict scale. Both scales are computed from the average of these six items. Note that three items of each scale are reverse-scored. Each role stressor item is on a 7-point scale from 1 (strongly disagree) to 7 (strongly agree).

This measure, developed by Rizzo, House, and Lirtzman (1970), was one of the first measures of role ambiguity and role conflict. A lack of necessary information regarding role expectation for a given organizational position has been defined as role ambiguity. Role conflict was defined as a condition of when employees have incompatible roles defined by supervisors or other members of an organization. This measure includes intrarole, interrole, as well as ambiguity due to lack of role predictability, role clarity, and role certainty (Bedeian, Mossholder, Kemery, & Armenakis, 1990)

Work-role ambiguity and work-role conflict were measured using five and eight items, respectively, adopted from Rizzo, House, and Lirtzman (1970), measured on a 5-point Likert scale ranging from “totally disagree” to “totally agree”. Higher score indicated greater work-role ambiguity and work-role conflict.

Role ambiguity, defined as the lack of clarity about job responsibilities and expectations, has been identified as a significant predictor of emotional exhaustion. In the nursing profession, a study by Gao et al. (2023) found that role ambiguity was positively correlated with emotional exhaustion and work alienation. Additionally, research by Di

Tecco et al. (2019) indicated that role ambiguity among healthcare professionals led to increased emotional exhaustion, which in turn negatively affected job satisfaction. These findings suggest that clarifying job roles and expectations is crucial in reducing emotional exhaustion.

2.3.2 H2: Job resources have statistically significant relationship with job engagement.

Job engagement thrives when employees perceive access to meaningful and empowering resources. The JD-R model classifies job resources as antecedents of engagement, especially when they align with core psychological needs like competence and autonomy. Schaufeli & Bakker (2004) argue that employees are more likely to exert full effort when their work environment provides support, recognition, and opportunities for growth. Rich et al. (2010) further affirm that job resources are critical enablers of vigor, dedication, and absorption—the hallmarks of engagement.

2.3.2.1 H2a. Supervisor Support has statistically significant relationship with job engagement.

Engagement is characterized by vigor, dedication, and absorption in one's work (Schaufeli et al., 2002). Supervisor support is a significant job resource that directly contributes to enhancing employee engagement, particularly in demanding occupational contexts. Supervisor support is characterized by the degree to which employees feel that their supervisor values their work, provides constructive feedback, and expresses concern for their well-being (Eisenberger et al., 2002). He found that perceived supervisor support enhances employees' emotional commitment to the organization, leading to increased engagement. Similarly, Bakker et al. (2005) demonstrated that supervisor support is

positively associated with work engagement, as it fulfills employees' need for relatedness and recognition. According to the Job Demands–Resources (JD-R) model, such support fosters engagement by fulfilling basic psychological needs and creating a resource-rich environment that enables employees to thrive (Bakker and Demerouti, 2007). Engaged employees are defined by their high levels of vigor, dedication, and absorption in work (Schaufeli et al., 2002), and supervisory behaviors such as active listening, recognition, and empowerment have been shown to stimulate these states.

Empirical studies consistently demonstrate that supervisor support positively influences both emotional and cognitive dimensions of engagement, acting as a motivator and an energy restorer (Tims et al., 2011). When supervisors are perceived as supportive, employees report higher levels of job enthusiasm, emotional investment, and proactive effort (Rich et al., 2010). Additionally, supervisory support has been shown to mediate the effects of workplace stressors by encouraging coping, goal clarity, and meaningful feedback, thereby enhancing psychological safety and the willingness to invest oneself in the job (Saks, 2006). In high-pressure settings such as clinical research, where task precision and deadline adherence are crucial, the presence of supportive leadership can play a decisive role in sustaining work engagement despite environmental challenges.

2.3.2.2 H2b. Autonomy has statistically significant relationship with job engagement

Autonomy is a powerful motivator in the workplace, representing the extent to which employees feel they have freedom and discretion over how they carry out their tasks. Within the Job Demands–Resources (JD-R) model, autonomy functions as a central job resource that enhances both job engagement and job satisfaction by fulfilling psychological needs for control, competence, and self-determination (Bakker and Demerouti, 2007; Deci and Ryan, 2000). Autonomy empowers employees to align their

work methods with personal strengths, encourages innovation, and allows for greater adaptability under pressure—all of which contribute to greater emotional and cognitive involvement in work (Macey and Schneider, 2008).

Empirical studies affirm the positive link between autonomy and job engagement. For example, Rich et al. (2010) found that employees who experienced higher levels of autonomy reported significantly greater vigor and absorption in their roles. Similarly, research by Seibert et al. (2011) showed that autonomy was a consistent predictor of engagement across various job types. In terms of job satisfaction, autonomy has long been identified as one of the most critical job characteristics (Hackman and Oldham, 1976), with meta-analytic evidence confirming its strong positive effect on employees' overall satisfaction (Humphrey et al., 2007). Employees who feel trusted to make decisions and manage their responsibilities autonomously tend to report higher morale, greater workplace commitment, and reduced turnover intentions. In the clinical research field, where precision and protocol adherence are essential, providing autonomy in problem-solving and decision-making may substantially boost professionals' sense of ownership and satisfaction.

2.3.2.3 H2c. Contingent Rewards have statistically significant relationship with job engagement

Contingent rewards—performance-based recognition and reinforcement—serve as a powerful motivational mechanism that enhances both job engagement and ultimately, job satisfaction. Rooted in social exchange theory (Cropanzano and Mitchell, 2005), contingent rewards signal to employees that their efforts are noticed and valued, which fosters a sense of fairness, motivation, and reciprocal commitment. Within the Job Demands–Resources (JD-R) framework, contingent rewards are considered a key job

resource, which stimulate intrinsic motivation and increase levels of engagement by reinforcing effort-outcome linkages (Bakker and Demerouti, 2007).

Numerous empirical studies have demonstrated that employees who receive appropriate and timely rewards are more likely to exhibit high levels of vigor, dedication, and absorption, the three dimensions of job engagement (Schaufeli et al., 2002). For instance, Saks (2006) found that perceived organizational rewards and recognition were significantly related to both job and organizational engagement. These engaged employees, in turn, tend to report higher levels of job satisfaction, as engagement enhances positive emotions and fulfillment derived from work. Furthermore, engaged employees experience less detachment, greater alignment with organizational goals, and a stronger sense of purpose—all contributing to sustained job satisfaction (Rich et al., 2010; Tuckey et al., 2012).

In high-demand environments like clinical research, contingent rewards may be especially critical in retaining talent and promoting long-term satisfaction. When professionals feel that their hard work is rewarded fairly—whether through compensation, promotions, or verbal recognition—they are more likely to invest themselves meaningfully in their work, leading to sustained engagement and satisfaction.

2.3.2.4 H2d. Nature of Work has statistically significant relationship with job engagement

The nature of work, encompassing the intrinsic characteristics, variety, significance, and meaningfulness of one's tasks, is a central driver of both job engagement and job satisfaction. According to the Job Demands–Resources (JD-R) model, the meaningfulness of work functions as a motivational job resource that stimulates engagement by fulfilling employees' needs for purpose, autonomy, and

personal growth (Bakker and Demerouti, 2007). Work that is perceived as purposeful and stimulating encourages employees to immerse themselves fully—emotionally, cognitively, and physically—thereby enhancing job engagement (Kahn, 1990; May et al., 2004).

Empirical research supports the role of meaningful work in sustaining employee involvement. For instance, May et al. (2004) found that meaningfulness was the strongest predictor of all three components of job engagement: vigor, dedication, and absorption. When employees believe their work contributes to a broader goal or positively impacts others, they experience heightened psychological connection to their roles, resulting in sustained engagement. This in turn influences job satisfaction, as engaged employees are more likely to derive emotional and professional fulfillment from their roles (Schaufeli et al., 2002). Furthermore, the Job Characteristics Model (Hackman and Oldham, 1976) also emphasizes that task significance, variety, and identity directly contribute to satisfaction by increasing intrinsic motivation. In knowledge-driven and highly procedural fields like clinical research, ensuring that employees perceive their tasks as intellectually engaging and socially impactful can be pivotal in fostering both engagement and satisfaction, ultimately reducing turnover and improving performance.

2.3.3 H3: Emotional exhaustion has statistically significant relationship with job engagement

Emotional exhaustion, defined as a state of chronic emotional and physical fatigue resulting from prolonged work stress, is known to impair an individual's ability to engage meaningfully in their work. In the framework of the Job Demands–Resources (JD-R) model, emotional exhaustion is considered the core component of burnout and a key indicator of energy depletion (Demerouti et al., 2001). When employees experience

emotional exhaustion, they are less likely to invest themselves cognitively, emotionally, and physically in their roles, thereby reducing their job engagement (Taris, 2006). Engagement, which encompasses vigor, dedication, and absorption, requires energy, resilience, and attentiveness—resources that become depleted as exhaustion sets in (Schaufeli et al., 2002). Research shows that emotional exhaustion disrupts these positive work states by fostering withdrawal, detachment, and reduced enthusiasm (Sonnentag, 2003; Bakker et al., 2008). Thus, as emotional exhaustion increases, employees become less engaged, less motivated, and more likely to psychologically distance themselves from their responsibilities, highlighting a clear inverse relationship between the two constructs. Emotional exhaustion—the core component of burnout—significantly undermines an employee's ability to remain psychologically present and energized at work. Defined as a state of depletion caused by sustained emotional and cognitive strain, emotional exhaustion erodes the vigor and enthusiasm required for active work engagement. The conservation of resources (COR) theory (Hobfoll, 1989) suggests that when individuals lack sufficient emotional resources, they are unable to invest in motivational states such as engagement. In line with this, Salanova, Agut, and Peiró (2005) found that emotional exhaustion in frontline service workers was directly associated with lower levels of engagement and customer-oriented behavior. Montgomery et al. (2003) reported similar findings in health care, where exhausted staff were less committed, less attentive, and more disengaged from patient care. Furthermore, Leiter and Maslach (2005) emphasized that emotional exhaustion leads to detachment from work identity, thereby impeding the emotional investment necessary for engagement. Bakker, Demerouti, and Sanz-Vergel (2014) also argue that exhausted individuals enter a state of withdrawal and self-protection, which disrupts cognitive and behavioral immersion in work tasks. Collectively, these studies reinforce that emotional

exhaustion has a clear and measurable negative impact on job engagement, particularly in professions that rely on sustained emotional labor and attention—such as clinical research.

2.3.4 H4: Emotional exhaustion has statistically significant relationship with job satisfaction

Burnout, particularly emotional exhaustion, has been identified as a key predictor of job dissatisfaction. According to Maslach et al. (2001), employees experiencing chronic exhaustion are less likely to feel fulfilled or positively evaluate their work environment. Lee and Ashforth (1996) showed that exhaustion erodes the emotional and cognitive resources required for job satisfaction, leading to reduced morale and higher turnover intentions. A substantial body of research supports a strong negative relationship between emotional exhaustion and job satisfaction across occupational settings. Emotional exhaustion, a core dimension of burnout, reflects a state of chronic emotional depletion caused by persistent job stressors and demands (Maslach, Schaufeli and Leiter, 2001). It has been consistently identified as a key predictor of reduced job satisfaction, as exhausted employees are less likely to experience positive affect or a sense of accomplishment in their roles (Lee and Ashforth, 1996; Shirom, 2003). In a meta-analysis, Alarcon (2011) confirmed that emotional exhaustion is significantly and negatively related to satisfaction, with burnout eroding job-related attitudes. Similarly, Wright and Cropanzano (1998) found that higher levels of emotional exhaustion corresponded to lower satisfaction over time, while Boles, Johnston and Hair (1997) reported that emotionally drained sales professionals displayed diminished satisfaction and performance. Among healthcare professionals, emotional exhaustion has been shown to undermine satisfaction and commitment (Shanafelt et al., 2009; Yildirim and Aycan,

2008). Jung and Yoon (2014) further demonstrated that emotional fatigue in the hospitality sector leads to dissatisfaction and organizational withdrawal. Longitudinal research by Innstrand, Langballe and Falkum (2011) also supports the enduring nature of this relationship, highlighting that emotional exhaustion negatively influences job satisfaction across time. Collectively, these findings underscore the detrimental role of emotional exhaustion in reducing job satisfaction, reinforcing its centrality within the health impairment process of the JD-R model.

2.3.5 H5: Job engagement has a statistically significant relationship with job satisfaction

A strong positive relationship between job engagement and job satisfaction has been consistently demonstrated in occupational psychology literature. Job engagement, characterized by vigor, dedication, and absorption (Schaufeli et al., 2002), is a motivational construct that energizes employees to immerse themselves fully in their work, which enhances satisfaction. Saks (2006) was among the first to empirically show that engaged employees experience higher job satisfaction due to their emotional investment and sense of purpose. Rich, Lepine and Crawford (2010) extended this by confirming that physical, cognitive, and emotional engagement all positively relate to job satisfaction and performance. Harter, Schmidt and Hayes (2002) conducted a large-scale meta-analysis linking engagement to satisfaction, productivity, and retention. Similarly, Shuck and Reio (2011) found that engagement directly improves satisfaction and organizational citizenship behaviors. In a longitudinal study, Christian, Garza and Slaughter (2011) showed that engagement predicts job satisfaction across time. In healthcare, Simpson (2009) demonstrated that nurse engagement strongly enhances satisfaction and care quality. Soane et al. (2013) found that engaged employees exhibit

stronger work identity and satisfaction, while Karatepe (2013) emphasized the role of engagement in reducing burnout and increasing satisfaction among frontline workers. Further, studies by Bailey et al. (2017) and Kim and Koo (2017) reinforce that engagement fosters a sense of psychological fulfillment, autonomy, and belonging, which are critical drivers of job satisfaction. Collectively, these findings provide robust support for the positive and consistent association between job engagement and job satisfaction across various industries and cultural contexts. Engaged employees often report higher levels of job satisfaction because they find their work meaningful, energizing, and aligned with personal goals.

2.4 Summary and Conclusions of Literature Review

This literature review explored the theoretical and empirical underpinnings of how job demands and job resources influence emotional exhaustion, job engagement, and job satisfaction, guided primarily by the Job Demands–Resources (JD-R) model, Conservation of Resources (COR) theory, and the Maslach Burnout framework.

Table 2. Definition of constructs and concerned studies

Construct	Definition	Concerned Studies
Workload	Amount of work assigned to or expected from an individual or group within a specific period,	Bakker, A.B., Demerouti, E. and Euwema, M.C. (2005), Cunningham, J.B. and MacGregor, J. (2000), Demerouti, E., Bakker, A.B., Nachreiner, F. and Schaufeli, W.B. (2001), Fried, Y. and Ferris, G.R.

	encompassing the volume, complexity, and time requirements of tasks	(1987), Gaudreau, P., Blanchard, C. and Lacroix, A. (2009), Häusser, J.A., Mojzisch, A., Niesel, M. and Schulz, H. (2010), Kahn, R.L. and Byosiere, P. (1992), Kahn, W.A. and Byosiere, P. (1992), Kline, T.J.B., Coyle, L. and Houghton, S.M. (2015), LePine, J.A., LePine, M.A. and Jackson, C.L. (2004), Maslach, C. and Leiter, M.P. (2008), Peeters, M.C.W., Montgomery, A.J., Bakker, A.B. and Schaufeli, W.B. (2005), Ramsay, S., Scholarios, D. and Harley, B. (2000), Sonnentag, S. and Fritz, C. (2007), Sonnentag, S., Mojza, E.J., Demerouti, E. and Bakker, A.B. (2012), Tuckey, M.R. and Neall, R. (2014)
Role Conflict	Occurs when an individual faces conflicting demands or expectations from different roles they occupy, leading to stress and	Adserias, R.P., Consalvo, J.F. and Rodriguez, J. (2020), Arnold, J., Cooper, C.L. and Robertson, I.T. (1998), Baruch, Y. and Peiperl, M. (2000), Greenhaus, J.H. and Beutell, N.J. (1985), Kahn, R.L., Wolfe, D.M., Quinn, R.P., Snoek, J.D. and

	uncertainty about how to fulfill those roles effectively. This can arise when responsibilities or expectations are incompatible, causing difficulty in prioritization and decision-making	Rosenthal, R.A. (1964), McCarthy, J., Lynch, M., and McMahon, C. (2020), Moore, J.E. (2000), Rizzo, J.R., House, R.J. and Lirtzman, S.I. (1970), Schulte, P.A., Vainio, H. and the WHO/ILO (2005), Van Sell, M., Brief, A.P. and Schuler, R.S. (1981)
Role Ambiguity	refers to a situation where an individual lacks clarity about their job responsibilities, expectations, or the scope of their role within an organization	Balderson, S., and Goh, Y.M.L. (2013), Cummings, L.L. and Connelly, C.E. (1993), Grant, A.M. and Parker, S.K. (2009), Gresov, C. and Drazin, R. (1997), Kahn, R.L., Wolfe, D.M., Quinn, R.P., Snoek, J.D. and Rosenthal, R.A. (1964), Rizzo, J.R., House, R.J. and Lirtzman, S.I. (1970), Role, J. and Gresov, C. (1990), Schaubroeck, J., and Merritt, D.E. (1997), Tepper, B.J. (2000), Tubre, T.C. and Collins, J.M. (2000).
Supervisor Support	Refers to the assistance and guidance provided	Arnold, J., and Fletcher, C. (2003), Ducharme, L.J., and Martin, J.K. (2000), Goh, Y.M.L., and Warden, A.

	by a supervisor or manager to their employees. This support can include emotional encouragement, resources to help with job tasks, feedback on performance, and fostering a positive work environment	(2015), Kahn, R.L., and Byosiere, P. (1992), Leach, D.J., and Allen, N.J. (2005), McAllister, D.J. (1995), Rhoades, L., and Eisenberger, R. (2002), Schaufeli, W.B., and Salanova, M. (2007), Semmer, N.K., and Beehr, T.A. (2014), Wu, L.Z., and Hu, X. (2013).
Autonomy	degree of freedom and independence an individual has in making decisions and performing their job tasks. In a workplace context, it means that employees have the ability to control their work processes, set their own goals, and make choices	Bakker, A.B., and Demerouti, E. (2007), Grant, A.M. (2008), Hackman, J.R., and Oldham, G.R. (1976), Humphrey, S.E., Nahrgang, J.D., and Morgeson, F.P. (2007), Karasek, R.A. (1979), Kahn, R.L., and Byosiere, P. (1992), Leach, D.J., and Allen, N.J. (2005), Parker, S.K. (1998), Tetrick, L.E., and Quick, J.C. (2003), Wu, C.H., and Hu, H.F. (2013)

	about how to achieve their objectives without excessive oversight or micromanagement	
Contingent Rewards	incentives or benefits provided to employees based on their performance or achievement of specific goals. These rewards are "contingent" upon meeting predetermined criteria, such as completing tasks, reaching targets, or demonstrating desired behaviors	Eisenberger, R., and Cameron, J. (1996), Gagne, M., and Deci, E.L. (2005), Judge, T.A., and Piccolo, R.F. (2004), Kohn, A. (1993), McClatchy, M. and Kahn, R.L. (1987), Milkovich, G.T., and Newman, J.M. (2008), Pink, D.H. (2009), Podsakoff, P.M., and MacKenzie, S.B. (1997), Rynes, S.L., and Gerhart, B. (2000), Vroom, V.H. (1964)
Nature of Work	refers to the characteristics and fundamental aspects of a job or occupation,	Hackman, J.R., and Oldham, G.R. (1976), Parker, S.K. (1998), Tetrick, L.E., and Quick, J.C. (2003), Schaufeli, W.B., and Bakker, A.B. (2004), Wright, T.A., and

	including the tasks, responsibilities, and activities involved	Cropanzano, R. (2000), Morgeson, F.P., and Humphrey, S.E. (2006), Cavanaugh, M.A., Boswell, W.R., Roehling, P.V., and Boudreau, J.W. (2000), Ilies, R., and Judge, T.A. (2003), Spector, P.E. (2003), Van der Doef, M., and Maes, S. (1999)
Emotional Exhaustion	state of mental, emotional, and physical depletion resulting from prolonged stress, excessive workload, or overwhelming demands in a work environment. It is characterized by feelings of fatigue, detachment, and a diminished sense of personal accomplishment	Maslach, C., and Jackson, S.E. (1981), Bakker, A.B., Demerouti, E., and Schaufeli, W.B. (2003), Brotheridge, C.M., and Lee, R.T. (2003), Halbesleben, J.R.B., and Ratliff, C.L. (2011), Lee, R.T., and Ashforth, B.E. (1996), Schaufeli, W.B., and Greenglass, E.R. (2001), Demerouti, E., Bakker, A.B., and Gevers, J.M. (2015), Crawford, E.R., LePine, J.A., and Rich, B.L. (2010), Toppinen-Tanner, S., Harkola, L., and Kalimo, R. (2005), Wiernik, B.M., and Ones, D.S. (2016)
Job Engagement	refers to the level of enthusiasm, commitment, and	Schaufeli, W.B., Bakker, A.B., and Salanova, M. (2006), Kahn, W.A. (1990), Macey, W.H., and Schneider,

	emotional investment that an employee has towards their work and organization	B. (2008), Saks, A.M. (2006), Rich, B.L., LePine, J.A., and Crawford, E.R. (2010), Bakker, A.B., and Demerouti, E. (2008), Hakanen, J.J., Bakker, A.B., and Schaufeli, W.B. (2006), Xanthopoulou, D., Bakker, A.B., Demerouti, E., and Schaufeli, W.B. (2007), Gillet, N., Vignoles, V., and Joussemet, M. (2013), Christian, M.S., Garza, A.S., and Slaughter, J.E. (2011)
Job Satisfaction	level of contentment and fulfillment that an individual feels toward their job	Locke, E.A. (1976), Katz, D., and Kahn, R.L. (1978), Judge, T.A., and Bono, J.E. (2001), Diener, E., and Lucas, R.E. (2000), Hackman, J.R., and Oldham, G.R. (1976), Heller, D., and Watson, D. (1998), Spector, P.E. (1997), McNeely, E., and Meglino, B.M. (1994), Warr, P.B. (1990), Judge, T.A., Thoresen, C.J., Bono, J.E. and Patton, G.K. (2001)

The theoretical insights suggest that excessive job demands—such as workload, role ambiguity, and role conflict—trigger emotional exhaustion through the depletion of employees' emotional and cognitive resources. In contrast, job resources—like

autonomy, supervisor support, contingent rewards, and the nature of work—help mitigate emotional exhaustion and promote engagement, which subsequently enhances job satisfaction.

Empirical findings consistently affirm the direct positive relationship between job demands and emotional exhaustion, and the inverse relationship between emotional exhaustion and job engagement and satisfaction. Equally strong evidence supports the motivational pathway, whereby job resources foster engagement and improve satisfaction. The review also highlighted several mediating mechanisms, especially the role of emotional exhaustion in translating job demands into dissatisfaction, and job engagement as a bridge between job resources and satisfaction.

Despite this robust foundation, several research gaps remain. This study addresses three major gaps identified from the literature. Firstly, there is limited or no existing research utilizing JD-R theory to investigate the dynamics in clinical research sector in the burnout literature. Secondly, no literature exists on examining the relationships between job demands, resources, emotional exhaustion, job engagement, and job satisfaction within the population of CRAs who work in high demand setting. Thirdly, there is a need for mixed methods research as most studies may rely heavily on quantitative data. Qualitative studies that explore CRAs' experiences in-depth could provide rich insights into how they interpret their work demands and resources, emotional exhaustion, and engagement levels.

This research justifies the need for the present study, which addresses these gaps by investigating the impact of job demands and resources on emotional exhaustion, engagement, and job satisfaction among clinical research professionals in India. By integrating theoretical constructs and empirical evidence into a comprehensive model, the study contributes to both academic literature and practical workforce management,

offering a nuanced understanding of burnout dynamics in a critical but underexplored sector.

CHAPTER III

METHODOLOGY

3.1 Overview of the Research Problem

Clinical Research Associates (CRAs) are key professionals in the clinical research industry responsible for monitoring clinical trials to ensure compliance with regulatory requirements, study protocols, and Good Clinical Practice (GCP) guidelines. CRAs conduct site visits, review study documentation, verify data accuracy, and provide support to investigators and site staff. Their role is critical for maintaining the integrity and quality of clinical trials, ultimately contributing to the successful development of new therapies. The stakeholders that a CRA must deal with are the site staff, their direct reporting line managers, project managers, data management team, central laboratory team, medical monitoring team, suppliers and vendors etc. CRAs are the frontline soldiers in clinical research, responsible for site monitoring, data integrity, and patient safety. Their role requires extensive travel, interaction with various stakeholders, and managing busy schedules of report writing and data evaluation. Despite their significant responsibilities—including data integrity, site monitoring, and compliance—there is limited empirical research examining the psychosocial stressors and emotional demands faced by CRAs. Their work environment involves complex stakeholder interactions, high travel demands, tight deadlines, and strict regulatory oversight, all of which can contribute to emotional exhaustion, reduced job engagement, and dissatisfaction. This study was designed to explore these dynamics using the Job Demands–Resources (JD-R) model to better understand how job demands and resources influence CRA well-being and work outcomes.

3.2 Operationalization of Theoretical Constructs

The study adopted the JD-R model as its theoretical framework, which states that job demands (e.g., workload, role conflict, ambiguity) lead to strain and emotional exhaustion, whereas job resources (e.g., autonomy, supervisor support, rewards) can enhance motivation and engagement. Emotional exhaustion, in turn, influences job engagement, and both emotional exhaustion and job engagement affect job satisfaction. Each construct was operationalized using validated psychometric instruments:

- **Job Demands**: Role Conflict, Role Ambiguity, and Workload
- **Job Resources**: Job Autonomy, Supervisor Support, Contingent Rewards, and Nature of Work
- **Outcome Constructs**: Emotional Exhaustion, Job Engagement, and Job Satisfaction

Each variable was measured using items on a five-point Likert scale adapted from prior peer-reviewed studies.

The theoretical framework of this literature review integrates several well-established models and theories to serve four key purposes. First, it establishes a strong conceptual foundation for understanding the theoretical constructs associated with job demands that contribute to emotional exhaustion among Clinical Research Associates (CRAs). Second, it facilitates the exploration of how job resources can buffer the negative effects of these demands and mitigate burnout. Third, it explains the impact of emotional exhaustion on job engagement and, consequently, on job satisfaction. Finally, it provides insights into how job demands, job resources, emotional exhaustion and job engagement collectively influence burnout, forming an integrated perspective on occupational well-being in the clinical research context.

3.3 Research Purpose and Questions

This research seeks to address a significant gap in the existing literature: the limited empirical data on stress and burnout among CRAs. Despite being the frontline professionals in clinical research—responsible for site monitoring, data integrity, regulatory compliance, and patient safety—CRAs remain underrepresented in occupational stress research. Their roles demand extensive travel, continuous interaction with diverse stakeholders, and tight deadlines for documentation and data evaluation. Given these high-pressure responsibilities, understanding and mitigating stress in this population is essential. Elevated stress levels among CRAs can negatively affect their job satisfaction, which in turn may compromise organizational efficiency and the success of clinical trials. This research will help to understand following research questions:

1. Is there a presence of emotional exhaustion among CRAs in India?

2. To what extent do job demands (role conflict, role ambiguity, and workload) predict emotional exhaustion in CRAs?

3. How do job resources (supervisor support, autonomy, contingent rewards, and nature of work) relate to job engagement in this context?

4. What is the impact of emotional exhaustion on job engagement?

5. How do emotional exhaustion and job engagement influence job satisfaction?

6. How well does an integrated model of job demands and job resources explain emotional exhaustion, job engagement, and job satisfaction among CRAs?

3.4 Research Design

A mixed-methods research design was employed, combining quantitative and qualitative data collection (Figure 10). The quantitative component utilized a semi-structured questionnaire to capture vivid responses, while the qualitative component

involved semi-structured interviews to gain deeper insights into participant experiences. This approach allowed triangulation of data, enhancing the validity of findings and offering both breadth and depth.

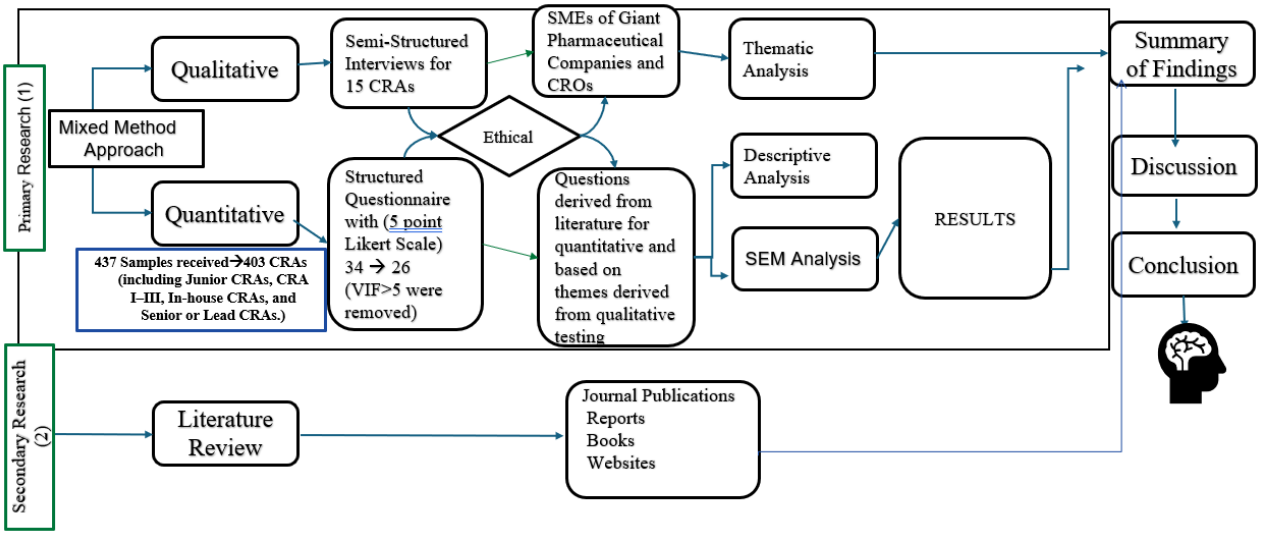
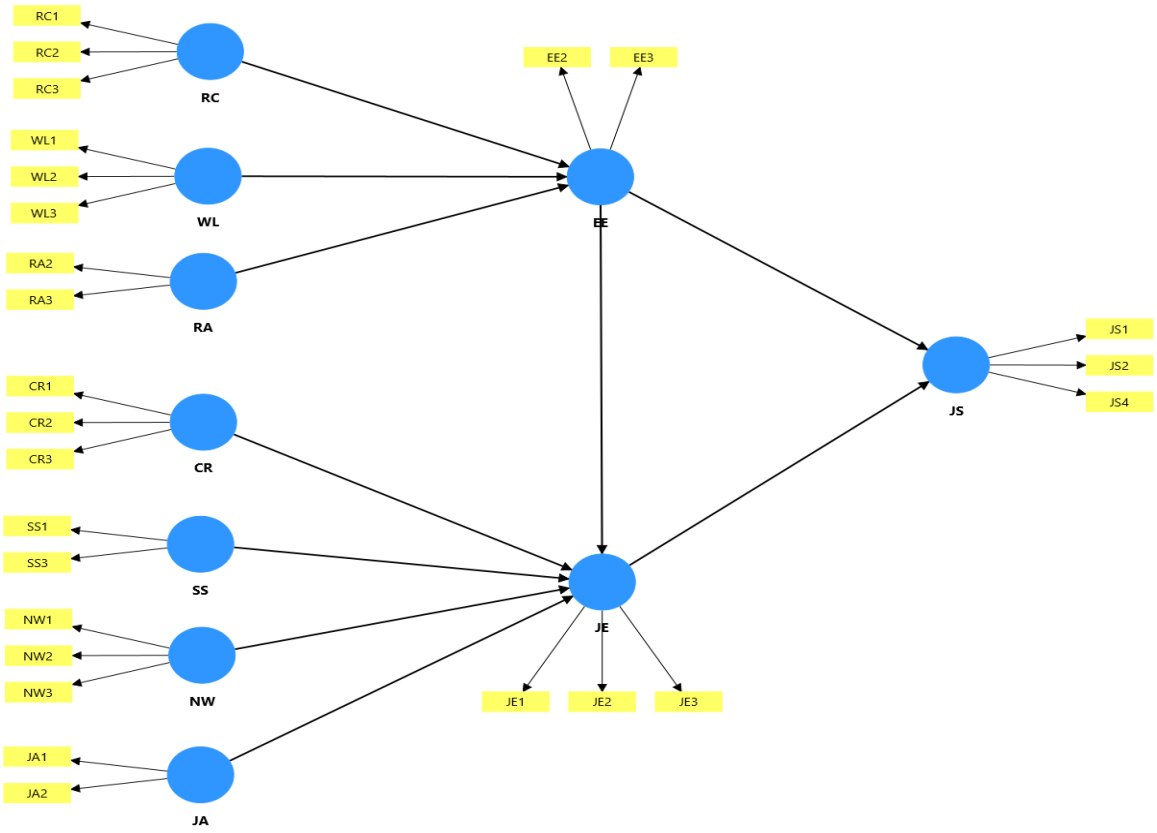


Figure 10: Research Design

3.4.1 PLS Model Overview

The conceptual framework for this study is grounded in the Job Demands–Resources (JD-R) model and operationalized through a structural model. The model consists of three main latent constructs — job demands, job resources, and employee outcomes, each measured through multiple observed indicators. The hypothesized relationships were analyzed using Structural Equation Modeling (SEM) (Figure 11).



RC	Role Conflict
WL	Workload
CR	Contingent Rewards
JA	Job Autonomy
SS	Supervisor Support
NW	Nature of Work
EE	Emotional Exhaustion
JE	Job Exhaustion
JS	Job Satisfaction

Figure 11. PLS Model of the Study

3.4.2 Latent Constructs and Their Indicators

1. Job Demands: These are operationalized via three constructs:

Role Conflict (RC) — Measured using 3 indicators: RC1, RC2, RC3

Role Ambiguity (RA) — Measured using 2 indicators: RA2, RA3

Workload (WL) — Measured using 3 indicators: WL1, WL2, WL3

These job demands are exogenous variables expected to have a positive impact on Emotional Exhaustion (EE).

2. Job Resources: These are captured through four constructs:

Contingent Rewards (CR) — 3 indicators: CR1, CR2, CR3

Job Autonomy (JA) — 2 indicators: JA1, JA2

Supervisor Support (SS) — 3 indicators: SS1, SS2, SS3

Nature of Work (NW) — 3 indicators: NW1, NW2, NW3

These constructs are modeled to have positive effects on Job Engagement (JE).

3. Outcome Variables:

Emotional Exhaustion (EE): Outcome construct with 2 indicators: EE2–EE3 Positively influenced by job demands. Expected to have a negative impact on Job Engagement (JE) and Job Satisfaction (JS)

Job Engagement (JE): Outcome construct with 3 indicators: JE1–JE3. Positively influenced by job resources. Negatively affected by Emotional Exhaustion (EE). Positively influences Job Satisfaction (JS).

Job Satisfaction (JS): Final outcome variable with 3 indicators: JS1, JS2, JS4. Positively predicted by Job Engagement (JE). Negatively predicted by Emotional Exhaustion (EE)

3.5 Population and Participant Selection for the sample:

The study population comprised CRAs currently employed in the pharmaceutical sector, Clinical Research Organizations (CROs), or clinical research units in India. The final quantitative sample consisted of 403 CRAs from varied roles and regions of India, including Junior CRAs, CRA I–III, In-house CRAs, and Senior or Lead CRAs. A qualitative sub-sample of 15 CRAs was selected for in-depth interviews.

For the quantitative survey, a hybrid sampling approach was used: convenience sampling (targeting accessible CRAs) combined with generalized snowball sampling (participants were encouraged to share the survey link with peers). For qualitative interviews, purposive sampling was employed to capture diverse experiences across levels, locations, and workload conditions. All participants provided voluntary consent.

The survey questionnaire had 43 questions in total with initial 9 questions on demographics and rest 34 questions based on the constructs. The survey was administered online, allowing respondents to access the questionnaire via a web-based link. This approach was selected for its practicality, efficiency, and cost-effectiveness in reaching geographically dispersed participants. The data collection period spanned three weeks in May 2025.

To ensure data completeness and reliability, all questionnaire items were marked as mandatory, thus avoiding partially completed responses. In cases where respondents failed to submit their responses, alternative participants were invited to maintain the target sample size.

The data collected includes both primary data (from survey responses and interviews) and secondary data (supporting literature and organizational insights). Although the use of non-probability sampling techniques limits absolute generalizability, the diversity of the sample across organizational roles and regions, coupled with the

random distribution strategy, supports the validity of extrapolating findings to the broader CRA population within the Indian pharmaceutical and CRO sectors.

3.6 Instrumentation

3.6.1 Questionnaire Development and Validation

The questionnaire for this study was developed based on an extensive review of literature grounded in the Job Demands–Resources (JD-R) model. The instrument was designed to capture perceptions of job demands, job resources, emotional exhaustion, job engagement, and job satisfaction among Clinical Research Associates (CRAs). Springer, Elsevier, Google Scholar, Scopus, and other online journal databases were searched using various search algorithms to gather the relevant material. A manual search was conducted on the expanded literature, utilizing citations and references to do both backward and forward searches.

Each construct in the model was operationalized using validated scales from prior empirical studies, ensuring both theoretical alignment and measurement reliability. The items were adapted to reflect the clinical research context in India, and phrased clearly to ensure respondent comprehension. A 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) was used for all items. Certain items were reverse scored from 5 to 1. (Table 3)

Table 3: Latent Constructs and Indicators Scale

Construct	Code Prefix	Items	Measurement	Developer
Role Conflict (RC)	RC1	I receive incompatible requests from two or more people	1=Strongly Disagree 2=Disagree	Rizzo, House and

	RC2	I receive an assignment without adequate resources and materials to execute it	3=Neutral 4=Agree 5=Strongly Agree	Lirtzman, 1970
	RC3	I work on unnecessary things		
Role Ambiguity (RA)	RA1	I have clear planned goals and objectives for my job	1=Strongly Agree 2=Agree 3=Neutral 4=Disagree 5=Strongly Disagree	Rizzo, House and Lirtzman, 1970
	RA2	I know what my responsibilities are		
	RA3	I know exactly what is expected of me at work		
Workload (WL)	WL1	I have too much work to do	1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree	Karasek, 1979
	WL2	My job requires working very fast		
	WL3	I have to work extra hard to finish my work		
Job Autonomy (JA)	JA1	I have significant autonomy in determining how I do my job	1=Strongly Disagree 2=Disagree	(Gözükara and

	JA2	I have the freedom to make decisions in my work	3=Neutral 4=Agree 5=Strongly Agree	Çolakoğlu, 2016)
	JA3	My job provides me with the independence to carry out tasks.		
Supervisor Support (SS)	SS1	My supervisor really cares about my opinions	1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree	Rhoades and Eisenberger, 2002
	SS2	My supervisor strongly considers my goals and values		
	SS3	My supervisor shows very little concern for me		
	SS4	My supervisor really cares about my wellbeing		
Contingent Rewards (CR)	CR1	When I do a job, I receive the recognition for it that I should receive	1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree	Job Satisfaction (JSS), 1994
	CR2	I do not feel appreciated for the work I do		
	CR3	I don't feel my efforts are rewarded the way they should be		

Nature of Work (NW)	NW1	I sometimes feel my job is meaningless	1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree	Job Satisfaction (JSS), 1994
	NW2	I like doing the things I do at work		
	NW3	I feel a sense of pride in doing my job		
Emotional Exhaustion (EE)	EE1	I feel emotionally drained from my work	1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree	Penny et al., 2023
	EE2	I feel fatigued when I get up in the morning and have to face another day on the job		
	EE3	I feel frustrated by my job		
	EE4	I feel burned out from my work		
Job Engagement (JE)	JE1	I feel energetic in my job	1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree	Rich, 2014
	JE2	I am interested in my job		
	JE3	I try my hardest to perform well on my job		

Job Satisfaction (JS)	JS1	I feel good about my job	1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree	Macdonald and Maclntyre, 1997
	JS2	I feel good about working at this company		
	JS3	All my talents and skills are used in this job		
	JS4	I feel close to the people at work		

In total, the questionnaire consisted of 34 items measuring 10 constructs excluding initial 9 questions on demographics. All items were made mandatory to ensure completeness of data and to prevent partial submissions. A pilot test of 100 samples was conducted prior to the full-scale data collection to ensure clarity, reliability, and internal consistency of the instrument. No change was required to be made in the questionnaire post pilot testing. However, upon data analysis, certain items were dropped based on redundancy. These items were: EE1, EE4, JA3, JE4, JS3, RA1, SS2, SS4. Final analysis was done on the remaining 26 items.

Following the development of the draft questionnaire, it was validated by a group of industry experts, including departmental heads, vice presidents, presidents, project managers, CRA managers, and directors from major pharmaceutical and clinical research organizations. The experts provided valuable feedback and suggestions, leading to the modification of certain questions to enhance clarity and relevance for the quantitative data collection. Based on the experts' recommendations, a semi-structured interview

questionnaire was created to gain deeper insights and a more detailed understanding of the qualitative aspects of the research. These questions aimed to explore the participants' experiences and perspectives in greater depth.

The qualitative component of this study was designed to complement the quantitative findings by providing deeper insights into the lived experiences of CRAs. The primary objective was to explore themes related to Emotional Exhaustion (EE), Job Engagement (JE), and Job Satisfaction (JS), as perceived and narrated by the participants.

1. Thematic Focus and Construct Selection

The development of the interview guide was informed by the same theoretical foundation as the quantitative instrument—namely, the Job Demands–Resources (JD-R) model. The guide was structured around three key outcome constructs: Emotional Exhaustion, Job Engagement, and Job Satisfaction. Additionally, during analysis, associated job demands and resources—such as Workload, Role Conflict, Role Ambiguity, Supervisor Support, Job Autonomy, Contingent Rewards, and Nature of Work—were derived as emerging themes from participant narratives.

2. Question Design

Open-ended questions were developed to elicit rich, reflective responses from participants. Questions were exploratory in nature, allowing participants to describe their experiences in their own words. Probing questions were used where necessary to delve deeper into areas of stress, motivation, support systems, and job role clarity.

3. Expert Validation

To ensure the guide was comprehensive and aligned with the research objectives, it was reviewed by two experts in qualitative research and clinical trial management. Their feedback was incorporated to refine the clarity, neutrality, and relevance of the questions.

4. Interview Procedure

Fifteen Clinical Research Associates (CRAs) from various organizations participated in the interviews. The sessions lasted between 30 minutes and 1.5 hours and were conducted either in person or via video conferencing platforms, depending on participant availability and preference. All participants provided informed consent prior to the interviews. The discussions were anonymously recorded and transcripts were saved anonymously. The notes were taken accordingly.

5. Coding and Thematic Analysis

The transcripts were analyzed using thematic analysis. Initial codes were generated inductively from the data, and then categorized into themes reflecting the core constructs of the study. Themes were both predefined based on the JD-R model and emergent based on the unique perspectives of the CRAs. Coded data were organized and analyzed manually.

3.7 Data Collection Procedures

3.7.1 Quantitative Data Collection

The quantitative data for this study were collected using a validated, structured questionnaire composed of 34 closed-ended items. The instrument was designed based on established scales and themes identified in the literature surrounding the Job Demands–

Resources (JD-R) model. The constructs included job demands (role conflict, role ambiguity, and workload), job resources (job autonomy, supervisor support, contingent rewards, and nature of work), emotional exhaustion, job engagement, and job satisfaction. All items were measured using a five-point Likert scale (Strongly Disagree to Strongly Agree), with scale direction and coding tailored to the nature of each construct to ensure accurate interpretation. The questionnaire was administered online via a survey link, and the data collection was conducted over a three-week period in May 2025. All questions were mandatory, ensuring complete datasets for all 403 participants. Out of 437 responses received, 403 were considered fit for analysis considering completeness and legibility.

Emotional Exhaustion was measured using the scale by Penny et al. (2023), with items scored from 1 = Strongly Disagree to 5 = Strongly Agree. A higher score on this scale indicates a greater level of emotional exhaustion. Sample items included “I feel emotionally drained from my work” and “I feel burned out from my work.” Job Autonomy was assessed using the scale developed by Gözükara and Çolakoğlu (2016), with items also scored from 1 = Strongly Disagree to 5 = Strongly Agree. Higher scores on this scale denote a greater degree of autonomy. Sample items included “I have significant autonomy in determining how I do my job” and “I have the freedom to make decisions in my work.”

Workload was measured using the Karasek (1979) scale, where items were scored from 1 = Strongly Disagree to 5 = Strongly Agree. A higher score represents a higher perceived workload. Example items were “My job requires working very fast” and “I have too much work to do.” Job Satisfaction was assessed using the scale by Macdonald and MacIntyre (1997), scored from 1 = Strongly Disagree to 5 = Strongly Agree. Higher

values on this scale indicate greater job satisfaction. Example items included “I feel good about my job” and “I feel close to the people at work.”

Supervisor Support was measured using the scale developed by Rhoades and Eisenberger (2002). For positively worded items, the scale ranged from 1 = Strongly Disagree to 5 = Strongly Agree, while negatively worded items were reverse coded, scored from 5 = Strongly Disagree to 1 = Strongly Agree. A higher score on the overall scale indicates higher perceived supervisor support. Sample items included “My supervisor really cares about my opinions” and “My supervisor shows very little concern for me” (reverse-coded).

Role Ambiguity was assessed using the scale from Rizzo, House, and Lirtzman (1970), with all items reverse-coded and scored from 5 = Strongly Disagree to 1 = Strongly Agree. A higher number on this scale reflects greater role ambiguity. Sample items included “I know what my responsibilities are” and “I know exactly what is expected of me at work.” Role Conflict, from the same authors, used a scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree, where a higher score represents greater role conflict. Example items were “I receive incompatible requests from two or more people” and “I work on unnecessary things.”

Nature of Work was measured using items adapted from the Job Satisfaction Survey (JSS). For positively worded items, the scale was 1 = Strongly Disagree to 5 = Strongly Agree, while negatively worded items were reverse-coded, scored from 5 = Strongly Disagree to 1 = Strongly Agree. Higher values on this scale indicate greater satisfaction with the nature of one’s work. Sample items included “I feel a sense of pride in doing my job” and “I sometimes feel my job is meaningless” (reverse-coded).

Contingent Rewards were also assessed using the JSS. Positively worded items were scored from 1 = Strongly Disagree to 5 = Strongly Agree, and negatively worded

items were reverse-coded, from 5 = Strongly Disagree to 1 = Strongly Agree. A higher score for positively worded items indicates higher perceived rewards, while a higher score for negatively worded items indicates lower perceived rewards. Sample items included “When I do a job, I receive the recognition for it that I should receive” and “I don’t feel my efforts are rewarded the way they should be” (reverse-coded).

Job Engagement was measured using the scale by Rich (2014), scored from 1 = Strongly Disagree to 5 = Strongly Agree. Higher scores represent greater job engagement. Example items included “I am energetic in my job” and “At work, my mind is focused on my job.”

3.7.2 Qualitative Data Collection

To complement the quantitative findings and provide a richer understanding of the research problem, qualitative data were collected through in-depth semi-structured interviews conducted with a purposive sample of 15 Clinical Research Associates (CRAs). The semi-structured format allowed for a consistent exploration of core themes, while also providing the flexibility to probe deeper based on individual responses. During the interviews, responses were handwritten as transcripts in real time to document the detailed narratives shared by participants. Recordings were anonymously saved. This approach also helped preserve the anonymity of respondents, particularly given the sensitive nature of discussions around workplace stress and burnout.

3.8 Data Analysis

Quantitative data were analyzed using Structural Equation Modeling (SEM) to test direct and mediated relationships among constructs. The collected transcripts were analyzed using thematic analysis, a systematic method for identifying, analyzing, and

reporting patterns within qualitative data. Through careful reading and coding, key themes and sub-themes were developed, reflecting both the explicit content of the interviews and underlying meanings. The qualitative findings were then used to contextualize the quantitative results**,** offering explanatory depth and nuanced insight into how CRAs perceive and experience job demands, resources, emotional exhaustion, and engagement. This mixed-method integration enabled a comprehensive, multi-dimensional interpretation of the research questions.

The qualitative data were analyzed using thematic analysis following Braun and Clarke's (2006) six-phase framework. This approach was selected to systematically identify and interpret key themes that emerged from in-depth interviews with CRAs. The process involved:

1. **Familiarization:** Transcripts were reviewed thoroughly to understand recurring content patterns and emotional context.
2. **Generating Codes:** Initial codes were manually identified to capture significant data features across interviews.
3. **Theme Search:** Codes were grouped into broader themes that captured meaningful patterns.
4. **Theme Review:** Themes were cross-checked with transcripts to ensure coherence and theoretical relevance.
5. **Theme Definition:** Each theme was refined and named to accurately reflect its essence.
6. **Report Production:** Themes were mapped to constructs in the JD-R framework—emotional exhaustion, job engagement, and satisfaction—and supported with representative quotes.

Seven overarching themes emerged:

- Demand-Induced Depletion
- Recognition Vacuum
- Autonomy as Engagement Driver
- Supervisor Support as a Buffer
- Exhaustion Disengages
- Purpose-Driven Engagement
- Emotional State Predicts Satisfaction

These themes were aligned with the JD-R framework and used to interpret quantitative findings more deeply (Figure 12)

Research Construct	Theme
Job Demands (JD)	Demand-Induced Depletion
Job Resources (JR)	Autonomy as a Motivational Resource Support as Emotional Armor
Emotional Exhaustion (EE)	Exhaustion as a Barrier to Engagement
Job Engagement (JE)	Meaning Fuels Motivation
Job Satisfaction (JS)	Emotional Climate Shapes Satisfaction

Figure 12. Thematic Analysis of the study based on Braun & Clarke, 2006

Ethical Considerations

Before beginning the interview, it was explained to each participant that their identity will remain anonymous, and recordings will be safely and anonymously stored.

3.9 Research Design Limitations

This study acknowledges some limitations. The use of non-randomized sampling limits generalizability. Additionally, social desirability bias may have affected self-reported data. Despite these limitations, the study maintains internal validity through methodological triangulation and validated instruments.

To prove or disprove the hypothesis and to answer research questions, survey was used to gather data. Andrade (2020) have discussed how the purpose of data collection using quantitative or qualitative methods is to ensure that the results can ultimately be generalized to the larger population. Indeed, this research study aims to find the relationship between JDR and emotional exhaustion and the impact of Burnout on Job

engagement and Job Satisfaction. However, when using survey research, the researcher has used convenience sampling which does not constitute randomization. Therefore, it may be that the results are not generalizable to other employees working in different companies in different parts of the world. Since Andrade (2020) argue that a strong sampling method must be chosen so that respondents do not overexpress a specific characteristic that does not occur in the population, it is recognized that since our sample is not randomized, the researcher may not be fully justified in generalizing the findings to a larger population. Additionally, social desirability bias may have affected self-reported data. This research has only collected data from 403 respondents. However clinical research sector is huge and needs more data. This study is only done in Indian CRAs however depending on the different countries the responses may vary and has to be done globally. Despite these limitations, the study maintains internal validity through methodological triangulation and validated instruments.

3.10 Conclusion

In conclusion, the methodology section describes not only the techniques and tools utilized by the researcher for data collection and statistical analysis but also reflects the beliefs, values, and approach used by the researcher throughout the whole of the study. This chapter described the mixed-methods approach used to investigate the psychosocial experiences of CRAs in India. The methodology integrated a structured quantitative survey and in-depth qualitative interviews grounded in the JD-R model. Sampling, instrumentation, and data collection procedures were carefully executed to ensure rigor. Data analysis combined SEM and thematic interpretation, enabling a robust understanding of how job demands and resources impact CRA burnout, engagement, and

satisfaction. The next chapter presents the results from both the quantitative and qualitative phases of the study.

CHAPTER IV

RESULTS

This chapter presents the data analysis used in the study and the results of the study. Quantitative analysis was conducted to ensure the reliability and validity of the research model. The quality of the instrument was first established through content validity checks and a pilot study. Model assessment was carried out in two stages: evaluation of the outer and inner models. The outer model was assessed by examining internal consistency reliability, convergent validity, and discriminant validity. The inner model was evaluated by testing for collinearity issues, assessing the level of significance of path coefficients, and interpreting R^2 and F^2 values to determine the explanatory power and effect sizes within the model (Table 4).

4.1 Data Cleaning

The data was collected using self-structured questionnaire. The questionnaire was developed on Google forms and the link was shared via social networks like Emails, LinkedIn and Whatsapp. The respondents had the option to reply at their convenience leading to better quality responses. The data collected was recorded automatically in the attached excel sheet which was available for download. The data was checked for incomplete responses (due to software issues or participants answering partially). These irregularities in data were treated using complete case elimination approach. Complete case elimination approach was found to be appropriate as the data was greater than 250 (Hair et al., 2010). In this approach, the incomplete responses are deleted. In the first round of data collection, 437 responses were received out of which only 403 were valid

responses and 34 responses were found to be incomplete. The incomplete responses were deleted leading to a total of 403 usable responses for further analysis.

Table 4: Table for Data Analysis (Dr Anuja Shukla, Hair et.al, 2012)

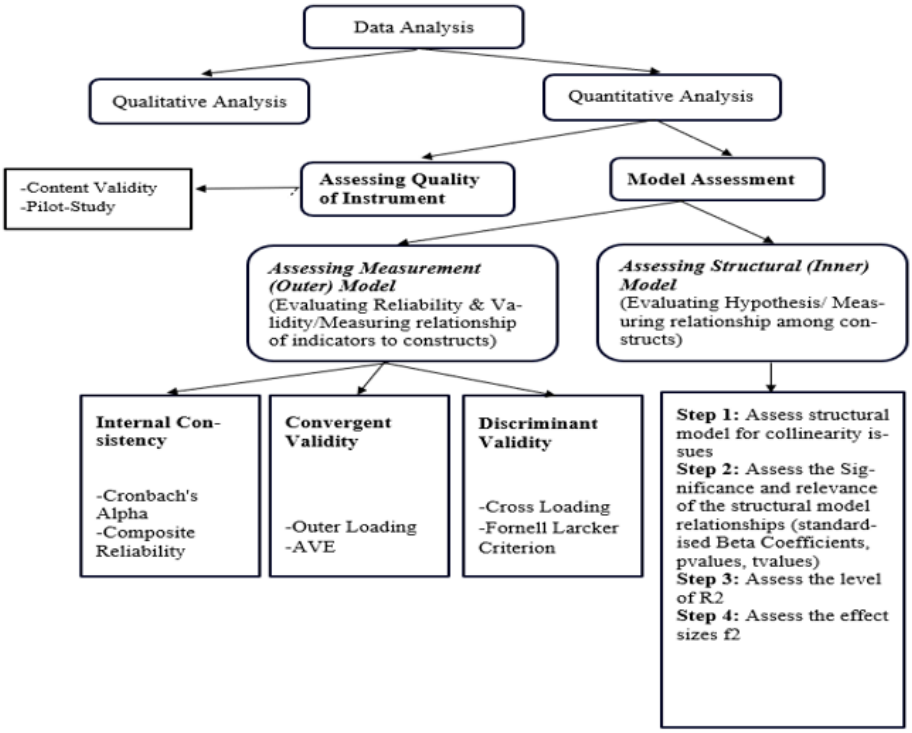


Table 5: Responses Recorded

Total Number of responses recorded in first round of data collection	437
Total Number of responses eliminated	34
Total Number of valid responses recorded	403

Note: Email ids were not collected from the participants as the same would have either led to biased or low responses

4.1.1 Missing Value Analysis

The missing value analysis was done to check if there were any random missing values in the data. There were no missing value found while analysis as all the responses were made mandatory. Since the data was free from missing values, it was taken further for analysis.

4.1.2 Coding of scale

The downloaded excel sheet was subjected to proper coding before proceeding for data analysis. The variables were coded and edited to show correct scale of measurement. The items were coded as shown in Table 2 and the Likert measurements were coded as shown in Table 2.

4.2 Demographic Analysis

This chapter presents the descriptive and inferential analysis results derived from a sample of 403 clinical research professionals. The purpose of this section is to provide an overview of the demographic characteristics of the study participants and to present descriptive statistics related to the key constructs under investigation. Descriptive analysis helps contextualize the sample, offering insights into its composition in terms of variables such as age, gender, years of experience, organization type, and therapeutic area. Understanding these background characteristics is essential to interpret the findings meaningfully and assess the generalizability of the results. The study sample comprised 403 clinical research professionals, with a near-balanced gender distribution—53.1% male and 46.89% female (Table 6). The majority of respondents were between 25–29 years old (38.46%), followed by those aged 30–34 (27.79%), indicating a predominantly young to mid-career workforce. Regarding experience, 45.65% had 5–9 years in the field,

while 32.75% had 0–4 years, reflecting a strong representation of early- and mid-level professionals.

Participants worked primarily in Contract Research Organizations (CROs) (60.05%), followed by pharmaceutical companies (36.47%) and a small proportion from hospitals (3.47%). In terms of education, 66.25% held postgraduate degrees, 19.6% had completed graduation, and 14.14% had doctoral qualifications, highlighting a highly educated cohort.

Therapeutically, most respondents had experience in oncology (49.88%), cardiology (39.45%), metabolic diseases (34.74%), and neurology (34.24%), with fewer involved in immunology (21.6%) and other areas (15%). Job roles were diverse but mainly included CRA I/II (42.93%) and senior-level CRAs (42.18%), with additional representation from remote CRAs (7.94%) and in-house/centralized CRAs (6.95%).

Exposure across clinical trial phases was broad, with most professionals working in Phase III trials (61.04%), followed by Phase II (51.12%), Phase IV (36.72%), Phase I (35.73%), and post-marketing surveillance (34.24%). In addition, 25.81% were involved in BABE and PKPD studies. Work settings varied, with 59.55% operating from office, 28.03% working remotely, and 12.4% in hybrid models, illustrating the evolving work environment in clinical research.

Table 6: Demographic Analysis

Variable Type	Variables	Count	%
Gender	Male	214	53.10
	Female	189	46.89
Age (years)	20-24	58	14.39

	25-29	155	38.46
	30-34	112	27.79
	35-39	58	14.39
	40-45	20	4.96
Experience (years)	0-4	132	32.75
	5-9	184	45.65
	10-14	62	15.38
	15-19	25	6.20
Organization Type	Pharmaceutical	147	36.47
	CRO	242	60.05
	Hospital	14	3.47
Educational Qualification	Doctorate	57	14.14
	Post Graduation	267	66.25
	Graduation	79	19.60
Therapeutic Area	1 (Oncology)	201	49.88
	2 (Cardiology)	159	39.45
	3 (Metabolic Diseases)	140	34.74
	4 (Immunology)	87	21.6
	5 (Neurology)	138	34.24
	6 (Others)	60	15
Clinical Research Title	Clinical Research Associate (CRA) I/ II	173	42.93
	CRA III/ Senior CRA/ Lead CRA/ Principal CRA	170	42.18
	Remote CRA	32	7.94
	In House/ Centralized CRA	28	6.95
Phase of Trials	Phase I	144	35.73
	Phase II	206	51.12
	Phase III	246	61.04

	Phase IV	148	36.72
	PMS	134	34.24
	BABE	104	25.81
	PKPD	104	25.81
Work Setting	Work From Office	240	59.55
	Work From Home	113	28.03
	Hybrid	50	12.40

4.3 Descriptive Analysis

This section presents the descriptive analysis of the survey responses, focusing on the three key constructs: emotional exhaustion, job engagement, and job satisfaction. The analysis highlights the average (mean) scores for each construct and the percentage of participants who expressed agreement with the corresponding items (Table 7). This provides a foundational understanding of how respondents perceived their work-related experiences across these dimensions.

Table 7: Descriptive Analysis

	Variables	**Emotional Exhaustion**	**Job Engagement**	**Job Satisfaction**
Gender	**Male**	3.5 (52.93%)	3.40 (53.27%)	3.19 (51.40%)
	Female	3.75 (55%)	3.35 (50.79%)	3.14 (53.43%)
Age (years)	**20-24**	3.96 (79.31%)	2.48 (18.96%)	2.25 (24.14%)
	25-29	3.46 (46.45%)	3.38 (49.03%)	3.12 (45.81%)
	30-34	3.03 (43.75%)	3.62 (56.67%)	3.35 (59.82%)
	35-39	2.98 (42.55%)	3.72 (65.52%)	3.65 (74.14%)
	40-45	2.55 (20%)	3.73 (85.00%)	3.82 (80.00%)
Experience	**0-4 years**	3.70 (37.88%)	2.96 (34.8%)	2.76 (37.88%)

	5-9 years	3.53 (34.26%)	3.52 (57.1%)	3.31 (55.98%)
	10-14 years	2.73 (32.26%)	3.74 (67.7%)	3.59 (66.13%)
	15-19 years	2.50 (28.00%)	3.76 (68.0%)	3.60 (68%)
Organization Type	**Pharmaceutical**	3.15 (47.52%)	3.45 (53.3%)	3.18 (53%)
	CRO	3.50 (50.34%)	3.40 (51.0%)	3.14 (50%)
	Hospital	2.56 (35%)	3.34 (60.1%)	3.12 (40%)
Work Setting	**Work From Office**	3.75 (64%)	3.15 (43.3%)	2.90 (45%)
	Work From Home	2.50 (22.12%)	3.74 (68.1%)	3.50 (63.72%)
	Hybrid	3.00 (36%)	3.64 (58%)	3.20 (60%)
Education	**Doctorate**	3.38 (49%)	54.4%	54.39%
	Post Graduate	3.05 (46%)	54.3%	52.81%
	Graduate	3.57 (58%)	43%	49.37%
Therapeutic Area	**1 (Oncology)**	3.2 (49.88%)	NA	NA
	2 (Cardiology)	2.94 (39.45%)	NA	NA
	3 (Metabolic Diseases)	2.87 (34.34%)	NA	NA
	4 (Immunology)	2.6 (21.6%)	NA	NA
	5 (Neurology)	2.85 (34.24%)	NA	NA
	6 (Others)	2.01 (15%)	NA	NA
Phase of Trial	**Phase I**	3.5 (35.73%)	NA	NA
	Phase II	3.13 (51.12%)	NA	NA
	Phase III	2.83 (61.04%)	NA	NA

	Phase IV	2.74 (36.72%)	NA	NA
	PMS	2.71 (34.24%)	NA	NA
	BABE	3.64 (25.81%)	NA	NA
	PKPD	3.64 (25.81%)	NA	NA

4.3.1 Descriptive Analysis by Emotional Exhaustion (EE)

The average emotional exhaustion (EE) score was found to be higher among females (3.75) than males (3.5) (Table 7). The 20–24 age group reported the highest EE mean score at 3.96, followed by 25–29 (3.46), 30–34 (3.03), 35–39 (2.98), and the lowest was among those aged 40–45 (2.55). Emotional exhaustion decreased as experience increased, with 0–4 years at 3.70, 5–9 years at 3.53, 10–14 years at 2.73, and 15–19 years at 2.50. By organization type, employees in CROs reported a mean EE of 3.50, followed by pharmaceutical companies (3.15), and hospitals (2.56). Those working from office settings reported the highest EE at 3.75, followed by hybrid (3.00), and lowest in work-from-home settings (2.50). Based on education, graduates had the highest EE (3.57), followed by doctorates (3.38) and postgraduates (3.05). Across therapeutic areas, the highest EE mean was observed in oncology (3.2), followed by cardiology (2.94), metabolic diseases (2.87), neurology (2.85), immunology (2.6), and others (2.01). Regarding clinical trial phases, Phase I trials had the highest EE mean (3.5), followed by Phase II (3.13), Phase III (2.83), Phase IV (2.74), PMS (2.71), and BABE/PKPD trials (3.64).

4.3.2 Descriptive Analysis by Job Engagement (JE)

In terms of job engagement (JE), males had a slightly higher mean (3.40) than females (3.35) (Table 7). Among different age groups, JE increased progressively: 20–24 years (2.48), 25–29 (3.38), 30–34 (3.62), 35–39 (3.72), and peaking in the 40–45 group (3.73). Job engagement also increased with years of experience: 0–4 years (2.96), 5–9 years (3.52), 10–14 years (3.74), and 15–19 years (3.76). By organization type, pharmaceutical workers showed a mean JE of 3.45, CRO workers (3.40), and hospital workers (3.34). Employees working from home reported the highest JE (3.74), followed by hybrid (3.64), and work from office (3.15). Education-wise, JE was highest among those with a doctorate (54.4%), followed by postgraduates (54.3%), and lowest among graduates (43%).

4.3.3 Descriptive Analysis by Job Satisfaction (JS)

For job satisfaction (JS), males reported a higher average (3.19) compared to females (3.14) (Table 7). The average JS increased with age: 20–24 years (2.25), 25–29 (3.12), 30–34 (3.35), 35–39 (3.65), and highest among 40–45 years (3.82). Job satisfaction also rose with experience: 0–4 years (2.76), 5–9 years (3.31), 10–14 years (3.59), and 15–19 years (3.60). By organization type, pharmaceutical workers reported a mean JS of 3.18, followed by CRO (3.14) and hospital (3.12). The work-from-home group showed the highest JS (3.50), followed by hybrid (3.20), and work-from-office (2.90). Based on education, job satisfaction was highest among doctorate holders (54.39%), followed by postgraduates (52.81%) and graduates (49.37%).

4.4 Measurement Model Assessment

The measurement model assessment was conducted to evaluate the reliability and validity of the latent constructs used in the study. This step ensures that the indicators accurately measure their respective constructs and that the constructs are distinct from one another. Before assessing the hypothesized relationships between constructs, it is essential to evaluate the quality of the measurement model in PLS-SEM (Table 8).

Key criteria assessed include:

- **Convergent Validity:** Assessed through Average Variance Extracted (AVE), all constructs demonstrated AVE values above 0.50, indicating that a substantial proportion of variance in the indicators is explained by their underlying construct.
- **Internal Consistency Reliability:** Both Cronbach's Alpha and Composite Reliability (CR) values for all constructs surpassed the 0.70 benchmark, confirming the internal consistency of the scales.
- **Indicator Reliability (Factor Loadings):** All item loadings exceeded the recommended threshold of 0.70, indicating strong associations between the observed indicators and their respective latent constructs.
- **Discriminant Validity:** The Fornell–Larcker criterion was used to confirm that each construct was distinct from others, with all values within acceptable ranges.

4.4.1 Convergent Validity

Convergent validity was evaluated using Average Variance Extracted (AVE) values for each construct (Table 8). All constructs exceeded the recommended threshold of 0.50, confirming adequate convergent validity (Hair et al., 2017; Bagozzi & Yi, 1988; Fornell & Larcker, 1981). Specifically, AVE values ranged from 0.794 (Nature of Work) to 0.949 (Emotional Exhaustion)**.** Each AVE was statistically significant, with t-values

ranging from 36.94 to 136.97 ($p < 0.001$), indicating that the constructs explain a substantial portion of variance in their indicators. Constructs such as Job Engagement (AVE = 0.833), Job Satisfaction (AVE = 0.861), and Job Autonomy (AVE = 0.883) showed particularly strong convergent validity. These results collectively support the internal consistency and unidimensionality of the measurement model.

Table 8: Table for Average Variance Extracted (AVE)

Constructs	Average variance extracted (AVE)
CR	0.807
EE	0.949
JA	0.883
JE	0.833
JS	0.861
NW	0.794
RA	0.939
RC	0.822
SS	0.815
WL	0.832

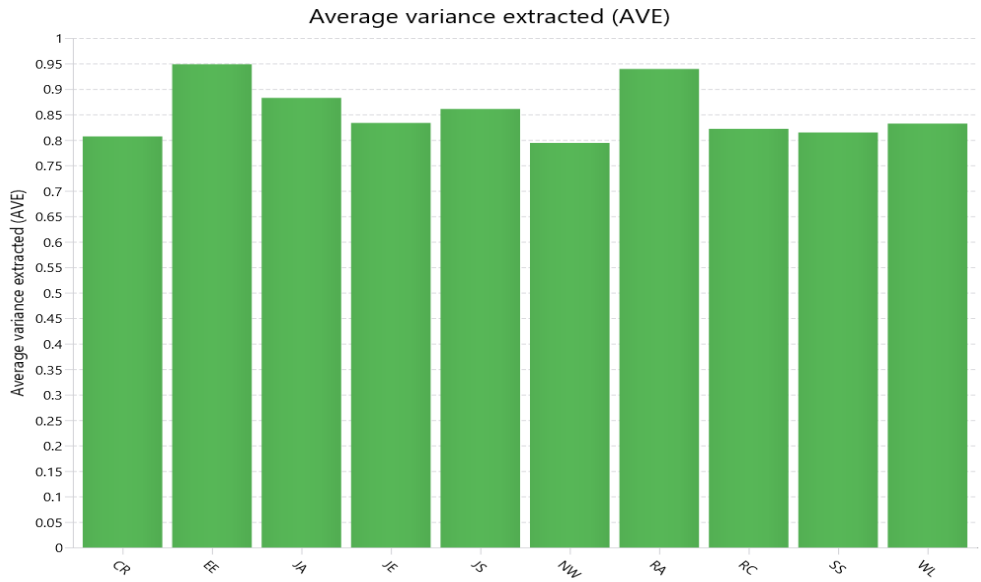


Figure 13. Bar Chart for Average Variance Extracted (AVE)

Outer Loadings: Indicator loadings should be at least 0.6 and ideally higher than 0.7 (Chin, 1998a; Henseler et al., 2009). In this study, all factor loadings exceeded the commonly accepted threshold of 0.70 (Table 9), indicating strong indicator reliability and confirming that each item contributed substantially to the construct it was intended to measure. For the Contingent Rewards (CR) construct, the loadings ranged from 0.889 to 0.905 (CR1 = 0.889, CR2 = 0.901, CR3 = 0.905), indicating high internal consistency among the indicators. Emotional Exhaustion (EE) demonstrated extremely strong loadings with EE2 and EE3 loading at 0.975 and 0.973, respectively. The indicators for Job Autonomy (JA) also loaded highly on their construct (JA1 = 0.932, JA2 = 0.947). Job Engagement (JE) showed strong factor loadings with JE1 = 0.947, JE2 = 0.948, and JE3 = 0.839, confirming that the construct was well represented by its indicators. For Job Satisfaction (JS), the loadings were high: JS1 = 0.911, JS2 = 0.946, and JS4 = 0.926, indicating very good measurement reliability. The construct Nature of Work (NW) had slightly more variation in loadings (NW1 = 0.748, NW2 = 0.954, NW3 = 0.955), with NW1 still meeting the acceptable threshold but indicating a slightly weaker indicator compared to the others. Role Ambiguity (RA) and Role Conflict (RC) both showed strong factor loadings ranging from 0.862 to 0.973, indicating reliable measurement of these constructs. Supervisor Support (SS) had two indicators (SS1 = 0.853, SS3 = 0.949), both reflecting high reliability. Finally, Workload (WL) demonstrated strong outer loadings across its indicators (WL1 = 0.921, WL2 = 0.930, WL3 = 0.884), again confirming good internal consistency. Overall, these results affirm the reliability and validity of the measurement model, as all loadings were well above the acceptable cut-off, supporting the use of the observed indicators in measuring their respective latent constructs.

Table 9. Indicator Reliability by Outer Loadings

Indicator	Outer loadings
CR1	0.889
CR2	0.901
CR3	0.905
EE2	0.975
EE3	0.973
JA1	0.932
JA2	0.947
JE1	0.947
JE2	0.948
JE3	0.839
JS1	0.911
JS2	0.946
JS4	0.926
NW1	0.748
NW2	0.954
NW3	0.955
RA2	0.965
RA3	0.973
RC1	0.917
RC2	0.939
RC3	0.862
SS1	0.853

SS2	0.949
WL1	0.921
WL2	0.930
WL3	0.884

4.4.2 Internal Consistency Reliability

4.4.2.1 Composite Reliability (ρc)

The internal consistency of the constructs was assessed using composite reliability (ρc) (Table 10). Values to range from 0.7 to 0.9 (Nunally& Bernstein, 1994), The values between 0.89 and 0.95 are considered ‘‘satisfactory to good’’ (Hair et al, 2014). All constructs exceeded the commonly accepted threshold of 0.70, indicating strong internal consistency reliability. Composite reliability values ranged from 0.898 (Supervisor Support) to 0.944 (Emotional Exhaustion)

Statistical testing confirmed the significance of all reliability estimates, with t-values ranging from 67.03 to 266.67 and p-values < 0.001 across all constructs. Key constructs such as Job Satisfaction (ρc = 0.949), Job Engagement (ρc = 0.937), and Role Ambiguity (ρc = 0.949) demonstrated exceptionally high reliability.

These findings affirm that all latent variables in the model are measured with precision and are internally consistent.

Table 9: Table for Composite reliability (rho_c)

Constructs	**Composite reliability (rho_c)**
CR	0.926
EE	0.944
JA	0.938

JE	0.937
JS	0.949
NW	0.920
RA	0.949
RC	0.933
SS	0.898
WL	0.937

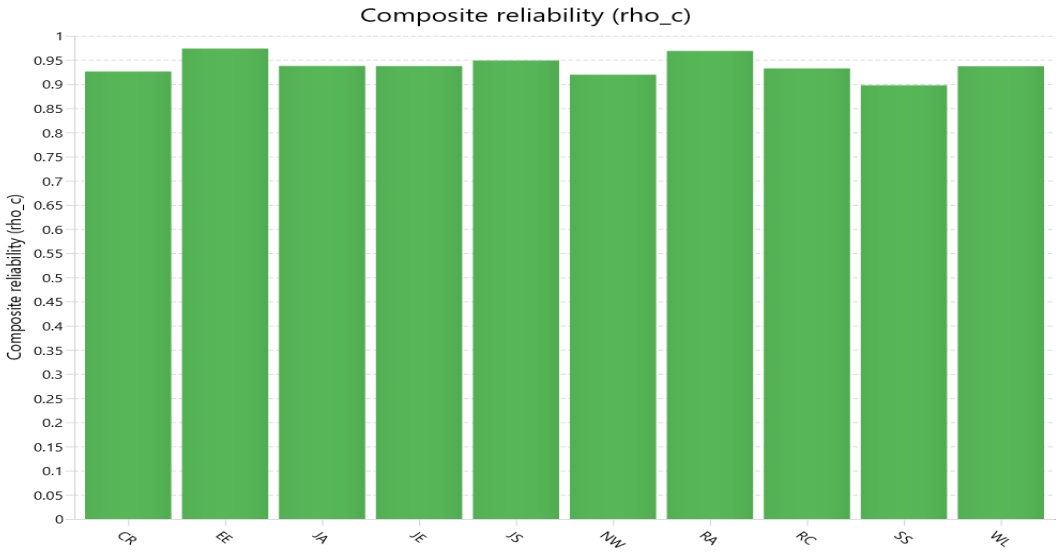


Figure 14: Bar Chart for Composite reliability (rho_c)

4.4.2.2 Composite Reliability (ρ_a)

To complement internal consistency assessments, composite reliability (ρ_a) was examined for each construct. All constructs reported ρ_a values well above the 0.70 benchmark (Table 10), demonstrating strong construct reliability and internal cohesion among indicators (Dijkstra & Henseler, 2015).

The highest ρ_a was observed for Contingent Rewards ($\rho_a = 0.903$), followed by Emotional Exhaustion ($\rho_a = 0.946$) and Nature of Work ($\rho_a = 0.934$). Even constructs with relatively fewer items, such as Job Autonomy ($\rho_a = 0.877$) and Supervisor Support ($\rho_a = 0.931$), achieved substantial internal consistency.

All reliability coefficients were statistically significant ($p < 0.001$) with t-values ranging from 25.00 to 124.73, confirming the robustness of the construct measures under this more conservative metric.

Table 11: Table for Composite reliability (rho_a)

Constructs	Composite reliability (rho_a)
CR	0.903
EE	0.946
JA	0.877
JE	0.923
JS	0.921
NW	0.934
RA	0.947
RC	0.898
SS	0.931
WL	0.903

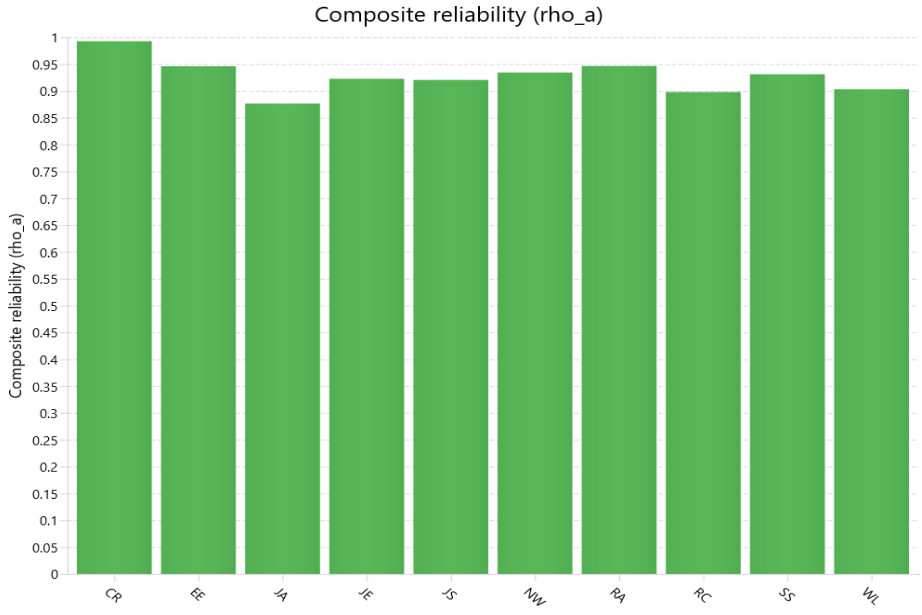


Figure 15: Bar Chart for Composite reliability (rho_a)

4.4.2.3 Cronbach's Alpha

To assess the internal consistency of each construct, Cronbach's alpha was examined. All constructs exceeded the recommended threshold of 0.70 (Table 11), confirming reliable measurement scales (Hair et al., 2010). Alpha values ranged from 0.785 (Supervisor Support) to 0.946 (Emotional Exhaustion), indicating strong internal consistency across all constructs. High reliability was observed for key constructs such as Job Satisfaction ($\alpha = 0.919$), Job Engagement ($\alpha = 0.900$), and Role Ambiguity ($\alpha = 0.936$). Even the lowest value, for Supervisor Support ($\alpha = 0.785$), was well above the minimum acceptable level. All coefficients were statistically significant with t-values between 28.06 and 122.73 ($p < 0.001$). These results validate the internal reliability of the latent constructs used in the measurement model.

Table 12: Table for Cronbach's alpha

Construct	Cronbach's alpha
CR	0.888
EE	0.946
JA	0.867
JE	0.900
JS	0.919
NW	0.869
RA	0.936
RC	0.891
SS	0.785
WL	0.899

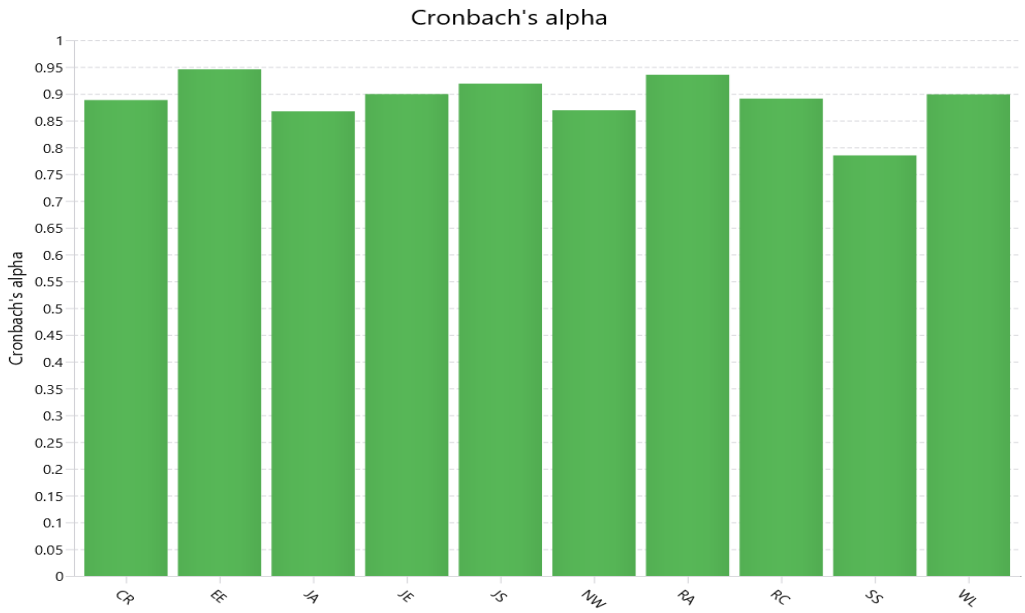


Figure 16. Bar Chart for Cronbach's alpha

4.4.3 Discriminant Validity: Cross Loadings

Discriminant validity refers to the extent to which a construct is truly distinct from other constructs, both conceptually and empirically. Discriminant validity was examined by comparing the indicator loadings on their respective constructs with their cross-loadings on other constructs (Table 12). According to the Fornell and Larcker (1981) and Chin (1989b) criteria, an indicator should load higher on its own construct than on any other construct. All indicators loaded substantially higher on their assigned latent variables than on any non-corresponding constructs. For example, JA1 and JA2 loaded at 0.932 and 0.947 respectively on Job Autonomy, while their cross-loadings on other constructs remained well below 0.85. Similarly, EE2 and EE3 loaded at 0.975 and 0.973 on Emotional Exhaustion, with all other loadings on unrelated constructs remaining lower. The same pattern was observed for Job Engagement (JE1 = 0.947, JE2 = 0.948) and Job Satisfaction (JS1 = 0.911, JS2 = 0.946, JS4 = 0.926), confirming that each

indicator is most strongly associated with its intended latent variable. There were no problematic cross-loadings where an indicator correlated more highly with another construct than its own. These results provide strong evidence of discriminant validity at the indicator level within the measurement model.

Table 13: Table for Cross Loadings to test Discriminant Validity

Items	CR	EE	JA	JE	JS	NW	RA	RC	SS	WL
CR1	**0.889**	-0.637	0.542	0.419	0.579	0.613	-0.475	-0.543	0.800	-0.616
CR2	**0.901**	-0.579	0.550	0.428	0.594	0.618	-0.481	-0.486	0.805	-0.546
CR3	**0.905**	-0.448	0.811	0.733	0.847	0.810	-0.732	-0.312	0.841	-0.339
EE2	-0.588	**0.975**	-0.364	-0.402	-0.468	-0.533	0.395	0.772	-0.569	0.757
EE3	-0.567	**0.973**	-0.359	-0.396	-0.463	-0.525	0.380	0.739	-0.555	0.745
JA1	0.608	-0.247	**0.932**	0.668	0.717	0.617	-0.771	-0.129	0.646	-0.155
JA2	0.779	-0.440	**0.947**	0.754	0.857	0.784	-0.838	-0.280	0.818	-0.294
JE1	0.666	-0.432	0.759	**0.947**	0.832	0.827	-0.796	-0.256	0.720	-0.231
JE2	0.661	-0.458	0.736	**0.948**	0.839	0.855	-0.771	-0.283	0.752	-0.266
JE3	0.354	-0.195	0.565	**0.869**	0.619	0.604	-0.685	-0.082	0.467	-0.017
JS1	0.694	-0.374	0.801	0.764	**0.911**	0.735	-0.830	-0.231	0.736	-0.203
JS2	0.765	-0.511	0.791	0.801	**0.946**	0.865	-0.810	-0.312	0.823	-0.321
JS4	0.727	-0.440	0.752	0.788	**0.926**	0.820	-0.761	-0.302	0.777	-0.293
NW1	0.681	-0.613	0.446	0.500	0.552	**0.868**	-0.453	-0.498	0.683	-0.495
NW2	0.735	-0.452	0.748	0.844	0.865	**0.954**	-0.766	-0.295	0.800	-0.303
NW3	0.707	-0.463	0.753	0.849	0.857	**0.955**	-0.779	-0.297	0.768	-0.278
RA2	-0.608	0.360	-0.817	-0.813	-0.827	-0.749	**0.965**	0.221	-0.681	0.191

RA3	-0.671	0.408	-0.846	-0.787	-0.843	-0.746	**0.973**	0.240	-0.750	0.235
RC1	-0.442	0.716	-0.221	-0.221	-0.264	-0.324	0.217	**0.917**	-0.413	0.737
RC2	-0.464	0.748	-0.225	-0.233	-0.315	-0.360	0.247	**0.939**	-0.425	0.701
RC3	-0.358	0.642	-0.154	-0.191	-0.245	-0.342	0.181	**0.862**	-0.341	0.568
SS1	0.839	-0.632	0.528	0.466	0.589	0.638	-0.512	-0.546	**0.853**	-0.605
SS3	0.829	-0.464	0.829	0.775	0.874	0.842	-0.775	-0.309	**0.949**	-0.338
WL1	-0.453	0.717	-0.197	-0.145	-0.239	-0.288	0.169	0.681	-0.409	**0.921**
WL2	-0.459	0.737	-0.207	-0.191	-0.268	-0.339	0.218	0.698	-0.419	**0.930**
WL3	-0.521	0.652	-0.267	-0.220	-0.304	-0.396	0.220	0.649	-0.491	**0.884**

Fornell-Larcker Criterion: To assess Discriminant Validity, the Fornell–Larcker criterion was applied. According to this criterion, the square root of the Average Variance Extracted (AVE) for each construct should be greater than the correlations it shares with other constructs in the model. The square roots of AVEs are presented on the diagonal of the matrix, while the off-diagonal elements represent inter-construct correlations (Table 13). The results are summarized and interpreted below:

Contingent Rewards (CR): The square root of AVE is 0.898, which is higher than its correlations with all other constructs, including JA (0.743), JS (0.786), NW (0.785), and SS (0.912). While the correlation with Supervisor Support is high, it remains slightly below the threshold, supporting discriminant validity.

Emotional Exhaustion (EE): The square root of AVE is 0.974, which is greater than its correlations with all other constructs such as RC (0.776), WL (0.771), and RA (0.398), confirming discriminant validity.

Job Autonomy (JA): The square root of AVE is 0.939, which exceeds its correlations with JS (0.842), NW (0.750), and SS (0.784), confirming that JA is empirically distinct from other constructs.

Job Engagement (JE): The square root of AVE is 0.913, which is higher than its correlations with JA (0.760), JS (0.846), NW (0.846), and SS (0.721). This confirms that JE is sufficiently different from other constructs.

Job Satisfaction (JS): The square root of AVE is 0.928, greater than all of its correlations, including JE (0.846), JA (0.842), NW (0.871), and SS (0.840). This confirms discriminant validity for JS.

Nature of Work (NW): The square root of AVE is 0.891, exceeding its correlations with JE (0.846), JA (0.750), SS (0.838), and JS (0.871), indicating discriminant validity.

Role Ambiguity (RA): The square root of AVE is 0.969, which is higher than its correlations with RC (0.239), EE (0.398), and NW (–0.771). This confirms that RA is empirically distinct from other constructs.

Role Conflict (RC): The square root of AVE is 0.907, which exceeds its correlations with EE (0.776), RA (0.239), WL (0.741), and SS (–0.435), thus supporting discriminant validity.

Supervisor Support (SS): The square root of AVE is 0.903, which is higher than its correlations with JS (0.840), JA (0.784), and NW (0.838), affirming discriminant validity.

Workload (WL): The square root of AVE is 0.912, which is greater than its correlations with EE (0.771), RC (0.741), and RA (0.221), confirming that the construct of workload is empirically distinct.

Table 14: Fornell-Larcker Criterion

Fornell-Larcker criterion AVE> squared correlations (Fornell &Larcker , 1981)										
	CR	**EE**	**JA**	**JE**	**JS**	**NW**	**RA**	**RC**	**SS**	**WL**
CR	0.898									
EE	-0.593	0.974								
JA	0.743	-0.371	0.939							
JE	0.630	-0.410	0.760	0.913						
JS	0.786	-0.478	0.842	0.846	0.928					
NW	0.785	-0.543	0.750	0.846	0.871	0.891				
RA	-0.662	0.398	-0.859	-0.824	-0.862	-0.771	0.969			
RC	-0.467	0.776	-0.222	-0.238	-0.305	-0.377	0.239	0.907		
SS	0.912	-0.577	0.784	0.721	0.840	0.838	-0.740	-0.435	0.903	
WL	-0.521	0.771	-0.243	-0.202	-0.295	-0.372	0.221	0.741	-0.480	0.912

Overall, since in each case the square root of AVE is greater than the inter-construct correlations, the Fornell–Larcker criterion is satisfied for all constructs in the model. This indicates adequate discriminant validity across the measurement model.

4.5 Structural Model

Following the validation of the measurement model, the structural model was assessed to examine the hypothesized relationships among latent variables. The structural model provides insights into how job demands and job resources influence emotional exhaustion, job engagement, and job satisfaction. Structural Model was analysed by examining the standardized path coefficients (β values), along with their corresponding t-statistics and p-values, using a bootstrapping procedure with 5000 resamples (Figure 17, Figure 18) Key aspects examined include:

Path Coefficients (β): The direction and strength of relationships between constructs were evaluated. Statistically significant path coefficients indicate support for the corresponding hypotheses.

T-statistics and p-values: These were used to determine the significance of each path. A p-value less than 0.05 indicates a statistically significant relationship.

Coefficient of Determination (R^2): R^2 values were assessed to determine the variance explained in the endogenous constructs (e.g., emotional exhaustion, job engagement, job satisfaction), with higher values indicating stronger explanatory power.

4.5.1 Path Coefficients

The path coefficients indicate the strength and direction of relationships between latent variables, while the significance levels determine whether these relationships support the proposed hypotheses. The parameter estimates of the path relationships in the structural model can be interpreted as standardized regression coefficients (Henseler et al., 2012). It is evaluated in terms of sign, magnitude and significance (Henseler et al., 2009). The results of the hypothesis testing are presented in the following section.

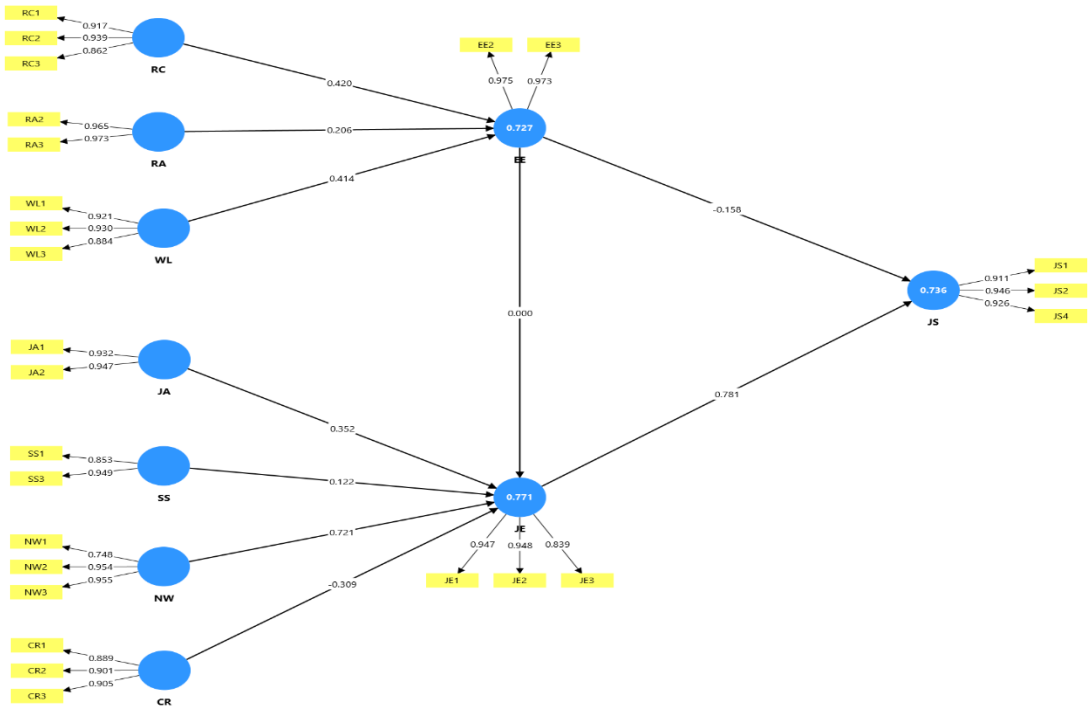


Figure 17: PLS Run of the Model

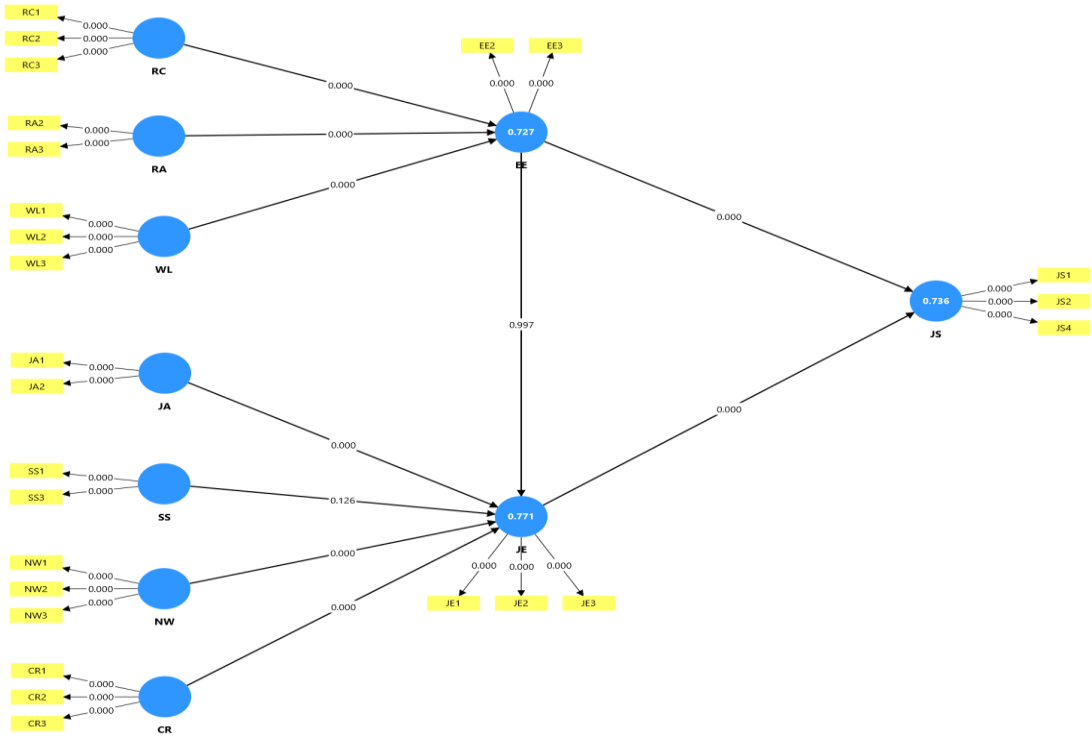


Figure 18: PLS (Bootstrapping-5000)

Table 14: Path Coefficients of the Hypothesized Model

Path	Original sample (O) β	T statistics (|O/STDEV|)	P values
WL -> EE	0.414	8.523	0.000
RC -> EE	0.420	8.863	0.000
RA -> EE	0.206	7.027	0.000
SS -> JE	0.122	1.530	0.126
JA -> JE	0.352	6.976	0.000
CR -> JE	-0.309	4.732	0.000
NW -> JE	0.721	13.974	0.000
EE -> JE	0.000	0.004	0.997
EE -> JS	-0.158	4.934	0.000
JE -> JS	0.781	29.839	0.000

To assess the structural relationships among constructs, path coefficients were evaluated along with their significance levels. The structural model assessment revealed multiple significant relationships between the constructs in the model. Workload (WL) exhibited a strong positive path to Emotional Exhaustion (EE) ($\beta = 0.414$, $t = 8.523$, $p = 0.000$), indicating a statistically significant effect. Similarly, Role Conflict (RC) showed a

significant positive relationship with EE (β = 0.420, t = 8.863, p = 0.000), and Role Ambiguity (RA) also demonstrated a positive and significant association with EE (β = 0.206, t = 7.027, p = 0.000).

In terms of predictors of Job Engagement (JE), Social Support (SS) was found to have a non-significant effect (β = 0.122, t = 1.530, p = 0.126). However, Job Autonomy (JA) had a statistically significant positive effect on JE (β = 0.352, t = 6.976, p = 0.000). Interestingly, Contingent Rewards (CR) revealed a significant negative path to JE (β = -0.309, t = 4.732, p = 0.000), while Networking (NW) emerged as a strong positive predictor (β = 0.721, t = 13.974, p = 0.000). The path from Emotional Exhaustion to Job Engagement (EE → JE) was not statistically significant (β = 0.000, t = 0.004, p = 0.997).

Lastly, the relationship between Emotional Exhaustion and Job Satisfaction (EE → JS) was negative and significant (β = -0.158, t = 4.934, p = 0.000), while Job Engagement (JE) was positively and significantly associated with Job Satisfaction (JS) (β = 0.781, t = 29.839, p = 0.000).

The results indicate that several hypothesized relationships are statistically significant and robust.

Hypothesis Testing:

4.3.1.1 H1: Job demands have statistically significant relationship with emotional exhaustion.

The Job Demands–Resources (JD-R) model posits that high job demands—such as workload, and role conflict—consume employees' emotional and physical resources, leading to emotional exhaustion. This dimension of burnout reflects feelings of being overextended and depleted of emotional energy. Empirical studies confirm that job demands are strong predictors of emotional fatigue (Bakker & Demerouti, 2007).

Schaufeli et al. (2009) emphasize that persistent exposure to high demands without adequate recovery is a direct precursor to emotional exhaustion.

H1 is fully supported. All three job demands significantly and positively predict emotional exhaustion. We have got enough evidence from the results to reject the null hypothesis.

4.3.1.2 H2: Job resources have a statistically significant relationship with job engagement.

Three job resources (NW, JA, CR) have statistically significant relationships with job engagement. However, Supervisor Support (SS) did not have a significant effect ($p = 0.126$), suggesting its influence may be context-dependent or mediated.

While the majority of job resources predict engagement significantly, the non-significant SS → JE path means the hypothesis is partially supported. We reject the null hypothesis for CR, NW, and JA and fail to reject the null hypothesis for SS. We have got enough evidence not to reject the null hypothesis. No relationship between supervisor support and job engagement.

4.3.1.3 H3 Emotional exhaustion has a statistically significant relationship with Job Satisfaction

Results support Hypothesis 3. The path coefficient is negative and statistically significant ($p = 0.000$). There is enough evidence to reject Null hypothesis. Despite the effect being modest in size ($\beta = -0.158$), its statistical significance confirms that emotional exhaustion negatively influences job satisfaction.

4.3.1.4 H4: Emotional exhaustion has statistically significant relationship with job engagement

Emotional exhaustion has no statistically significant relationship with job engagement as per the results.

The coefficient is zero (β = 0.000) and the p-value is 0.997**.** Fail to reject H_0 → Do not support H4. This finding suggests that emotional exhaustion does not directly influence job engagement in this model, possibly indicating indirect or moderated pathways.

4.3.1.5 H5: Job engagement has a statistically significant relationship with job satisfaction.

Job engagement has a strong, positive, and statistically significant effect on job satisfaction. With a very high coefficient (β = 0.781) and p-value = 0.000, this is the strongest relationship in this model. There is enough evidence to reject null hypothesis and accept H5.

4.5.2 Explained Variance (R^2 Values)

The explanatory power of the structural model was assessed using R-squared (R^2) values which express the proportion of the endogenous latent variables' explained variance (Henseler et al., 2012) R2 values of 0.75, 0.50, or 0.25 for endogenous latent variables can be described as substantial, moderate or weak (Hair, Ringle, & Sarstedt, 2011; Henseler., 2009) The results indicate strong explanatory capability:

Emotional Exhaustion (EE): $R^2 = 0.727$, $t = 30.104$, $p < 0.001$

Job Engagement (JE): $R^2 = 0.771$, $t = 35.997$, $p < 0.001$

Job Satisfaction (JS): $R^2 = 0.736$, $t = 28.871$, $p < 0.001$

Table 15: Table for Explained Variance (R^2 Values)

	R-square
EE	0.727
JE	0.771
JS	0.736

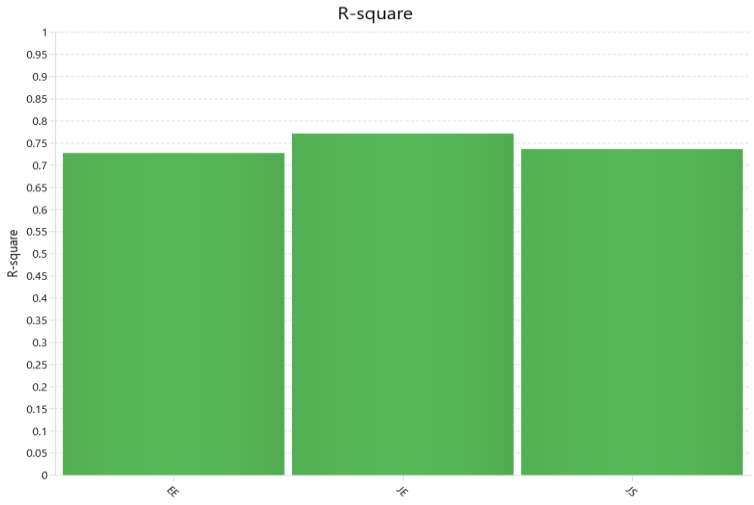


Figure 19: Bar Chart for Explained Variance (R^2 Values)

These values exceed the 0.67 threshold recommended for substantial models (Chin, 1998), indicating that the model accounts for a large proportion of variance in these key outcomes. Specifically, 73.6% of the variance in job satisfaction is explained by job engagement and emotional exhaustion, 77.1% of job engagement is predicted by job resources and demands, and 72.7% of emotional exhaustion is explained by job demands (workload, role ambiguity, and role conflict). The statistical significance of all R^2 values ($p < 0.001$) further supports the model's predictive relevance.

Effect Size (f2): The effect size f2 is the change in R2 value when a specified exogenous construct is omitted from the model can be used to evaluate whether the

omitted construct has substantive impact on the endogenous construct. The values of 0.02, 0.15, 0.35 respectively represent small, medium, and large effects (Cohen, 1988) of exogenous variables (as cited in Hair et al., 2014).

JE -> JS (f^2 = 1.921): This relationship shows a very large effect size, indicating that job engagement is a major predictor of job satisfaction. Enhancing job engagement could significantly improve job satisfaction among employees.

NW -> JE (f^2 = 0.601): The nature of work has a large effect on job engagement, suggesting that the characteristics of the work environment play a crucial role in determining how engaged employees feel.

Many relationships, including those from CR, EE, JA, RA, RC, SS, and WL to their respective constructs, show medium effect sizes. This indicates that while these factors do contribute meaningfully to the changes in the dependent variables, their impact is not as profound as the major predictors. For instance:

CR -> JE (f^2 = 0.171) and EE -> JE (f^2 = 0.150) suggest that these constructs moderately impact job engagement.

WL -> EE (f^2 = 0.282) implies that workload has a medium effect on emotional exhaustion.

Table 17. Table for Effect Size (f^2 Values)

	f-square	**Effect Size**
CR -> JE	0.171	Medium Effect
EE -> JE	0.150	Medium Effect
EE -> JS	0.187	Medium Effect
JA -> JE	0.181	Medium Effect
JE -> JS	1.921	Large Effect
NW -> JE	0.601	Large Effect
RA -> EE	0.191	Medium Effect
RC -> EE	0.287	Medium Effect
SS -> JE	0.151	Medium Effect

WL -> EE	0.282	Medium Effect

4.5.3 Test for Multicollinearity: Variance Inflation Factors (VIFs)

To evaluate potential multicollinearity among indicator variables, Variance Inflation Factors (VIFs) were examined. If the VIF values are greater than 5, it indicates towards the collinearity among the indicators (Hair et al., 2016). In the given model, the VIF values were found to be less than 5 which shows absence of collinearity.

Table 18: Table for Outer Loadings (VIF)

Outer model - List	VIF	Is Collinearity Problem (VIF>5)
CR1	2.317	No
CR2	2.618	No
CR3	1.844	No
EE2	3.700	No
EE3	3.617	No
JA1	2.418	No
JA2	2.418	No
JE1	3.735	No
JE2	3.747	No
JE3	1.983	No
JS1	2.959	No
JS2	4.162	No
JS4	3.380	No
NW1	1.562	No
NW2	2.346	No
NW3	2.395	No
RA2	3.400	No
RA3	3.400	No
RC1	3.176	No
RC2	3.671	No
RC3	2.114	No
SS1	1.717	No
SS3	1.717	No

WL1	3.080	No
WL2	3.290	No
WL3	2.372	No

4.6. Qualitative Results

4.6.1 Thematic Analysis

This section presents the findings from the qualitative interviews conducted with 15 CRAs (CRA numbers coded here as P1 to P15). The analysis focused on three key outcome constructs: Emotional Exhaustion (EE), Job Engagement (JE), and Job Satisfaction (JS). Using an inductive thematic approach, predictors such as Role Ambiguity, Work Overload, Supervisor Support, Recognition, Job Autonomy, and Meaningful Work emerged across the dataset. These subthemes align with the JD-R model.

Theme 1: Emotional Exhaustion (EE)

Emotional exhaustion was a consistent concern across participants. Key contributing factors included role ambiguity, conflicting directives from superiors, and a high volume of work with insufficient rest or appreciation.

Subthemes and Illustrative Quotes:

• Role Ambiguity: “I receive instructions from the PM and LM, and they’re often in conflict. I don’t know who to follow.” – P2

• Work Overload: “We handle too many trials at once. No time for breaks or proper review.” – P6

Theme 2: Job Engagement (JE)

Engagement varied significantly among CRAs. Many found engagement when they had autonomy and were contributing to something meaningful. Others felt disengaged due to repetitiveness and lack of challenge or recognition.

Subthemes and Illustrative Quotes:

• Job Autonomy: "I'm more motivated when I have control over my tasks and timelines." – P9

• Meaningful Work: "When I feel I'm contributing to something important, I stay more involved." – P12

Theme 3: Job Satisfaction (JS)

Job satisfaction was closely tied to recognition, fairness in workload, and emotional well-being. When CRAs felt overlooked or underpaid, satisfaction levels dropped dramatically.

Subthemes and Illustrative Quotes:

• Recognition: "Nobody appreciates the extra effort. Not even a thank-you from the sponsor." – P5

• Workload vs. Compensation: "The workload is insane for what we get paid. It's not satisfying anymore." – P3

Table 19: Table for Theme–Construct Matrix (Qualitative Findings)

Research Construct	**Theme**	**Sub-Themes**
Job Demands (JD)	Demand-Induced Depletion	Workload overload, role ambiguity, conflicting instructions

Job Resources (JR)	Autonomy as a Motivational Resource Supervisor Support as motivational armor Nature of work as a purpose Appreciation, Recognition, Rewards	Control over planning, trust in decision-making Supervisor empathy, flexible management, coaching Meaningful work, sense of purpose, Creating Value Transparency in Rewards, equality, justice
Emotional Exhaustion (EE)	Exhaustion as a Barrier to Engagement	Cognitive fatigue, emotional detachment, loss of initiative
Job Engagement (JE)	Meaning Fuels Motivation	Purpose in work, pride in contribution, site-level impact
Job Satisfaction (JS)	Emotional Climate Shapes Satisfaction	Satisfaction tied to mental state, support experience, and personal growth

4.6.2 Summary of Themes and Subthemes:

The table below summarizes the primary outcome themes and their associated subthemes derived from CRA interviews:

Table 20: Quote Evidence Table

Theme	Sub-Theme	Quote	Participant
Emotional Exhaustion (EE) → Exhaustion as a	Cognitive fatigue	"It wasn't just physical exhaustion — I felt mentally foggy, emotionally numb."	P1

Barrier to Engagement	Emotional detachment	"When I'm mentally exhausted, I just go into auto-pilot... I stop asking questions or thinking ahead."	P2
	Loss of initiative	"I often go home feeling overwhelmed and doubting myself... trying to learn and perform perfectly at the same time."	P5
Job Engagement (JE) → Meaning Fuels Motivation	Purpose in work	"I am always involved in decision making... I find my job meaningful."	P12
	Pride in contribution	"When I'm engaged, I feel proud to be a CRA... I enjoy seeing trial progress."	P1
	Site-level impact	"Just getting the patients from the sites is what matters to them... they don't understand my point of views."	P3
Job Satisfaction (JS) → Emotional Climate Shapes Satisfaction	Satisfaction tied to mental state	"Exhaustion makes me feel disconnected. I don't take pride in the work... satisfaction fluctuates with how emotionally balanced I feel."	P4
	Support experience	"My current manager is very flexible... If I need a day off... she supports that. That kind of understanding makes me feel seen."	P12
	Personal growth	"I feel like I'm learning, growing, and contributing to something larger than myself."	P14
Job Resources (JR) → Appreciation, Recognition, Rewards	Transparency in rewards	"There is no transparency in rewards. No explanations. No appreciation of hard work."	P4
	Equality	"They have their favourites... sometimes, I don't even bother putting in extra efforts."	P1
	Justice	"Even if I am competent enough... they do not let me decide anything."	P11

Job Resources (JR) → Nature of Work as a Purpose	Meaningful work	"I feel like I'm learning, growing, and contributing to something larger than myself."	P14
	Sense of purpose	"Working outside my JD adds extra feathers to my cap... I am learning a lot and so I am happy."	P12
	Creating value	"If I get to work beyond my JD for something that adds value to my profile, I find it engaging and meaningful."	P6
Job Resources (JR) → Supervisor Support as Motivational Armor	Supervisor empathy	"My immediate supervisor is empathetic and does check in occasionally, which I appreciate."	P12
	Flexible management	"My manager always tries to listen to my perspective... it is an informed decision."	P14
	Coaching	"If I am guided on the additional tasks and responsibilities then I might happily do it..."	P7
Job Resources (JR) → Autonomy as a Motivational Resource	Control over planning	"I also enjoy the autonomy I have during site visits — I can schedule, assess, and take decisions independently."	P12
	Trust in decision-making	"I feel like my voice matters... I'm in a position where I influence outcomes."	P12
Job Demands (JD) → Demand-Induced Depletion	Workload overload	"Last month we had three back-to-back site audits... I was on calls until 10:30 PM... Even small tasks felt overwhelming."	P1
	Role ambiguity	"I'm not clear about my manager's expectations. They keep changing."	P1
	Conflicting instructions	"My line manager and my project manager give contradictory instructions... I get frustrated."	P11

CHAPTER V:

DISCUSSION

5.1 Discussion of Results

This study aimed to explore the relationships between job characteristics and employee outcomes among CRAs, with a particular focus on job engagement, job satisfaction, and emotional exhaustion. The findings revealed both expected and unexpected relationships among these variables, offering a nuanced understanding of how job demands and resources influence CRA experiences. Using a mixed-methods approach, data were collected from 403 CRAs through validated questionnaires and in-depth interviews with 15 CRAs. This section discusses the quantitative and qualitative findings in light of the theoretical framework, with a focus on hypothesis validation, statistical relationships, and interpretive meaning.

5.1.1 Demographic Frequency Analysis

Gender Differences: Females reported slightly higher Emotional Exhaustion (3.75) than males (3.5), suggesting that women may be experiencing more burnout. This could be due to role conflicts, work-life balance challenges, or gender-specific workplace stressors. Interestingly, male employees reported slightly higher Job Engagement (3.40) compared to females (3.35), though the difference is marginal. In terms of Job Satisfaction, both genders scored closely: males (3.19) and females (3.14). This suggests gender might not play a significant role in overall satisfaction but may influence burnout and engagement slightly.

Age-Wise Patterns: Emotional Exhaustion decreases with age. It is highest among 20–24-year-olds (3.96) and lowest in the 40–45 age group (2.55). Younger employees might be facing transition stress or adjusting to demanding job roles. Job Engagement increases with age, peaking in the 40–45 age group (3.73). Older employees may have developed coping strategies or stronger professional identities. Similarly, Job Satisfaction is highest among 40–45-year-olds (3.82) and lowest among 20–24-year-olds (2.25), indicating that experience and age contribute to contentment in the workplace.

Years of Experience: Those with 0–4 years of experience reported the highest Emotional Exhaustion (3.70), which drops steadily with increased experience, reaching a low of 2.50 for those with 15–19 years. Engagement improves with experience: 2.96 (0–4 years) to 3.76 (15–19 years). Job Satisfaction follows a similar trend, rising from 2.76 (0–4 years) to 3.60 (15–19 years). This reflects the impact of organizational familiarity, confidence, and skill development on positive workplace outcomes.

Organization Type: Emotional Exhaustion is highest in CROs (3.50) and lowest in hospitals (2.56), possibly due to more intense deadlines and multitasking in CRO environments. Engagement is relatively similar across sectors, with hospital employees showing slightly higher JE (3.34–3.45). Satisfaction is also fairly uniform, suggesting organizational type influences stress more than engagement or satisfaction.

Work Setting: Emotional Exhaustion is highest in those working from the office (3.75), followed by hybrid (3.00), and lowest in work-from-home (2.50). This suggests that WFH may help reduce burnout. Conversely, Job Engagement is lowest for WFO (3.15) and highest for WFH (3.74). Hybrid workers fall in between (3.64), highlighting the

motivational benefits of flexible work arrangements. Job Satisfaction mirrors engagement, with WFH scoring highest (3.50), then hybrid (3.20), and WFO (2.90) lowest.

Education: Graduates show the highest Emotional Exhaustion (3.57), while postgraduates and doctorates report lower levels (3.05 and 3.38). This could indicate entry-level strain or lack of role clarity among graduates. Doctorates and postgraduates have similar Job Engagement and Satisfaction (~54%), higher than graduates (~43%–49%), suggesting advanced education correlates with better adaptation and contentment.

Therapeutic Area (Only EE analysed): Emotional Exhaustion is highest among oncology professionals (3.2) and lowest in "Others" (2.01). Oncology and cardiology (2.94) are emotionally demanding fields due to disease severity, ethical challenges, and workload. Fields like metabolic diseases, neurology, and immunology report moderate EE (2.6–2.87), possibly due to technical complexity and longer trial durations.

Phase of Trial (Only EE analysed): EE is highest in Phase I (3.5) and lowest in PMS and PKPD (2.71, 3.64 respectively). Phase I trials are often more intensive and risky, explaining higher burnout. Later phases (Phase III – 2.83; Phase IV – 2.74) show moderate EE, possibly due to more defined workflows and experience handling trials.

5.1.2 Quantitative Results Analysis: PLS-SEM revealed the following relationships:

5.1.2.1. Emotional Exhaustion (EE)

The study hypothesized that job demands, namely Workload (WL), Role Conflict (RC), and Role Ambiguity (RA), would be statistically significantly related to Emotional Exhaustion. The PLS-SEM results confirmed the statistically significant path coefficients for WL-EE, RC-EE, and RA-EE with high level of significance.

Role Conflict emerged as the strongest predictor of emotional exhaustion with 42% variance. It indicates that when CRAs experience conflicting expectations or incompatible demands in their role, they are more likely to feel emotionally drained. The high significance reinforces the robustness of this relationship. Workload with 41% of variance also suggests that an increase in workload leads to a substantial rise in emotional exhaustion. For Role Ambiguity although the effect size is smaller compared to workload and role conflict, role ambiguity still significantly contributes to emotional exhaustion. When CRAs are unclear about job responsibilities, expectations, or reporting lines, it adds to their stress and reduces emotional well-being. This implies that as CRAs face higher work demands and pressure, their emotional energy is increasingly depleted. Interviews supported this, with over 70% of participants citing multitasking, unrealistic deadlines and unrealistic expectations as core stressors aggravating exhaustion by creating confusion and cognitive overload.

5.1.2.2. Job Engagement (JE)

The hypothesis testing revealed that Job resources: job autonomy (JA), nature of work (NW), and contingent rewards (CR) were significant predictors of job engagement (JE), while supervisor support (SS) did not demonstrate a statistically significant relationship.

Among these, nature of work emerged as the most influential factor, accounting for approximately 72% of the variance in job engagement. This suggests that CRAs are

more emotionally and cognitively invested in their roles when they perceive their work as meaningful and fulfilling.

Job autonomy also played a vital role in enhancing engagement, with participants reporting that having control over how they execute tasks increased their intrinsic motivation. This finding was echoed in the qualitative data, where CRAs frequently described autonomy as a core driver of their professional involvement and satisfaction.

Interestingly, while supervisor support had a moderate path coefficient, it was not statistically significant. This may indicate that, in the context of CRAs, peer and task-related factors play a more pivotal role in fostering engagement than supervisory input.

A particularly noteworthy finding was the negative relationship between contingent rewards and job engagement, which contradicts much of the existing literature. Rather than serving as a motivator, contingent rewards appeared to diminish engagement, possibly due to perceptions of unfairness, inconsistency, or lack of transparency in the reward systems within the organizations. This highlights a potential area of concern for management, suggesting that monetary or recognition-based rewards may not be effective unless they are perceived as equitable and meaningful.

Overall, the results emphasize the importance of task-related intrinsic factors—such as meaningful work and autonomy—over extrinsic motivators in fostering engagement among CRAs.

5.1.2.3. Job Satisfaction (JS)

Job Satisfaction was influenced by EE and JE significantly. Interestingly, Job Engagement mediated the relationship between job resources and satisfaction, and Emotional Exhaustion negatively impacted satisfaction. Recognition, fairness, and alignment between effort and reward emerged as core factors driving satisfaction levels.

From qualitative data, CRAs expressed frustration with inadequate acknowledgment and rewards, even when performance exceeded expectations.

Job engagement emerged as a central mediating variable between job characteristics and job satisfaction. Specifically, nature of work and job autonomy were found to have strong positive indirect effects on job satisfaction through their influence on engagement. Nature of work had the most substantial indirect effect (0.563), indicating that CRAs who perceive their work as meaningful and aligned with personal values are more emotionally and cognitively engaged, leading to greater satisfaction. Job autonomy also contributed positively, suggesting that discretion and control over one's tasks enhance motivation and satisfaction. These findings are consistent with the JDR model, which emphasizes the role of intrinsic job resources in fostering engagement and protecting against burnout. Qualitative responses supported these results, as CRAs consistently emphasized meaningful work and autonomy as key factors driving their engagement.

A particularly noteworthy and somewhat counterintuitive finding was the negative indirect effect of contingent rewards on job satisfaction through engagement. Contrary to established motivational theories, which typically suggest that rewards increase engagement, the data revealed that CRAs perceived the reward systems within their organizations as unfair, biased, or lacking transparency. Interview feedback reinforced this, with multiple participants reporting favoritism, inconsistent recognition, and unclear reward criteria. In such cases, contingent rewards appeared to act as a demotivator, undermining engagement and, in turn, reducing job satisfaction. This highlights a critical issue for management: the design and delivery of reward systems must not only be structurally sound but also perceived as equitable and meaningful by employees to be effective.

The study also examined the impact of role-related stressors such as role ambiguity, role conflict, and workload on emotional exhaustion. While role ambiguity and role conflict were associated with increased emotional exhaustion, these stressors did not significantly translate into lower engagement or job satisfaction through indirect paths. However, both role conflict and workload showed small negative indirect effects on job satisfaction, suggesting that stressors may subtly erode satisfaction, particularly when they contribute to prolonged emotional strain.

Interestingly**,** emotional exhaustion did not show a significant relationship with job engagement**,** a finding that diverges from much of the existing literature, where emotional fatigue is often seen as a barrier to psychological involvement in work. One possible explanation is that CRAs, despite experiencing exhaustion, continue to engage behaviorally in their roles due to strong professional identity, purpose-driven motivation, or a commitment to patient outcomes. This is supported by qualitative accounts from participants who reported feeling stressed or depleted but still invested effort into their work, especially when they found it meaningful or career-enhancing. Thus, emotional exhaustion may not always disrupt engagement directly in high-responsibility, purpose-oriented roles.

On the other hand, emotional exhaustion did show a significant negative relationship with job satisfaction, confirming that the emotional strain of the role impacts how CRAs evaluate their work overall. Participants shared how cognitive fatigue and emotional depletion diminished their sense of accomplishment, recognition, and control—factors that directly contributed to job dissatisfaction. This aligns with previous research indicating that exhaustion erodes affective experiences at work and reduces one's capacity to feel positively about the job, even if it does not always impact day-to-day engagement.

Supervisor support demonstrated a positive but non-significant direct effect on job engagement. However, it had a small positive indirect effect on job satisfaction through engagement. This indicates that while supervisor support may not be a primary driver of engagement, it contributes to a more supportive work environment that enhances overall satisfaction. It plays a complementary role to task-related factors, helping to reduce stress and facilitate access to resources that support employees in maintaining their engagement.

In summary, this study reinforces the importance of meaningful work and autonomy as primary drivers of engagement and satisfaction among CRAs. It also reveals that contingent rewards, when perceived as unfair, can have a detrimental effect on engagement and satisfaction. While emotional exhaustion and role stressors are present, their impact on engagement may be mitigated by intrinsic motivation and role identity. However, emotional strain clearly affects satisfaction, pointing to the need for organizational strategies that balance job demands, promote emotional well-being, and improve fairness and clarity in leadership practices.

5.1.3 Qualitative Findings Analysis

5.1.3.1 Job Demands and Emotional Exhaustion

Quantitative findings showed that Workload (WL)**,** Role Conflict (RC)**,** and Role Ambiguity (RA) were all positively and significantly related to Emotional Exhaustion (EE). These results validate the assumption from the JD-R model that high job demands are primary antecedents of emotional exhaustion. This finding is strongly supported by the qualitative data. CRAs described overload, multitasking, unrealistic expectations, and frequent deadline pressures as emotionally draining. For instance, CRA P1 shared, *"Even*

small tasks felt overwhelming... I was mentally foggy, emotionally numb." Similarly, CRA P4 noted, *"I have to do my own work which is piled up and my project manager keeps delegating tasks that don't make any sense."* These narratives vividly illustrate how excessive and ambiguous demands diminish cognitive resources, aligning with the statistical relationship between job demands and emotional exhaustion.

5.1.3.2 Job Resources and Job Engagement

Among job resources, Nature of Work (NW) and Job Autonomy (JA) had strong positive effects on Job Engagement (JE), with NW showing the highest impact (β = 0.721). This indicates that CRAs are more engaged when they find their work meaningful and when they have control over how they perform their duties. Qualitative insights reinforce this. CRAs like P12 and P14 reported high engagement and satisfaction due to a sense of purpose and autonomy, such as, *"I feel like I'm learning, growing, and contributing to something larger than myself,"* and *"I enjoy the autonomy during site visits... it plays a huge role."* This aligns directly with the subthemes of control over planning and meaningful work found in the qualitative coding. On the other hand, Supervisor Support (SS) had a non-significant relationship with JE in the quantitative data. Still, it showed a small indirect effect on Job Satisfaction through JE (β = 0.09y6), suggesting its influence may be more nuanced or context-dependent. This is echoed in mixed qualitative accounts. While some CRAs (e.g., P12, P14) felt supported and listened to, others (e.g., P3, P5) expressed feeling unrecognized or judged, indicating that the quality and perception of supervisor support vary greatly across experiences.

5.1.3.3 Contingent Rewards and Job Engagement

Surprisingly, Contingent Rewards (CR) had a negative and significant effect on Job Engagement (β = -0.31) and a negative indirect effect on Job Satisfaction via JE (–0.241)**.** This contradicts typical expectations in motivational theory where rewards enhance engagement. This discrepancy is powerfully explained by qualitative data. Several participants (e.g., CRA P1, P4) expressed dissatisfaction with how recognition and rewards were distributed, citing *"favoritism, lack of transparency, and unfair treatment."* This supports the idea that perceived injustice in reward systems can demotivate rather than engage, even when rewards are present.

5.1.3.4 Job Engagement and Job Satisfaction

Job Engagement (JE) showed a strong direct effect on Job Satisfaction (JS) (β = 0.781), indicating that engagement is a crucial mediator of satisfaction. Indirect effects further revealed that both NW and JA positively influenced JS through JE (β = 0.563 and 0.275 respectively). This is confirmed in the interviews. Participants who felt engaged often linked that engagement to positive emotions, pride in contribution, and satisfaction, such as CRA T1 stating, *"When I'm engaged, I feel proud to be a CRA… But when I'm emotionally drained, I start questioning everything."* Others, such as CRA T6 and T12, also described strong emotional investment in their roles, supported by meaningful tasks and autonomy, directly connecting engagement and satisfaction.

5.1.3.5 Emotional Exhaustion and Job Satisfaction

Emotional Exhaustion (EE) had a significant negative impact on Job Satisfaction (β = -0.16), confirming that emotional strain diminishes the positive experience of work. The qualitative data similarly depicted emotional detachment, cognitive fatigue, and loss

of initiative (e.g., CRA P5, P7), which influenced how participants evaluated their roles.As CRA P4 stated, *"Exhaustion makes me feel disconnected. I don't take pride in the work… satisfaction fluctuates with how emotionally balanced I feel."* These subjective accounts support the path model's indication that emotional energy is essential to sustaining job satisfaction.

5.2 Summary of Quantitative Findings

PLS-SEM revealed the following significant relationships:

- Workload, role conflict, and role ambiguity significantly predicted emotional exhaustion.
- Job autonomy and nature of work positively predicted job engagement.
- Contingent rewards negatively predicted job engagement.
- Job engagement significantly predicted job satisfaction.
- Emotional exhaustion negatively predicted job satisfaction.
- Supervisor support showed no significant direct relationship with job engagement but had a small positive indirect effect on job satisfaction through engagement.
- Emotional exhaustion had no significant relationship with job engagement.

5.3 Summary of Qualitative Findings

Thematic analysis of in-depth interviews with 15 CRAs revealed the following themes:

- Emotional exhaustion was often attributed to workload overload, conflicting expectations, and role ambiguity.

- Job engagement was fostered through autonomy, meaningful work, and supportive supervision (when present).
- Contingent rewards, when perceived as unfair or opaque, often demotivated rather than engaged CRAs.
- Supervisor support varied widely; inconsistency and favoritism diminished its impact.

5.4 Integration of Findings

This study adopted a mixed-methods approach to investigate the experiences of Clinical Research Associates (CRAs) with regard to job demands, job resources, emotional exhaustion, job engagement, and job satisfaction. The integration of quantitative and qualitative findings provided a more nuanced and holistic understanding of the complex dynamics shaping the work life of CRAs (Table 20).

Table 21: Comparison of Constructs for Quantitative and Qualitative Results

Construct	Quantitative Result	Qualitative Support
WL, RA, RC → EE	Significant positive relationships	P1, P4, P7 reported burnout due to overload, ambiguity, and conflicting expectations
NW, JA → JE	Strong positive effects	P12, P14 found purpose, autonomy, pride, motivating
CR → JE	Significant negative effect	P1, P4 cited unfairness and favoritism in rewards, lack of transparency, perception of fairness is more important

JE → JS	Strong positive relationship	P1, P12 noted that engagement drives satisfaction
EE → JS	Moderate negative effect	P4, P5, P7 discussed how exhaustion harms satisfaction
SS → JE	Non-significant, but small indirect effect	Mixed accounts: some CRAs felt supported P14, others ignored P3, P5, empowering managers enhance work satisfaction
EE → JE	Non-significant effect	Few CRAs reported being mentally and emotionally drained yet remained highly engaged—possibly sustained by intrinsic motivation and strong professional identity.

Job Demands and Emotional Exhaustion Quantitative findings confirmed that workload, role conflict and role ambiguity significantly predicted emotional exhaustion. These findings were strongly supported by qualitative narratives. Participants described high workloads, unrealistic expectations, and contradictory instructions as major stressors. For instance, one participant shared, "Even small tasks felt overwhelming... I was mentally foggy, emotionally numb," illustrating the emotional toll of unmanaged job demands.

The integration of quantitative and qualitative findings provided a comprehensive understanding of the dynamics between job demands, job resources, emotional exhaustion, engagement, and satisfaction among Clinical Research Associates (CRAs). Notably, nature of work and job autonomy emerged as the strongest positive predictors of job engagement, reflecting the significance of intrinsic motivators. Interview data

reinforced this, with participants often citing meaningful tasks, decision-making freedom, and opportunities for growth as core drivers of their motivation and pride in their roles.

In contrast, supervisor support, although theoretically a key job resource, did not significantly predict engagement in the quantitative model. However, qualitative responses painted a nuanced picture: while some CRAs experienced empathy and empowerment from their supervisors, others described micromanagement or neglect, indicating variability in how this resource is experienced and perceived.

A particularly novel and counterintuitive finding was the negative impact of contingent rewards on job engagement and its indirect negative effect on job satisfaction. This contradicts traditional motivational theories, which posit that rewards enhance engagement. Qualitative insights revealed that perceptions of favoritism, inconsistency, and lack of transparency in reward systems often demotivated employees. This underscores the critical role of perceived fairness and justice in driving employee engagement.

The role of job demands—specifically workload, role ambiguity, and role conflict—was clearly supported, with all three significantly predicting emotional exhaustion. Interviewees described being overwhelmed by overlapping responsibilities, unrealistic expectations, and unclear instructions. These experiences led to mental fatigue and emotional detachment, validating the JD-R framework's assertion that excessive demands drain emotional resources.

While emotional exhaustion had a significant negative impact on job satisfaction, it did not significantly influence job engagement, diverging from much of the burnout literature. Some CRAs reported being mentally and emotionally drained yet remained highly engaged—possibly sustained by intrinsic motivation and strong professional

identity. This suggests that in purpose-driven roles, engagement can persist even under emotional strain.

Finally, job engagement strongly mediated the relationship between job resources and job satisfaction. Participants who felt connected to their work and experienced a sense of purpose reported greater fulfillment, while disengagement—often linked to emotional exhaustion—reduced satisfaction and triggered thoughts of leaving the organization.

Overall, the findings validated the JD-R model, showing that job resources promote engagement and satisfaction, whereas job demands drive emotional exhaustion. Importantly, qualitative data offered deeper insight into the reasons behind some unexpected statistical outcomes, particularly regarding supervisor support and reward systems, thereby enhancing the explanatory power of the study and highlighting the value of a mixed-methods approach.

5.5 Alignment with Existing Literature

The findings of this study largely align with existing literature on the JD-R model, reinforcing the theoretical understanding that job demands and job resources play crucial roles in shaping outcomes such as emotional exhaustion, job engagement, and job satisfaction. However, the results also diverge from the literature in key areas, offering new perspectives specific to the work context of CRAs.

The demographic findings of this study are largely in alignment with existing literature on workplace psychology and clinical research professions. Previous studies have consistently reported higher emotional exhaustion among female professionals in healthcare settings, attributed to higher emotional labor, dual work roles, and lack of institutional support (Maslach & Jackson, 1981; Schaufeli et al., 2009). Our results

mirror this trend, confirming gender-related vulnerability to burnout. Though exhaustion was observed in both the genders.

The observation that younger professionals (20–29 years) report higher emotional exhaustion and lower job satisfaction is also supported by existing studies, which suggest early-career employees face higher stress due to job insecurity, role ambiguity, and skill mismatches (Bakker & Demerouti, 2007; Leiter & Maslach, 2004). In contrast, older professionals with longer tenure show greater engagement and satisfaction, aligning with theories of occupational socialization and job-person fit.

Higher burnout among professionals in hospital settings and in therapeutic areas such as Oncology, Cardiology and Neurology is consistent with literature available for physicians working with emotionally demanding patient care and complex protocol adherence (Noronha J, 2020, Jeffrey B. Michel, 2017; Busis, 2017). These findings reinforce the significance of demographic variables in understanding workplace outcomes and confirm the applicability of the JD-R model across different strata of clinical research professionals.

The positive association between job resources—particularly job autonomy and nature of work—and job engagement is strongly supported by prior studies. Research has consistently shown that when employees experience autonomy and find their tasks meaningful, they are more likely to be psychologically invested in their roles (Bakker & Demerouti, 2007; Schaufeli et al., 2002). This study affirms those findings through both quantitative and qualitative data. Participants who described feeling engaged also spoke of being entrusted with responsibilities, having control over their work, and understanding the broader value of their contributions.

Similarly, the significant positive relationship between job engagement and job satisfaction aligns with a broad body of literature (Rich et al., 2010; Saks, 2006),

suggesting that employees who are more engaged derive more fulfilment and are generally more satisfied with their jobs. CRAs in this study expressed satisfaction when they were actively involved, felt valued, and had the opportunity to grow professionally.

In terms of job demands, this study confirmed that workload, role ambiguity, and role conflict were all significant predictors of emotional exhaustion, consistent with previous findings that excessive demands deplete psychological resources and lead to burnout (Maslach & Leiter, 2008; Crawford et al., 2010). Qualitative accounts echoed this, with CRAs reporting stress due to constant travel, contradictory instructions, multitasking, and unrealistic expectations.

However, a notable divergence from established models emerged with the finding that emotional exhaustion had no significant relationship with job engagement. This is contrary to much of the literature, which typically views burnout—particularly emotional exhaustion—as a major inhibitor of engagement (Schaufeli et al., 2002; Leiter & Maslach, 2004). From this perspective, emotional fatigue would be expected to reduce the energy and motivation required for engagement.

Nevertheless, some contextualized research supports the idea that employees may remain engaged in their work despite emotional exhaustion, particularly in highly skilled or purpose-driven roles. For example, Bakker et al. (2008) and Gonzalez-Romá et al. (2006) found that professionals in emotionally demanding roles often continue to demonstrate behavioral engagement due to intrinsic motivation or strong professional identity. In the case of CRAs, the ability to derive meaning from their tasks, commitment to patient outcomes, or opportunities for career advancement may sustain engagement even when emotional energy is depleted. Thus, while this result departs from the dominant pattern, it may reflect a contextual resilience observed in similar high-demand professions.

On the other hand, the finding that emotional exhaustion had a significant negative effect on job satisfaction is in line with earlier studies suggesting that prolonged emotional strain erodes affective commitment and positive job attitudes (Wright & Cropanzano, 1998). This supports the notion that while emotional exhaustion may not immediately disrupt engagement, it does diminish how employees evaluate their work overall, contributing to dissatisfaction.

Another unexpected result was the negative relationship between contingent rewards and job engagement, which contrasts with traditional motivation theories such as expectancy theory (Vroom, 1964) and reinforcement theory (Skinner, 1953). These frameworks suggest that performance-based rewards should enhance motivation and engagement. However, more recent research in organizational psychology has highlighted that perceptions of fairness, equity, and transparency in reward systems are critical (Colquitt et al., 2001; Cropanzano & Mitchell, 2005). The qualitative data in this study strongly supported this interpretation: CRAs expressed frustration with inconsistent, biased, or opaque reward practices, which contributed to disengagement rather than motivation.

Lastly, the role of supervisor support revealed a more complex picture. While supervisor support was not a significant predictor of engagement in the quantitative data, it showed a small indirect effect on job satisfaction through engagement. This mixed result is partially supported by the literature. Although many studies emphasize the buffering role of supportive supervision (Eisenberger et al., 2002; Halbesleben, 2006), its effectiveness depends heavily on the quality, consistency, and perceived authenticity of that support (Rhoades & Eisenberger, 2002). Qualitative feedback from CRAs ranged from accounts of empathetic and flexible supervisors to descriptions of neglect and

micromanagement, suggesting that inconsistent supervisory practices may have diluted the overall impact**.**

In summary, this study's findings largely support existing theoretical frameworks, especially the JD-R model, while also highlighting context-specific nuances. The results affirm the motivational value of autonomy and meaningful work, the detrimental impact of job demands on emotional exhaustion, and the importance of engagement for satisfaction. At the same time, the unexpected lack of a relationship between emotional exhaustion and engagement, and the negative role of contingent rewards, offer valuable contributions to the literature by underscoring the role of perception, fairness, and professional resilience in shaping how job characteristics affect outcomes in high-pressure roles like that of the CRA.

Table 22. Alignment with Existing Literature

Category	Findings	Alignment/Divergence
Theoretical Framework	Job demands (workload, role ambiguity, role conflict) and job resources (autonomy, meaningful work) critically influence outcomes like emotional exhaustion, job engagement, and job satisfaction.	Largely aligned with existing literature on the JD-R model.
Demographic Trends	Higher emotional exhaustion among female professionals; younger employees (20-29 years) report higher emotional exhaustion and lower job satisfaction; older professionals show higher engagement.	Consistent with findings in workplace psychology and clinical research professions.
Special Contexts	Higher burnout in hospital settings, especially in Oncology, Cardiology and	Supports literature linking these environments with increased emotional strain.

	Neurology; elevated emotional exhaustion in Phase I, II, BABE, PKPD trials due to greater demands.	
Job Resources	Positive association between job autonomy/nature of work and job engagement; CRAs value feeling entrusted and meaningful tasks.	Strong support from existing studies highlighting the motivational value of autonomy.
Job Engagement and Satisfaction	Significant positive relationship between job engagement and job satisfaction; CRAs derive satisfaction from involvement and feeling valued.	Aligned with literature emphasizing the connection between engagement and job satisfaction.
Impact of Job Demands	Workload, role ambiguity, and role conflict significantly predict emotional exhaustion, confirming the detrimental impact of excessive demands.	Consistent with prior findings linking high demands to burnout.
Emotional Exhaustion and Engagement	No significant relationship found; CRAs may remain engaged despite emotional exhaustion due to intrinsic motivation or purpose.	Diverges from traditional views, suggesting contextual resilience exists in high-demand roles.
Emotional Exhaustion and Satisfaction	Significant negative effect on job satisfaction, consistent with literature that prolonged emotional strain undermines positive job attitudes.	Aligns with earlier studies on the detrimental impact of emotional exhaustion on job evaluation and satisfaction.
Contingent Rewards	Negative relationship with job engagement; perceptions of fairness and transparency in rewards are critical to motivation.	Contrasts with traditional motivation theories but aligns with recent perspectives emphasizing perceptions of equity.
Supervisor Support	Mixed findings; while not a significant predictor of engagement, it has a small indirect effect on job satisfaction through engagement.	Partially supports literature; highlights the importance of quality and perceived authenticity of supervisory support.

Overall Summary	Findings support motivational value of autonomy, detrimental impacts of job demands, and contextual nuances in emotional exhaustion and engagement.	Confirms existing theoretical frameworks while introducing new insights on perception, fairness, and resilience.

5.6 Hypothesis Testing and Significance Interpretation

This study tested five hypotheses based on the JD-R Model, using PLS-SEM to determine the strength and significance of the relationships among key constructs. The significance of the results was assessed using p-values, with a threshold of $p < 0.05$ considered statistically significant. The findings from the hypothesis testing are summarized below.

- **H1** (H1a, H1b, H1c) was supported, confirming that high job demands significantly contribute to emotional exhaustion. This aligns with the JD-R model and burnout literature.
- **H2** (H2b, H2c, H2d) was partially supported, showing that job resources, particularly autonomy (H2b) and meaningful work (H2d), play a strong role in fostering engagement whereas supervisor support (H2a) showed no impact and contingent rewards (H2c) showed counterintuitive impact.
- **H3** was not supported. Emotional exhaustion did not have a significant impact on job engagement, which diverges from typical burnout theories but may reflect contextual resilience in CRAs.
- **H4** was supported. Emotional exhaustion negatively impacts job satisfaction, confirming that affective strain reduces employees' positive evaluation of their work.

- **H5** was strongly supported, establishing that job engagement is a key positive predictor of job satisfaction.

These results reinforce the JD-R model while highlighting unique insights specific to the clinical research environment. In particular, the non-significant relationship between emotional exhaustion and engagement (H3) and between supervisor support and job engagement as well as negative impact of contingent rewards on job engagement warrants further investigation into the buffering role of intrinsic motivation and professional identity in sustaining engagement under stress.

5.6.1 Specific Indirect Effects

The analysis of specific indirect effects revealed several notable relationships among the study variables.

CR -> JE-> JS

The path indicates a negative specific indirect effect of Contingent Rewards on Job Satisfaction through Job Engagement. This suggests that higher levels of contingent rewards may not enhance job satisfaction via increased job engagement. This could indicate that the rewards do not resonate positively with employees regarding their engagement, possibly warranting a review of how rewards are structured and communicated.

EE-> JE -> JS

There is no significant indirect effect of Emotional Exhaustion on Job Satisfaction through Job Engagement. This implies that emotional exhaustion does not play a role in mediating the relationship between engagement and satisfaction, suggesting that

emotional states do not necessarily affect how engaged employees feel, thereby not impacting their satisfaction levels directly.

JA-> JE -> JS

The path from Job Autonomy to Job Engagement and then to Job Satisfaction has a positive effect. This indicates that greater job autonomy enhances job engagement, which in turn positively influences job satisfaction. This demonstrates the significant role that autonomy can play in fostering a more engaged and satisfied workforce.

NW-> JE -> JS

A strong positive effect from Nature of Work to Job Engagement and subsequently to Job Satisfaction shows that the type and quality of work performed substantially enhance both engagement and satisfaction. This finding suggests that organizations should focus on enriching the nature of work to improve employee satisfaction.

RA-> EE-> JE

The absence of a significant indirect effect from Role Ambiguity to Emotional Exhaustion to Job Engagement indicates that ambiguity in roles does not contribute to emotional exhaustion in a way that affects job engagement. This suggests that role clarity might not be a primary concern in impacting engagement levels directly.

RA -> EE -> JS

The pathway from Role Ambiguity to Emotional Exhaustion and then to Job Satisfaction shows a slight negative effect. This indicates that greater role ambiguity might marginally

decrease job satisfaction through increased emotional exhaustion, although the effect is minor.

RC-> EE -> JE

There is no significant indirect effect from Role Conflict to Emotional Exhaustion and then to Job Engagement. This suggests that role conflict does not significantly influence emotional exhaustion to affect engagement.

SS-> JE -> JS

The path from Supervisor Support to Job Engagement and then to Job Satisfaction shows a positive effect. This relationship indicates that supportive supervisory practices encourage job engagement, which subsequently enhances job satisfaction. This reinforces the importance of supervisor involvement in improving employee outcomes.

WL-> EE -> JE -> JS

The lack of an indirect effect from Workload through Emotional Exhaustion to Job Engagement and then to Job Satisfaction suggests that workload does not affect these outcomes in this specific mediated manner, indicating that workload concerns may need to be addressed differently.

RC -> EE -> JS

The path from Role Conflict to Emotional Exhaustion and then to Job Satisfaction shows a slight negative effect, indicating that role conflict may contribute to emotional exhaustion, which negatively influences job satisfaction.

WL -> EE -> JE

The indirect effect from Workload to Emotional Exhaustion and then to Job Engagement is zero. This indicates that changes in workload do not influence engagement through emotional exhaustion.

WL -> EE -> JS

The pathway from Workload to Emotional Exhaustion and then to Job Satisfaction indicates a slight negative effect. This finding suggests that excessive workload may lead to emotional exhaustion, which might slightly decrease job satisfaction.

RA -> EE -> JE -> JS

The absence of an indirect effect from Role Ambiguity to Emotional Exhaustion to Job Engagement and then to Job Satisfaction further indicates that role ambiguity does not significantly affect these outcomes through this pathway.

RC -> EE -> JE -> JS

Similarly, the absence of an indirect effect from Role Conflict to Emotional Exhaustion to Job Engagement and subsequently to Job Satisfaction reinforces that these relationships are not significant.

CHAPTER VI

SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

6.1 Summary of the Study

This study examined the complex interplay between job demands, job resources, emotional exhaustion, job engagement, and job satisfaction among CRAs in India. Anchored in the JD-R theoretical framework, the research adopted a convergent mixed-methods design to capture both the breadth and depth of CRA work experiences. Quantitative data were gathered from 403 CRAs through a structured questionnaire, while qualitative insights were drawn from 15 in-depth semi-structured interviews.

The quantitative strand employed PLS-SEM to test five hypotheses regarding direct and indirect relationships among key constructs. Results confirmed that job demands—specifically workload, role ambiguity, and role conflict—were positively associated with emotional exhaustion. Job resources, particularly nature of work and job autonomy, significantly enhanced job engagement, whereas contingent rewards exhibited a surprising and significant negative association with engagement. Job engagement strongly predicted job satisfaction, and emotional exhaustion negatively influenced satisfaction. However, emotional exhaustion did not significantly impact job engagement—an important deviation from existing burnout models. Supervisor support was also found to be statistically non-significant in influencing engagement directly, though it had a modest indirect effect on satisfaction through engagement.

The qualitative data enriched these findings by illuminating how intrinsic motivation, task meaning, and perceived fairness shaped CRAs' psychological experiences. Interview participants described emotional exhaustion as stemming from

excessive workload, ambiguous responsibilities, and contradictory guidance. Despite this, many remained engaged when they felt their work was meaningful or had autonomy in execution. Conversely, demotivation was pronounced when reward systems were perceived as biased or supervisory support was inconsistent.

This integrative approach provided a holistic view of the psychological mechanisms underlying CRA work dynamics and offered both empirical validation and contextual nuance to the JD-R model within the clinical research setting.

6.2 Theoretical Implications

The present study contributes meaningfully to the ongoing development and contextual adaptation of the JD-R framework. It reaffirms the model's core proposition that job demands deplete energy and lead to emotional exhaustion, while job resources such as autonomy and meaningfulness foster motivation and engagement. Yet, the findings also prompt critical re-examination of certain assumed relationships.

Firstly, the non-significant relationship between emotional exhaustion and job engagement contrasts with established burnout literature, which typically positions exhaustion as a key inhibitor of engagement. This deviation suggests that in professions marked by high accountability and intrinsic motivation—such as clinical research—individuals may sustain engagement despite emotional fatigue. This finding encourages future theoretical models to accommodate resilience**,** professional identity, or purpose-driven commitment as potential moderators or buffers in emotionally taxing environments.

Secondly, the negative impact of contingent rewards on engagement introduces a noteworthy critique of conventional motivational theories. While traditional frameworks (e.g., expectancy theory) suggest that rewards should enhance effort, the data here

illustrate how perceived inequity or favoritism in reward distribution can reverse the intended motivational effect. This underscores the importance of incorporating perception-based constructs—such as organizational justice and psychological contract fulfillment—into models of workplace motivation.

In sum, this study supports the JD-R model while extending its explanatory power by integrating the nuances of perception, fairness, and contextual resilience into the broader understanding of employee well-being and motivation.

6.3 Managerial Implications

The findings of this study have significant practical relevance for organizations operating in the clinical research domain, particularly for HR leaders, line managers, and operational heads overseeing CRA functions. The insights suggest targeted strategies to enhance engagement, reduce burnout, and promote job satisfaction.

1. **Redesign Roles to Reinforce Purpose and Impact**

Organizations should actively link daily CRA responsibilities to the broader mission of patient safety and scientific advancement. Highlighting how CRAs contribute to life-saving treatments can create a sense of purpose that sustains engagement.

2. **Promote Genuine Autonomy in Task Execution**

Allowing CRAs to manage their schedules, make site-level decisions, and prioritize tasks fosters ownership and internal motivation. Micromanagement should be minimized, and decision-making authority should be clearly communicated and supported.

3. **Rebuild Reward and Recognition Systems with Fairness and Transparency**

Reward systems must be restructured to eliminate perceived bias and favoritism.

Introducing peer-nominated recognition, transparent criteria, and timely appreciation can restore trust and turn rewards into effective motivational tools.

4. **Clarify Role Definitions and Improve Instruction Consistency**

Regular alignment meetings among managers and cross-functional teams can ensure clarity in task expectations. Standardized communication protocols and SOPs can reduce confusion and cognitive strain caused by conflicting instructions.

5. **Balance Workload with Resource Planning and Delegation**

Realistic workload distribution should be implemented through better resourcing and capacity mapping. Use of workload tracking tools and structured delegation frameworks can help prevent burnout and improve overall efficiency.

6. **Develop Emotionally Intelligent Supervisors**

Supervisor training programs should incorporate emotional intelligence, coaching skills, and conflict resolution. Supervisors who actively listen, empathize, and advocate for their team can be powerful buffers against stress.

7. **Institutionalize Mental Health and Well-being Support**

Organizations should provide CRAs with access to counseling services, flexible time-off policies, peer support groups, and well-being check-ins. Creating a psychologically safe environment is critical for preventing long-term emotional exhaustion.

These recommendations are not only relevant for immediate managerial action but also for shaping long-term policies and workplace culture in clinical research settings.

6.4 Recommendations for Future Research

Given the limitations and insights of this study, several avenues for future research are proposed:

1. **Longitudinal Research Designs**

Future studies should examine how engagement, exhaustion, and satisfaction evolve over time, particularly across different phases of clinical trial projects or during organizational transitions.

2. **Comparative Role Analysis**

Examining the job demands and resources of CRAs in comparison with other roles (e.g., project managers, site coordinators) may yield richer insight into inter-role dynamics and tailored interventions.

3. **Exploration of Moderating Variables**

Future research could investigate how factors such as resilience, coping style, emotional intelligence, or organizational culture influence the strength or direction of relationships in the JD-R model.

4. **Cross-Cultural Validation**

Expanding the sample across different countries or regions would allow for analysis of how cultural values, healthcare systems, and regulatory environments shape CRA experiences.

5. **Intervention-Based Studies**

Empirical testing of specific interventions—such as supervisor training programs, reward system reforms, or well-being initiatives—could provide practical validation of the strategies recommended in this study.

6. **Mixed-Method Expansion with Diary or Observational Techniques**

Incorporating real-time data collection (e.g., experience sampling, observational studies) can uncover moment-to-moment dynamics of emotional strain and engagement not captured in retrospective interviews or surveys

6.5 Conclusion

This study advances our understanding of how job demands and job resources interact to shape the emotional and motivational landscape of Clinical Research Associates. By combining robust statistical analysis with rich qualitative insights, the study offers a balanced and evidence-based contribution to theory and practice.

While core tenets of the JD-R model were upheld—namely, that job demands predict emotional exhaustion and job resources drive engagement—important divergences emerged. The lack of a significant relationship between emotional exhaustion and engagement, and the demotivating role of contingent rewards, reflect the complexity of work experiences in high-pressure professional settings. These findings underscore the importance of fairness, clarity, autonomy, and meaning as pillars of employee well-being.

Ultimately, this study calls for a renewed organizational focus on human-centered management—one that transcends performance metrics to value psychological safety, trust, and purpose in the workplace. By addressing structural, relational, and perceptual challenges, clinical research organizations can cultivate a workforce that is not only resilient but also deeply engaged and satisfied in their professional roles.

APPENDIX A

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APPENDIX C

SURVEY COVER LETTER and INFORMED CONSENT

The header of the questionnaire contained the following statement:

This questionnaire is designed to measure the Burnout and Job Satisfaction in the Clinical Research Associates working at different levels of their careers. Your responses will be kept confidential and used solely for the purpose of this study. If you complete it, it would be your contribution to research to know the burnout in clinical research associates. Your responses will be analyzed anonymously, and your identity or your personal details will not be linked to your answers. Participation in this study is entirely voluntary. By completing this form, you are providing your informed consent to take part in the study.

This research is divided into 2 sections. Section 1 is regarding Demographics and Section 2 has different questions on different aspects of Job that are categorised into 5 options from Strongly Disagree to Strongly Agree.

Few of the questions are reverse worded so read the questions carefully and choose any 1 option out of 5 based on your feeling about your job. All the questions are mandatory to attend to get full evaluation of the responses. Looking forward to your contribution.

While sharing the form through social media, following cover letter was used:

Hi XYZ,

I'm conducting a short, anonymous survey on burnout and job satisfaction specifically among Clinical Research Associates for my academic research.

Clinical Research Associates are the least studied when it comes to work-related stress and well-being — even though CRAs face intense demands every day. Your input will help shed light on real challenges and support research that aims to improve our work environment.

- Takes less than 7 minutes
- Participation is voluntary
- 100% anonymous
- No personal details included
- For academic research only

Your voice matters. Please consider participating to help science and share with your other CRA friends for better reach.

Please find the google form link below:

Thank you for your time and support!!

APPENDIX D

SURVEY QUESTIONNAIRE

1. Gender *

Mark only one oval.

- ◯ Male
- ◯ Female
- ◯ Prefer not to say

2. Age *

Mark only one oval.

- ◯ Between 20-24 years
- ◯ Between 25-29 years
- ◯ Between 30-34 years
- ◯ Between 35-39 years
- ◯ Between 40-45 years

3. Education *

Mark only one oval.

- ◯ Graduate
- ◯ Post Graduate
- ◯ Doctorate
- ◯ Other:

4. No of Years of Clinical Research Experience *

Mark only one oval.

- ◯ 0-4 years
- ◯ 5-9 years
- ◯ 10-14 years
- ◯ 15-19 years

5. Organization Type *

Mark only one oval.

- ◯ Pharmaceutical or Sponsor
- ◯ Clinical Research Organisation or CRO
- ◯ Hospital or Site
- ◯ Other:

6. In which therapeutic area do you primarily operate? (Select all that apply) *

Check all that apply.

- [ ] Oncology
- [ ] Cardiology
- [ ] Neurology
- [ ] Metabolic Diseases
- [ ] Immunology
- [ ] Other: _____

7. Which Phase of Trials are you currently doing? (Select all that apply) *

Check all that apply.

PK PD/ BA BE

- [ ] Phase I
- [ ] Phase II
- [ ] Phase III
- [ ] Phase IV or PMS

8. Title of the Job *

Mark only one oval.

- ◯ Clinical Research Associate (CRA) I/ II
- ◯ CRA III/ Senior CRA/ Lead CRA/ Principal CRA
- ◯ Remote CRA
- ◯ In House/ Centralized CRA

9. Work Setting *

Mark only one oval.

- ◯ Work from Office
- ◯ Work from Home
- ◯ Hybrid

10. I receive incompatible requests from two or more people *

Mark only one oval.

- ◯ Strongly Disagree
- ◯ Disagree
- ◯ Neutral
- ◯ Agree
- ◯ Strongly Agree

11. I receive an assignment without adequate resources and materials to execute it *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

12. I work on unnecessary things *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

13. I feel emotionally drained from my work *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

14. I feel frustrated by my job *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

15. I feel tired when I get up in the morning and have to face another day on the job *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

16. My job requires working very fast *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

17. I feel burned out from my work *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

18. I have to work extra hard to finish my work *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

19. I do not feel appreciated for the work I do *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

20. My supervisor shows very little concern for me *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

21. I don't feel my efforts are rewarded the way they should be *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

22. I sometimes feel my job is meaningless *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

23. I have too much work to do *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

24. I have significant autonomy in determining how I do my job *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

25. I know what my responsibilities are *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

26. I have clear planned goals and objectives for my job *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

27. I have the freedom to make decisions in my work *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

28. I know exactly what is expected of me at work *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

29. My job provides me with the independence to carry out tasks *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

30. All my talents and skills are used in this job *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

31. I feel good about my job *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

32. I feel good about working at this company *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

33. I feel close to the people at work. *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

34. My supervisor really cares about my opinions *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

35. My supervisor strongly considers my goals and values *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

36. My supervisor really cares about my well being *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

37. I like doing the things I do at work *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

38. I feel a sense of pride in doing my job *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

39. When I do a job, I receive the recognition for it that I should receive

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly agree

40. I am energetic in my job *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

41. I am interested in my job *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

42. I try my hardest to perform well on my job *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

43. At work my mind is focussed on my job *

Mark only one oval.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

APPENDIX E

INTERVIEW QUESTIONNAIRE

1. EMOTIONAL EXHAUSTION (EE)

Q1: Can you describe any recent experiences that left you emotionally drained?

Q2: What aspects of your job contribute most to that emotional exhaustion?

OR What job situations make you feel emotionally drained?

OR What causes emotional exhaustion in your job?

2. JOB ENGAGEMENT (JE)

Q1. Do you find yourself engaged in your job? What do you think is engaging about your job. If not, what do you think is missing?

Q2. How does emotional exhaustion affect your engagement?

3. JOB SATISFACTION (JS)

Q1. How satisfied are you with your job?

Q2. How would you describe your job satisfaction?

Q3. What would increase your job satisfaction?

Q4: Would you say that your emotional exhaustion influences your job satisfaction — and how?

Q5. Would you say that job engagement influences your job satisfaction – and how?

PROBE QUESTIONS (These questions were asked only when the answers for the expected themes were not received from the main theme questions. This was done to avoid bias and to avoid making the interview sessions exhaustive and lengthy)

4. WORKLOAD (WL)

Q1. Can you describe a time when your workload felt overwhelming?

Q2. How does your current workload affect your mental or emotional energy?

Q3. How does your workload influence your overall job satisfaction?

5. ROLE CONFLICT (RC)

Q1. Do you ever receive conflicting instructions from different supervisors or teams? How does that affect you emotionally?

Q2. How do inconsistencies or contradictions in your role affect your satisfaction?

Q3. Do you feel role clarity would improve your experience at work?

6. ROLE AMBIGUITY (RA)

Q1. Are there aspects of your job that are unclear or not well defined? How does that make you feel?

Q2. Do you ever feel stressed or exhausted due to not knowing what is expected of you?

Q3. How does role clarity or ambiguity influence your overall job satisfaction?

Q4. Would more defined responsibilities increase your satisfaction with your job?

7. SUPERVISOR SUPPORT (SS)

Q1. When you're under stress, how supportive are your supervisors?

Q2. Do you feel more involved or enthusiastic about your work when your supervisor is supportive?

Q3. How important is your supervisor's support in how satisfied you feel in your job?

8. JOB AUTONOMY (JA)

Q1. How does having autonomy influence your engagement in work tasks?

Q2. Are you more motivated when you have the freedom to make decisions?

Q3. How would your satisfaction change if your autonomy was increased or decreased?

9. NATURE OF WORK (NW)

Q1. How meaningful do you find your work? Does this affect your level of engagement?

Q2. Do you feel proud or fulfilled by the kind of work you do?

Q3. How much does the content or nature of your work contribute to your satisfaction?

10. CONTINGENT REWARDS (CR)

Q1. Does receiving timely and fair rewards or recognition increase your engagement?

Q2. Have you ever felt disengaged because your efforts were not acknowledged?

Q3. How satisfied are you with the reward and recognition system in your organization?

APPENDIX F

LIST OF ABBREVIATIONS

CRA – Clinical Research Associate

JD-R – Job Demands–Resources

EE – Emotional Exhaustion

JE – Job Engagement

JS – Job Satisfaction

RA – Role Ambiguity

RC – Role Conflict

WL – Workload

SS – Supervisor Support

JA – Job Autonomy

CR – Contingent Rewards

NW – Nature of Work

PLS-SEM – Partial Least Squares Structural Equation Modeling

AVE – Average Variance Extracted

R^2 – Coefficient of Determination

IRB – Institutional Review Board

SD – Standard Deviation

APPENDIX G

GLOSSARY

Burnout: A state of emotional, physical, and mental exhaustion caused by prolonged exposure to stressors, especially in high-demand roles such as those in clinical research. In this study, emotional exhaustion represents the core component of burnout.

Clinical Research Associate (CRA): A professional responsible for monitoring and managing clinical trials, ensuring compliance with regulatory requirements, protocols, and Good Clinical Practice (GCP) guidelines.

Contingent Rewards (CR): Recognition or compensation provided in response to job performance. In this study, it measures the perceived fairness, transparency, and consistency of rewards in the organization.

Construct: An abstract concept measured through multiple indicators or survey items, such as job engagement or supervisor support, often analyzed through latent variables in SEM.

Cross Loadings: A diagnostic tool in the measurement model that helps evaluate discriminant validity by showing how well each indicator loads on its intended construct versus others.

Discriminant Validity: The extent to which a construct is distinct from other constructs in the model. Assessed using tools like the Fornell–Larcker criterion, HTMT ratio, and cross loadings.

Emotional Exhaustion (EE): A feeling of being emotionally drained and fatigued due to work-related stressors. In this research, it is a dependent variable influenced by job demands.

Fornell–Larcker Criterion: A test of discriminant validity that compares the square root of AVE for each construct with its correlations with other constructs. Higher AVE indicates the construct shares more variance with its items than with others.

Job Autonomy (JA): The degree of freedom, independence, and discretion an employee has in scheduling and performing their job tasks.

Job Demands: Aspects of the job that require sustained effort or energy, such as workload, role conflict, and ambiguity. High demands are associated with increased emotional exhaustion.

Job Engagement (JE): A positive, fulfilling state of work-related well-being characterized by vigor, dedication, and absorption. In this study, it serves as a mediating variable between job resources and job satisfaction.

Job Resources (JR): Aspects of the job that help achieve work goals, reduce job demands, or stimulate growth. Examples in this study include supervisor support, autonomy, nature of work, and rewards

Job Satisfaction (JS): An overall evaluation of one's job experience, encompassing emotional responses and attitudes toward the work environment, responsibilities, and relationships.

Latent Construct: An unobserved variable inferred from observed variables (indicators) in SEM. Constructs like emotional exhaustion or engagement are latent and measured indirectly.

Loadings (Factor Loadings): Statistical estimates that indicate how well an item represents the underlying construct. High loadings (>0.7) suggest strong item-construct relationships.

Measurement Model: The portion of a PLS-SEM model that evaluates the reliability and validity of the observed indicators used to measure latent constructs.

Nature of Work (NW): The extent to which the tasks and responsibilities of a role are perceived as meaningful, fulfilling, and aligned with one's values and purpose.

Path Coefficient (β): A standardized regression weight that indicates the strength and direction of the relationship between constructs in the structural model.

PLS-SEM (Partial Least Squares Structural Equation Modeling): A statistical technique used to estimate complex cause-effect models involving latent variables, particularly suitable for exploratory and predictive research.

Role Ambiguity (RA): A job demand that arises when an employee lacks clarity about expectations, responsibilities, or procedures in their role.

Role Conflict (RC): A type of job demand resulting from incompatible or contradictory job expectations from different sources (e.g., managers, departments).

R^2 (R-squared): Indicates the amount of variance in the dependent variable explained by the independent variables. Higher values imply better model fit.

Specific Indirect Effects: The effect of one construct on another that occurs through a mediating variable (e.g., CR → JE → JS). These are used to test mediation hypotheses.

Structural Model: The part of SEM that assesses the relationships among latent constructs, used to test hypotheses and theory-driven paths.

Supervisor Support (SS): The extent to which employees perceive their supervisor as empathetic, accessible, and supportive in both professional and emotional domains.

Variance Inflation Factor (VIF): A statistic used to detect multicollinearity among predictor variables in the structural model. VIF values below 3.3 suggest no collinearity issues.

Workload (WL): The perception of excessive demands in terms of time pressure, volume of tasks, or cognitive effort required.

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APPENDIX A:

FIRST APPENDIX TITLE [USE “CHAPTER TITLE” STYLE]

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