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Engagement and Safety: The Key to Healthier Outcomes in the Healthcare Workforce

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Abstract
The study examined the effect of occupational health risk perceptions (OHRP) on employees' outcomes in the healthcare industry with the mediating role of work engagement and moderating role of safety culture. Using the Job-Demand Resource Model, this study has established a unique association of health risks with work outcomes. A total of 309 healthcare professionals of twin cities of Rawalpindi and Islamabad of Pakistan had completed the survey questionnaires using convenience sampling technique. Data were analyzed by using PLS-SEM technique done through SMART PLS-4 software. The results revealed that work engagement has positive impact on job satisfaction and organizational commitment and work engagement partially mediates the relationship of occupational health risk perceptions and employees' organizational commitment and job satisfaction. The study further disclosed that safety culture moderated and buffered between OHRP and employee outcomes. The findings of the study provides valuable insights into the complex relationships between occupational health risk perception, work engagement, safety culture, organizational commitment, and job satisfaction in healthcare sector.These findings of this study can inform the development of interventions and policies aimed at promoting employee well-being, satisfaction, and organizational outcomes. A structured safety management program can help to enhance safety culture to meet legal and moral obligation of a health care provider.
Keywords: Occupational Health Safety, Risk Perception, Safety Culture, Organization Commitment, Employee Engagement.

Introduction

Global statistics show that work related accidents or ailments cause death of nearly 2.34 million people annually around the world; out of which one-quarter of the deaths are related to hazardous working environment (Chartres *et al.* 2019). Over 200 million employees globally, are exposed to a range of occupational hazards while around 16 million employees engaged in 30 different types of jobs reported to have work in toxic and harmful organizations (Shafiei et al. 2019). These metrics have grabbed the attention of practitioners and

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Vol. 2 No. 4 (November) (2024)

researchers from broader fields of medical science, industrial and organizational psychology and human resource management. Researchers have explored the outcomes and antecedents of occupational health risks for the employees as well as the mechanisms that may foster or buffer the effects of occupational health risks on work outcomes psychological and general wellbeing of employees (Harrison and Dawson 2016; Liu et al. 2021; Shan et al. 2022). A wide variety of firms have been the context of these studies such as agriculture, health, education, banking and communication services and the hospitality sectors (Mehmood *et al.* 2021).

Occupational health risk or safety hazards refers to exposure of employees to harmful conditions, processes, materials and environment causing mental or physical health problems at their workplace (Shan *et al.* 2022). It can involve exposure of employees to harmful chemicals in production plants, unsafe working environment in a construction project, unhygienic food processing plant or hazardous healthcare workplace (Nguyen and Vu 2023). Studies suggest that occupational health risk perception may result in higher level of stress and reduced organizational commitment and lower level employees' job satisfaction (Godovykh *et al.* 2021). This long held stress caused by occupational health risk perception may negatively affect the work engagement of the employees (Liu *et al.* 2021). Based upon these complexities of OHRP, organizations were then mandated to create and implement safety policies to protect their workforce. In response to these policy directions, organizational development managers began formulating employee safety policies in various types of organizations, as highlighted by Shan *et al.* (2022).

To cater to the detrimental effects of occupational health risk perception on the productivity of the employees, the international community has devised policy guidelines on employees' safety at the workplace (Wolffe *et al.,* 2023). Given the global commitments and policy guidelines, literature examined the adverse impacts of perceived workplace-related health risks on individual and organizational level outcomes (Shan *et al.* 2022; Liu *et al.* 2021 and Elewa and Banan 2016). Under this context of safety as a concern, job outcomes can be affected. Employees' commitment is the bond that employees experience with their organization (Nijhof *et al.* 1998), whereas, satisfaction with the job refers to employees' level of contentment either permanently or in a contractual setting (Thatcher *et al.* 2002). Researchers and practitioners have been examining the factors that amplify these positive work outcomes and buffer the negative work outcomes of employees in the organization (Grant and Parker 2019; Probst and Estrada 2022).

One of these negative factors are health risks perception and proved detrimental factor to the productivity of the organization as well as the positive work outcomes of its members (Smith *et al.* 2018). Similarly, buffering and fostering mechanisms of this relationship, particularly in the perspective of the job demands-resources model (Bakkar *et al.* 2016), lack empirical evidence. This induces a need to examine how occupational health risk perception drains job resources which in turn may result in negative work outcomes at the workplace. The majority of the studies used contexts such as the construction sector (Liu *et al.* 2021), power generation, oil and gas (Guzman, *et al.* 2022), and chemical production (Swaminathan 2011). These studies examined the antecedents and outcomes of occupational health risk perception in specific businesses. However,

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DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 2 No. 4 (November) (2024)

studies on occupational health risk perception of healthcare employees lack the attention of the researchers in the health sector particularly (Szilvassy and Širok 2022). The job demands-resources model suggests that continuous job demands trigger health impairments and drain job resources (satisfaction and commitment). Based on the assumptions of the job demands-resources model, it is assumed that occupational health risk perceptions may reduce employees' engagement which in turn negatively affects work outcomes such as job satisfaction and employees' commitment.

These dynamics cannot prevail in isolation, organizations do have environment in which these phenomena occur. In this scenario of concern of safety, the safety culture developed by the organization may buffer this negative effect of occupational health risk perceptions on work outcomes. In this way, the adoption of safety measures as the perceived culture of the organization may tend to reduce the effect of risk perceptions and conserve employee outcomes. This study tested assumptions of the job demands-resources model in the healthcare sector in the twin cities of Rawalpindi and Islamabad. First, it intends to examine the impact of perceived related workplace-related health risks on work outcomes through employees' engagement. Secondly, it examined the moderating effect of safety culture in the relationship between perceived workplace-related health risks and work outcomes through employees' engagement in the healthcare sector. In the Asian context particularly as Pakistan, studies disclosed significant relations between healthcare workers' context safety concerns and their job outcomes. Abbas, Rafique, and Asam (2023) argued that needle stick injuries are a broader risk factor associated with employee behaviors for safety management.

Theoretical background

Occupation Health Risk Perceptions (OHRP)

Occupational health risks refer to the potential dangers or hazards that employees may face in their work environment, such as exposure to toxic substances, noise, physical strain, ergonomic issues, and psychological stress (Shan, *et al.* 2022). Factors such as the availability and adequacy of personal protective equipment (PPE), workplace policies and procedures related to infection control and safety, support from supervisors and colleagues, and overall organizational culture and climate for occupational health and safety shape these perceptions (Clarke and Perko 2017). Individual's personal characteristics also influence OHRP. Dealing with infectious diseases or workplace accidents that triggers emotional responses can shape perceptions of occupational health risks (Alrawad *et al* 2022; Leppin *et al* 2013). Besides this, social factors such as social norms, peer interactions, and social support triggers perceptions on health risk. The healthcare worker may perceive that their colleagues or superiors do not prioritize or comply with occupational health and safety measures and so develop risk perceptions (Nguyen and Vu 2023).

Research on the OHRP has witnessed various outcomes in work settings, these are either related to individual psychological aspects as well as behaviors. Perceiving occupational health risks can influence an individual's health behaviors (Arefi *et al.* 2022). OHRP also determines attitudes such as low job satisfaction (Shan *et al.,* 2022) in individuals, their motivation and also leads to turnover intention and seeking for other careers to get rid of this discomfort (Burton et al. 2017). This pattern of individuals, if aggregated can result in

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DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 2 No. 4 (November) (2024)

increased absenteeism, decreased productivity (Mayer *et al.*,2022), increased workers' compensation claims, and potentially negative impacts on the overall performance and reputation of the organization (Grazzini *et al.* 2022).

OHRP and Employee Outcomes

Since occupational health risk refers to the exposure of employees to a harmful conditions, processes, materials and environments causing mental or physical health problems at their workplace (Shan *et al.* 2022) thus studies suggest that it is detrimental to the organizational as well as individual level outcomes such as job satisfaction (Yan *et al.* 2021) and employees' outcomes (Geisler *et al.* 2019). A review of available literature on perceived workplace-related health risks suggests that expert knowledge, probability of harm, and severity of risk are major risk perceptions of the healthcare workforce (Portell *et al.* 2014). Among these, healthcare workers are the most prone employees to occupational health risks and hazards (Elewa and Banan 2016). They may experience physical or psychological risk from surgical instruments, chemical reactions, medical processes or even violent attacks of the patients in some cases under their cure. A hazardous working environment at healthcare organizations may result in negative work outcomes such as job stress and anxiety (Amponsah-Tawiah and Mensah 2016). It is believed that, when employees feel low job satisfaction, they are unwilling to accept the organization's goals and values, and may even consider leaving the organization (Bakker and Demerouti 2006). Satisfaction with the job is adversely affected by an unhygienic and insecure work environment (Alsubaie et al. 2019; Thoresen *et al.* 2003). The literature manifests the negative nature of OHRP for employee outcomes .Based upon this evidence, the study intends to draw the given relationship between OHRP and job satisfaction and employee commitment to their jobs in the healthcare sector of Pakistan:

H1. Occupational health risk perception has a negative effect on job satisfaction of employees.

H2. Occupational health risk perception has a negative effect on the organizational commitment of employees.

OHRP and Employee Engagement

Employees' work engagement refers to a positive state of mind that encompasses devotion, vigor and enthusiasm (Schaufeli *et al.* 2006). Studies suggest that employees' engagement is predictor of employees' work outcomes (Rai and Maheshwari 2020). Work engagement refers to the psychological state in which employees are fully absorbed, enthusiastic, and dedicated to their work tasks (Shuck and Wollard 2010). Several factors have been identified as antecedents of employees' job engagement and work satisfaction. These factors can be categorized into individual-level, job-level, and organizational-level factors. The impacts of OHRP on employee outcomes reach by passing hidden psychological mechanisms in employees. OHRP is detrimental to positive organizational dynamics as well as individual work outcomes (Burton *et al.* 2017; Nielsen and Miraglia 2017).

The excess of perceived workplace-related health risks adversely affects employees' engagement (Gyensare *et al.* 2019; Romero-Martín *et al.* 2022). On the other hand, employees who perceive their work as meaningful and

purposeful, despite the potential risks involved (Quick and Tetrick 2003), and their organization is taking appropriate measures to manage and mitigate occupational health risks may perceive their work environment as safe, leading to increased work engagement (Gallagher 2018; Leppin *et al.* 2013). One commonly used framework is the Job Demands-Resources (JD-R) model, which posits that demands of job (such as load of work, pressure of time) and resources of job (discretion and support) affect the engagement of employee (Bakker and Demerouti 2006; Zhang and Liao 2015). Based on the assumptions of JD-R model, it is assumed that OHRP has a negative effect on work engagement.

H3. Occupational health risk perception has negative effect on employees' work engagement.

Employees' Engagement and Work Outcomes

Individual characteristics such as personality, motivation, and self-efficacy have been found to be positively associated with work engagement and job satisfaction. For example, employees with high levels of extraversion, conscientiousness, and positive affect are more likely to be engaged at work and satisfied with their jobs (Dedahanov and Khandan 2021). Various job-related factors influence engagement of employees with work and satisfaction with job. These include the nature of the job, task characteristics as well as design of the job, leadership style, organizational culture, and social support also play a vital role in shaping employees' work engagement and satisfaction with job. Job Demands-Resources (JD-R) Model has been widely used to study the relationship of work engagement and job satisfaction. According to job demand resource framework, characteristics of a job can be categorized as (i) job demand, and (ii) job resource. Job resources on the other hand help a worker to cope with the strain of job and reduce it through social support and opportunities of personal development and growth. JD-R suggests that as a result of equilibrium between job demands and resources employees are engaged to work. When the workers are realized that their resources are more than their job demands, their engagement is increased and their satisfaction with job is heightened. JD-R model offers a theoretical underpinning in understanding the association between work engagement and organizational commitment. This model suggests that work engagement is affected by equilibrium between job demands and resources i.e. organizational commitment as a positive resource affects the engagement of employees at workplace (Bakker and Demerouti 2006). Hence it can be assumed that:

H4. Employees' Work Engagement has positive effect on job satisfaction of employees.

H5. Employees' Engagement has positive effect on organizational commitment of employees.

Mediating Role of Employees' Engagement

When employees feel engaged and involved in addressing the health risks in their workplace, it can positively influence their overall job satisfaction (Gyensare *et al.* 2019). Engaged employees tend to have a higher level of job satisfaction as they feel more connected, empowered, and fulfilled in their work. They may also perceive their organization as caring and supportive, which can further

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DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 2 No. 4 (November) (2024)

contribute to their job satisfaction (Chen *et al.* 2001).The JD-R model proposes that job demands (such as health risks in the workplace) and job resources (such as engagement) impact employees' well-being and job outcomes (Bakker and Demerouti 2008). Employee engagement can be considered a job resource that can buffer the negative impact of health risks by providing employees with the psychological, social, and cognitive resources needed to cope with and mitigate those risks In other words, work engagement may explain how occupational health risk perception influences organizational commitment (Gyensare *et al.* 2019) This increased work engagement may then lead to higher organizational commitment(Salanova, et al., 2008)., as employees may feel more motivated, satisfied, and connected to an organization that values their well-being. Work engagement can thus act as a mediating variable that helps in explaining the association of organizational and employees' OC. Based on the findings of these studies as well as assumptions of job demands-resources model, it is hypothesized that

H6. Employees' work engagement mediates the relationship of occupational health risk perception and employees' job satisfaction.

H7. Employees' work engagement mediates the relationship of occupational health risk perception and organizational commitment of employees.

Moderating Role of Safety Culture

The presence of occupational safety guidelines may help reduce occupational health risks, thereby fostering employees' work engagement (Phillips 2008). Hence, increased work engagement fosters job satisfaction and promotes organizational commitment (Helliwell and Putnam 2004). The safety culture developed by the organization may amplify the mediated effect of employees' work engagement in occupational health risks and work outcomes relationship (Zhang and Liao 2015). In organizations with a strong safety culture, employees are likely to perceive that their organization is committed to providing a safe work environment and that their health risks are minimized through effective safety practices (Dedahanov and Khandan 2019). This perception may lead to increased organizational commitment (Elsawah *et al.* 2018).

On the other hand, in organizations with a weak or negative safety culture, employees may perceive that their organization does not prioritize safety or adequately address health risks in the workplace and they perceive the as organization not prioritizing their safety (Khandan *et al.* 2017). Therefore, safety culture can act as a moderating variable that influences the perceived workplace-related risks of health, WE, and OC relationship (Probst and Brubaker 2021). Without adequate safety resources and support, employees may feel vulnerable to health risks and perceive their organization as not prioritizing their safety which may lead to a reduced commitment to the organization (Dedahanov and Khandan 2021; Elsawah and Kazi 2018). Research has shown that safety culture can act as a moderating factor in the relationship between occupational health risk perception and employees' job satisfaction (Dedahanov and Khandan 2021; Elsawah and Kazi 2018).

H8. Safety Culture moderates the effect of occupational health risk perception on organizational commitment such that effect decreases when safety culture is high.

H9. Safety Culture moderates the effect of occupational health risk perception on

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www.journalforeducationalresearch.online

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DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 2 No. 4 (November) (2024)

job satisfaction such that the effect decreases when safety culture is high.

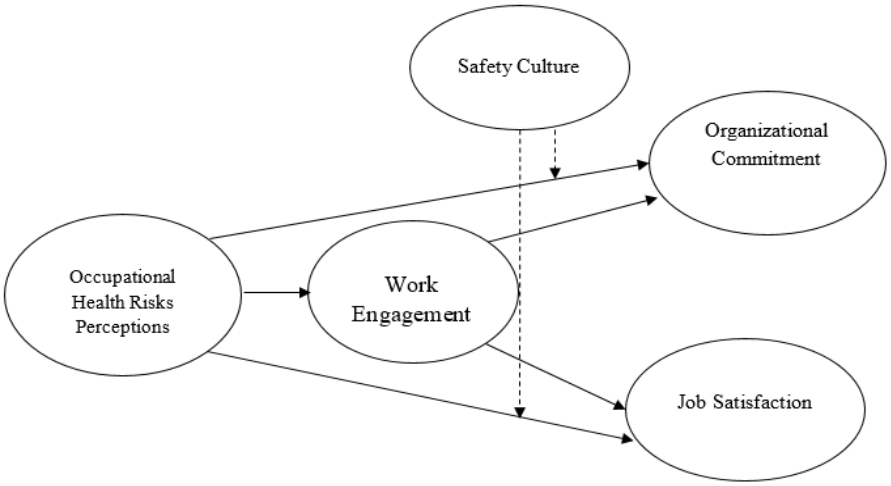

Figure 1 Research model

Methodology

Sample and procedure

The participants of the study included healthcare professionals including doctors, nurses, paramedical staff, and pharmacists working at healthcare centers in the twin cities of Rawalpindi and Islamabad Pakistan. The sampling technique is a non-probability convenience sample. Which is cost-effective and best suited for cross-sectional studies with unknown populations (Matsumoto and van de Vijver 2012). The sample size has been calculated using the rule of 10 employed by Bentler and Chou (1987). They suggested that for an unknown population, 10 observations per estimated parameter may be selected. Thus, in this case, there are 40 items (observations) of the combined questionnaire. Hence, a total of 400 (10×40) healthcare professionals participated in the study.

Measurements and instruments

A survey questionnaire is used to measure the demographic and main variables of the study. Responses of the respondents were anchored on a five-point rating scale ranging from Strongly Agree=5 to Strongly Disagree=1. Occupation health risk perception was measured using 7 items Liu et al. (2021). Job satisfaction was measured by using the 5-item scale of Janssen (2001). Organizational commitment was measured by the 8-item scale of Meyer et al. (1993). Work engagement was measured using Schaufeli et al. (2006) 17-item scale. Safety culture is measured using 9 9-item scale of Cox and Cheyne (2000).

Demographics of the Respondents

A total of 309 respondents completed the survey questionnaires. Out of 309 respondents, 163 were male respondents while 146 respondents were female respondents. This shows that no significant difference regarding the gender of the respondents. The 194 respondents had ages between 20-30 years, 70 had an age between 31-40 years, 30 respondents were from the age group of 41-50 years and 10 of them had ages between 51-60 years. Only 5 respondents have aged more than 60 years. Results depict that most of the respondents were young

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DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 2 No. 4 (November) (2024)

whose ages ranged from 20 years to 40 years. 64 respondents were medical officers, 107 respondents were nurses and 138 respondents were paramedical staff.

3.4 Data Analyses

Data were analyzed using SPSS Version 27 and SMART PLS-4 by applying descriptive and inferential statistics. At the initial stage, data were computed in SPSS. Later, the researchers made descriptive analyses that included mean scores, outlier analysis, missing value analysis and factor analysis, and reliability of the scales. The inferential analysis includes model fitness, correlation, and regression analysis.

Results

Measurement model results

According to Fornell and Larcker (1981), a minimum threshold of factor item loadings is 0.5, average variance extracted (AVE) is 0.50, composite reliability (CR) is greater than 0.60, construct reliability is greater than 0.70 and Cronbach alpha is greater than 0.6. According to the results, the factor loadings of all items are 0.6 and above as per the minimum threshold. Convergent validity and factor loadings of each variable item are indicated in Table 1. All other items have loadings above 0.6. Hence, no item was dropped following Fornell and Larcker (1981) rule. The values of Cronbach alpha, construct reliability, composite reliability, and AVE meeting the threshold are given in Table 1.

Table 1. Measurement model: loadings, construct reliability and convergent validity

Constructs	Items	Outer Loadings	Cronbach's Alpha	CR	AVE
Perceived workplace-related health risks (07×items)	OHRP1	0.912	0.977	0.981	0.882
	OHRP2	0.954			
	OHRP3	0.975			
	OHRP4	0.888			
	OHRP5	0.946			
	OHRP6	0.948			
	OHRP7	0.946			
Job Satisfaction (05×items)	JS1	0.954	0.937	0.954	0.805
	JS2	0.96			
	JS3	0.849			
	JS4	0.747			
	JS5	0.958			
Organizational Commitment (08×items)	OC1	0.953	0.978	0.982	0.869
	OC2	0.95			
	OC3	0.973			
	OC4	0.904			
	OC5	0.938			
	OC6	0.922			

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www.journalforeducationalresearch.online

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ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 2 No. 4 (November) (2024)

	OC7	0.903			
	OC8	0.915			
Safety Culture (09×items)	SC1	0.819	0.968	0.972	0.796
	SC2	0.882			
	SC3	0.854			
	SC4	0.9			
	SC5	0.936			
	SC6	0.839			
	SC7	0.906			
	SC8	0.949			
	SC9	0.937			
Work Engagement (17×items)	WE1	0.959	0.992	0.993	0.887
	WE2	0.944			
	WE3	0.976			
	WE4	0.963			
	WE5	0.964			
	WE6	0.942			
	WE7	0.973			
	WE8	0.912			
	WE9	0.917			
	WE10	0.942			
	WE11	0.965			
	WE12	0.945			
	WE13	0.942			
	WE14	0.938			
	WE15	0.981			
	WE16	0.873			
	WE17	0.868			

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization
Rotation Converged in 5 Iterations
Note(s): *CR= composite reliability (Dillon–Goldstein index); and AVE=average variance extracted. *p < 0.05, **p < 0.01, ***p < 0.001*

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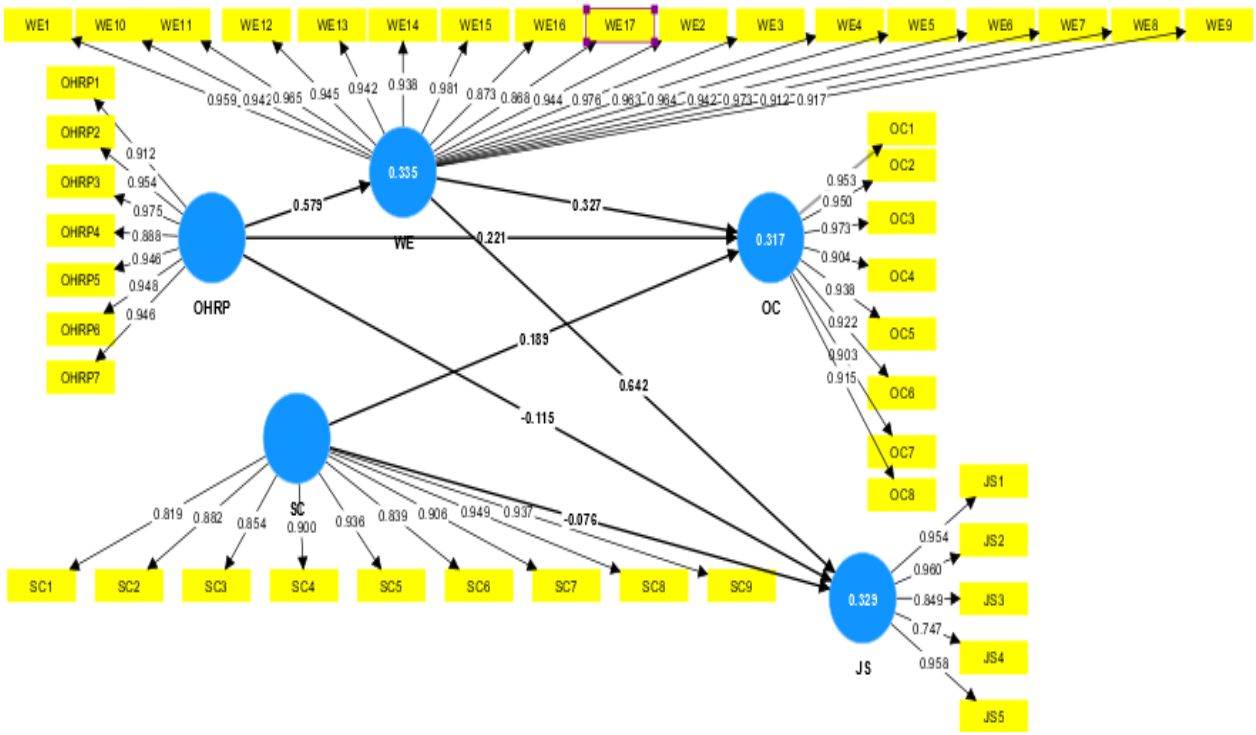
DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 2 No. 4 (November) (2024)



Discriminant Validity

Discriminant validity analysis was made to ensure that all the items were different from one another through the Fornell and Larcker criterion and HTMT ratio. Table 2depicts the result of the Fornell and Larcker criterion showing that all the diagonal values are greater than the non-diagonal values. It suggests that the discriminant validity of research variables satisfies the Fornell and Larcker criteria.

Table 2. Measurement model: discriminant validity

Fornell and Larcker Criterion	JS	OC	OHRP	SC	WE
JS	0.897				
OC	0.267	0.932			
OHRP	0.241	0.448	0.939		
SC	0.034	0.301	0.202	0.892	
WE	0.56	0.493	0.579	0.207	0.942

Abbreviations: OHRP = Occupation Health Risk Perception; JS = Job Satisfaction; OC = Organizational Commitment; WE = Work Engagement; SC= Safety Culture

Descriptive Statistics

The researcher performed descriptive analysis using SPSS Version 27 that included mean scores and standard deviations of all the variables understudy. The variables included gender, age, designation, perceived workplace-related health risks, work engagement, JS, OC, and safety culture. Table 3 suggests a normal distribution of the data. Further, it also depicts higher reliability of the

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ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 2 No. 4 (November) (2024)

data.

Table 3. Descriptive Analysis

	Mean	Std. Deviation
OHRP	4.1479	.76476
OC	4.1727	1.13387
JS	4.0388	1.01293
SC	2.6810	1.32922
WE	4.2315	.74809

Correlation Analysis

A significant negative association between OHRPs and OC was found (r= -0. 443, P<0.05). Contrary to it, there was no vital association among OHRPs and JS (r=0.238, P>0.05), OH RPS and safety culture (r=0.199, P>0.05) as well as perceived workplace-related health risks and work engagement (r=0.075, P>0.05). However, there was a vital positive association between JS and OC (r=0.466**, P<0.05), safety culture, and OC (r=0.596**, P<0.05) as well as OC and WE (r=0.493**, P<0.05). Moreover, there was a vital positive association between JS and safety culture (r=0.603**, P<0.05) as well as JS and WE (r=0.560**, P<0.05). Finally, a significant positive association between safety culture and WE was found from the results of the study (r=0.504**, P<0.05).

Direct Effects using PLS-SEM

The results of PLS-SEM for the hypothesis of occupational health risk hurts the job satisfaction of employees (β=-0.238**, P<0.05). The results also confirm the hypothesis 1 and 2 of the study stating that occupational health risk hurts organizational commitment (β=-0.443**, P<0.05). However, results couldn't confirm the 3rd hypothesis stating occupational health risk hurts work engagement (β=0.075, P>0.05). Further, the results confirm hypotheses 4 and 5 of the study stating that work engagement has a positive effect on organizational commitment (β=0.560**, P<0.05) and job satisfaction (β=0.493**, P<0.05).

Table 4. Direct Effects

Relationship	B	SE	T-Value	P-Value
OHRP→JS	-0.238**	0.073	4.297	.0000
OHRP→OC	-0.443**	0.076	8.666	.0000
OHRP→WE	0.075	0.046	12.312	.0600
WE→OC	0.560**	0.064	11.846	.0000
WE→JS	0.493**	0.075	9.924	.0000

Mediation Analysis

Mediation analysis was performed to examine the mediating effect of work engagement in perceived workplace-related health risks and job satisfaction relationships. The results of mediated regression analysis show a partial mediation as both the direct (β=-16.59, P<0.05) and mediated indirect effects (β=0.4813, P<0.05) were significant. The bootstrapping structural model of mediation regression analysis presented at table 5 confirms the hypothesis 6 of

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www.journalforeducationalresearch.online

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DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 2 No. 4 (November) (2024)

the study.

Table 5. Mediation Analysis of WE between OHRP and JS

Variable's Relationship	B	T	P
OHRP to Mediator			
OHRP →WE	0.5624	12.31	0.000
Direct effect of the mediator on JS			
WE→JS	0.8558	11.0042	0.000
OHRP effect on JS			
OHRP →JS	-16.59	-2.1803	0.030
	B	CI lower	CI upper
Indirect effect of OHRP on JS via mediator (bootstrap results) WE	0.4813	0.3341	0.6291

The results of mediated regression analysis show a partial mediation as both the direct (β=-0.3544, P<0.05) and mediated indirect effects (β=0.3030, P<0.05) were significant. The bootstrapping structural model of mediation regression analysis presented at Table 6 confirms hypothesis 7 of the study.

Table 6. Mediation Analysis of WE between OHRP and OC

Variable's Relationship	B	T	P
OHRP to Mediator			
OHRP→WE	0.5624	12.31	0.000
Direct effect of the mediator on OC			
WE→OC	0.5387	5.9997	0.000
OHRP effect on OC			
OHRP →OC	-0.3544	4.0346	0.001
	B	CI lower	CI upper
Indirect effect of OHRP on OC via mediator (bootstrap results) WE	0.3030	0.1815	0.5272

Moderation Analysis

Results revealed that SC moderates the adverse impact of OHRPs on employees' satisfaction with their job (β=-0.3020, P<0.05). Further, it is clear that impact of OHRPs on JS was high when safety culture was low (-0.5010, P<0.05) whereas this effect was low when safety culture was high (-0.3018, P<0.05) as shown in table 10 below confirming hypothesis 8 of the study.

Table 7 . Moderating effect of SC in OHRP and JS relationship

Direct Relationship	β	SE	T-Value	P-Value
OHRP→JS	-0.9092	0.1574	-5.7774	.0000
SC →JS	1.2590	0.3044	4.1357	.0000
OHRP * SC→JS	-0.3020	0.0715	- 4.2236	.0000
Probing Moderated Indirect Relationship	β	SE	Confidence Interval Low/High	P-Value

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ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 2 No. 4 (November) (2024)

Low SC	-0.5010	0.0846	0.3344/0.6674	.0000
High SC	-0.3018	0.1644	0.2108 /0.6253	.0000

OHRP= Occupational Health Risk Perception, SC= Safety Culture, JS= Job Satisfaction

Results revealed that SC moderates the adverse impact of OHRPs on OC (β=-0.3448, P<0.05). Further, the impact of OHRPs on OC was high when the safety culture was low (β=-0.7997, P<0.05) whereas this effect was low when the safety culture was high (β=-0.1169, P<0.05) as shown in table 8 below. This confirms hypothesis 9 of the study.

Table 8. The moderating effect of SC in OHRP and OC relationship

Direct Relationship	β	SE	T-Value	P-Value
OHRP→OC	-1.2657	0.1567	-8.0798	.0000
SC→OC	1.6380	0.3030	5.4054	.0000
OHRP * SC→OC	-0.3448	0.0712	- 4.8444	.0000
Probing Moderated Indirect Relationship	β	SE	Confidence Interval Low/High	P-Value
Low SC	-0.7997	0.0843	0.6339/0.9655	.0000
High SC	-0.1169	0.1637	0.2053/0.4390	.0000

OHRP= Occupational Health Risk Perception, SC= Safety Culture, OC=Organizational Commitment

Discussion and Conclusion

The findings of this research are similar to the findings of the studies of Shan et al. (2022), Shafiei *et al.* (2019), Kuo, *et al.* (2014), and Portell *et al.* (2014). This result is consistent with these studies because these studies have conducted in healthcare sector of Saudi Arabia, Iran, Ghana, Spain and Taiwan. The study depicted that perceived workplace related health risks do not predict work engagement of employees. However, findings of the studies of Nguyen and Vu (2023), Romero-Martín *et al.* (2022), Gyensare *et al.* (2019), Burton *et al.* (2017) and Mimura and Griffiths (2017) are contradictory to the current study. These studies reported that perceived workplace related health risks negatively affect the work engagement of employees. But the study of Mimura and Griffiths (2017) reported similar findings. Romero-Martín *et al.* (2022) conducted in healthcare sector of Spain are of vital significance.

The outcomes of this study are similar to the results of the studies of Romero-Martín et al. (2022) and Alsubaie *et al.* (2019). Similar to this, work engagement has a partial mediating effect in association between perceived workplace related health risks and employees' OC. It suggests how engagement may help explain how association of OHRPs and employees' OC. Findings of this research are similar to the results reported by Rameshkumar (2020), Song and Li (2020) and Alsubaie *et al.* (2019). These studies suggest that employees' engagement to their work acts as a mediator between the associations of work-related perceived risk and employees' commitment to the organization. In view of the findings of the

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current study, assumptions of Job Demand Resource (JD-R model) model as well as the findings of the studies of Namian *et al.* (2021), Oliveira et al. (2021), it may be asserted that safety culture moderates the effect of perceived workplace related health risks on satisfaction of employees with their job such that effect decreases when safety culture is high and vice versa. This further confirms the 9th hypothesis of the study stating safety culture moderates the effect of perceived workplace related health risks and satisfaction of healthcare employees with their job. In a nutshell, promoting job engagement and a positive safety culture are important factors for enhancing employees' well-being, employees' commitment to firm, and work satisfaction. Organizations need to prioritize these factors and develop tailored interventions to promote them, which will not only benefit employees but also improve overall organizational performance.

Implications, Limitations, and Future Studies

The findings suggest that organizations need to prioritize promoting work engagement among employees. Strategies such as providing opportunities for growth and development, making safety the priority, recognition and rewards for high performance, and creating a supportive work environment can help foster employee work engagement. This study highlights the importance of creating and maintaining a positive safety culture in the workplace. A positive safety culture involves creating a shared understanding of the importance of safety, promoting safety communication, providing safety training and resources, and holding individuals accountable for safety violations. Employees of healthcare organizations may be offered training about the need based on job evaluation and importance of globally adopted. When considering risk hazards among nurses in Pakistan, the study of Awan et al., (2017) depicted that these employees were aware of occupational hazards as workers of public sector employees. Another study conducted by Ullah *et al.* (2021), emphasized that workplace safety requirements are vital for the effectiveness and sustainability of healthcare providers. Upon examining tertiary care hospitals in Pakistan, they argued safety concerns require policies to mitigate with employee well-being issues. The same has been endorsed by Kashif *et al.* (2023), that work-related health risks are strategic factors.

Conflict of Interest: There is no conflict of interest for this study.

Ethics statement: This research was conducted in accordance with ethical guidelines, ensuring informed consent from all participants, maintaining confidentiality, and adhering to integrity in reporting findings, while complying with relevant regulations and considering the impact on participants and the community.

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