THE PREVALENCE AND DETERMINANTS OF BURNOUT IN MEDICAL DOCTORS AT PUBLIC HOSPITALS IN GQEBERHA DURING THE COVID-19 PANDEMIC: A CROSS-SECTIONAL STUDY

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DECLARATION

I, Saajida Khan, hereby declare that the work on which this dissertation/thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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Dr. Saajida Khan 09 October 2022

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DEDICATION

To the Almighty, for granting me the health, patience, and resilience to complete this work.

To my late parents, for their care, love and guidance which allowed me to realise my potential.

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ABSTRACT

Introduction: Burnout has been defined as “a syndrome that results from chronic workplace stress” which has been unsuccessfully managed and has previously been documented in doctors. The COVID-19 pandemic has increased the occupational challenges faced by doctors in hospitals, potentially increasing their risk for burnout.

Aim: This study aimed to determine the prevalence and determinants of burnout amongst medical doctors at public hospitals in Gqeberha (South Africa) during the COVID-19 pandemic.

Methods: A cross-sectional study was conducted on 260 doctors employed at three public hospitals in Gqeberha. Participants voluntarily completed self-administered electronic questionnaires: Oldenburg Burnout Inventory, selected subscales of the NIOSH Generic Job Stress Questionnaire, the Connor-Davidson Resilience Scale 10 to assess burnout, job stress and resilience as well as questions related to challenges associated with the COVID-19 pandemic.

Results: The burnout prevalence amongst the study participants was 78%. Most of the participants were female (58%) and young, with 43% in the 20-29 age-group. Medical Interns formed the dominant occupational group (32%) with an average of 2 years of service (IQR = 1-5) and 96% were in full-time employment. Burnout was significantly associated with being a medical intern or community service medical officer (OR=6.72, 1.71-26.40), being in the lowest income band (OR= 10.78, 2.55-45.49) as well as in those using alcohol to manage work-related stress (OR=3.01, 1.12-8.04). Burnout was furthermore significantly associated with experiencing high conflict at work (OR=5.04, 1.92-13.20) and high role ambiguity (OR=4.49,1.98-10.18). Participants with low job satisfaction (OR=27.82, 6.27-123.45), low support at work (OR=9.99, 3.66-27.23), medium job satisfaction (OR= 5.38, 2.65-10.93) and medium support at work (OR=3.39, 1.71-6.73) were also at increased risk of burnout. Medium (OR=0.28, 0.10-0.80) and high resilience (OR=0.08, 0.03-0.25)

were found to be significantly protective against burnout. Factors related to COVID-19 infection and workplace interventions were not significantly associated with burnout.

Conclusion: The prevalence of burnout amongst medical doctors in Gqeberha during the COVID-19 pandemic was high. Factors associated with burnout include conflict at work, role ambiguity and role conflict, job satisfaction, support at work and resilience. Given the strong associations with job stress factors and burnout, the management of burnout and mitigation should focus on interventional measures that are implemented at an organisational level.

ABBREVIATIONS AND ACRONYMS

ICD 11:	International Classification of Diseases
HCWs:	Healthcare workers
SARS CoV-2:	Severe Acute Respiratory Syndrome Coronavirus 2
COVID-19:	Coronavirus disease
PPE:	Personal Protective Equipment
MBI:	Maslach Burnout Inventory
OLBI:	Oldenburg Burnout Inventory
LMICs:	Low- and Middle-income Countries
HICs:	High Income Countries
WHO:	World Health Organisation
MERS:	Middle East Respiratory Syndrome
PTSD:	Post Traumatic Stress Disorder
IPC:	Infection Prevention and Control
LVH:	Livingstone Hospital
PEPH:	Port Elizabeth Provincial Hospital
DNH:	Dora Nginza Hospital
LTH:	Livingstone Tertiary Hospital
NIOSH:	National Institute of Occupational Safety and Health
GJSQ:	Generic Job Stress Questionnaire
CD-RISC-10:	Connor-Davidson Resilience Scale 10
OR:	Odds Ratio
IQR:	Interquartile range
WRS:	Work-Related Stress

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CHAPTER ONE: INTRODUCTION AND LITERATURE REVIEW

1.1 Introduction and background

The 11th Revision of the International Classification of Diseases (ICD11), describes burnout as "an occupational phenomenon" and burnout is defined as a "syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed".[1] Burnout, as described by Freudenberger[2] and further defined by Christina Maslach[3], is according to the ICD11, characterized by three dimensions: "feelings of energy depletion or exhaustion; increased mental distance from one's job or feelings of negativism or cynicism related to one's job; and reduced professional efficacy".[1] Burnout is a syndrome commonly found among individuals working in human service professions and is thought to result from the emotional demands associated with these occupations.[4] Prolonged exposure to occupational stress causes burnout in healthcare workers (HCWs) as well, and medical doctors have been shown to be at increased risk of burnout in comparison to other professionals.[5] Burnout may also be a symptom of organisational functioning.[6] Occupational stressors for burnout may include work overload, poor communication, time pressure, diminished control at work, reduced decision-making authority as well as insufficient rewards.[7] These occupational stressors result from organizational conditions which systematically and incrementally contribute to burnout in a healthcare organization.[7]

The global spread of the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) has posed challenges at all levels of society.[8] SARS-CoV-2, also known as Coronavirus disease (COVID-19), has compelled healthcare systems to rationally utilise resources in their attempt to mitigate the morbidity and mortality from COVID-19.[9] As a result, HCWs on the frontline of the health system have to contend with high workloads and occupational stress, increasing their vulnerability to burnout.[10] While COVID-19 may be novel, the impact of burnout on doctors are considerable and have been well documented in literature.[11] The COVID-19 pandemic has resulted in increasing levels of uncertainty and inadequate support

experienced by doctors in the healthcare system.[11] Nonetheless, doctors persevere to manage these existing obstacles to their health while faced with the unexpected demands of the pandemic.[8]

Due to resource limitations, ongoing staffing constraints and absent leadership, medical doctors in the Eastern Cape Province are faced with daily challenges in the workplace.[11-12] In 2021, the Public Protector investigated allegations of deteriorating conditions within Eastern Cape health facilities, which revealed "systemic deficiencies such as acute staff shortages, inadequate physical infrastructure, shortage of medical equipment or machinery and insufficient supply of other resources like personal protective equipment (PPE), which are necessary to sustain an effective health facility".[13] These systemic deficiencies increase the occupational stress faced by doctors in Eastern Cape public hospitals.[13] However, to date, there have not been any studies regarding the prevalence rates and determinants of burnout amongst doctors in the Eastern Cape Province.

This cross-sectional study aimed to determine the prevalence of burnout in medical doctors at public hospitals in Gqeberha during the COVID-19 pandemic. Another aim of this study was to identify the determinants of burnout. This study assessed the resilience level in public hospital doctors during the pandemic in Gqeberha, with the objective to propose preventative interventions at an organizational level which would successfully reduce burnout amongst medical doctors.

1.2 Literature review

For this study, the literature review focus was on the prevalence as well as the determinants of burnout in medical doctors. A short synopsis of the development of burnout research is provided. This review highlights the prevalence of burnout in doctors globally and locally and explores the individual and occupational factors contributing to burnout in doctors. The review

discusses the COVID-19 related factors precipitating burnout in doctors and describes the consequences of burnout not only to the doctor, but also to the patient, organisation, and society. The review also addresses the preventative interventions required to mitigate burnout in doctors.

1.2.1 Literature search strategy

For this study, a search was conducted on Google Scholar and Pubmed, to identify articles on the prevalence of burnout and the determinants of burnout in medical doctors within the period ranging from 1970-2022. The search used different combinations of the following key words “burnout” AND “medical doctors OR physicians” AND “prevalence”, AND “contributing factors”, AND “interventions” AND “COVID-19” OR “SARS-CoV-2”. The retrieved articles have also been analysed for relevant citations, which then were included in the review. Inclusion criteria were articles published in English with full available text with burnout and doctors/physicians, organizational stress, and COVID-19. Articles not relating to doctors or burnout were excluded. The review focused on determining the burnout prevalence and identifying the factors (individual, occupational and COVID-19 related) contributing to burnout, exploring the consequences of burnout on doctors, patients and health facilities with specific focus on articles dealing with interventions for mitigating burnout in doctors.

1.2.2 Brief overview of the history of burnout research

Burnout research has received much attention for almost fifty decades. While the term burnout has been used colloquially since the 1960’s, Maslach, Schaufeli and Leiter[14] in their influential article have discriminated between the pioneering and empirical phases of burnout research.

In the pioneering phase, a North American psychoanalyst, Herbert Freudenberger[2], initially described burnout during the mid-1970’s. He described the condition as “a state of becoming exhausted by making excessive demands on energy, strength or resources”[2] and further

stated that the “overly dedicated and excessively committed”[15] were most likely to burnout. As a pioneer of the concept, Freudenberger[2,15] linked burnout to specific work environments and organisational contexts. Christina Maslach, a social psychologist, is another preeminent scholar of burnout research globally. While Freudenberger[2,15] chronicled the phenomenon of burnout in volunteers working at his free clinic, Maslach simultaneously and independently, by conducting interviews with human service workers about job stress, discovered that coping strategies influenced professional identity and burnout.[16] Maslach described and focused on burnout as three dimensions, namely: “emotional exhaustion; depersonalisation; and reduced personal accomplishment”.[14] She developed the Maslach Burnout Inventory (MBI), for use by people working in the human services and healthcare.[3,17] The development of the MBI marked a defining moment in burnout research as it allowed for the objective measurement of the syndrome in different professions.[18]

The empirical phase of burnout research from the 1980’s was more quantitative and utilised survey methodology.[18] During the 1980’s, burnout research was also influenced by the field of industrial psychology, which resulted in burnout being regarded as a workplace stress with a focus on job satisfaction and organisational commitment.[18]

In the 1990’s, the burnout concept was extended beyond the human service sectors and the development of the MBI-General Survey allowed for the measurement of burnout within any occupation.[14] As a result, “depersonalisation”, previously specific to human services, was extended to refer to “detachment from work” and renamed ‘cynicism’. So too, “personal accomplishment” was extended and changed to ‘professional efficacy’.[19] During this period, the relationships of the three dimensions of burnout with organisational factors was explored by researchers to develop structural models of burnout in workplaces and to determine the consequences of burnout at work. The 1990’s also saw an expansion of burnout research beyond the borders of North America to Europe and Canada.[16-19]

In the 21st century the basic construct of burnout was bolstered to include the positive state of job engagement.[20] Schaufeli and Bakker[20], proposed that engagement be considered the

opposite of burnout. While burnout was described by the three negative dimensions of exhaustion, cynicism, and reduced professional efficacy,[16-19] engagement was characterised by the positive dimensions of vigour (high energy levels), dedication (enthusiasm), and absorption (being engrossed in work).[20] The 21st century also established an expansion of the burnout theory to different theoretical frameworks. These theoretical frameworks combined individual and organisational (situational) factors by using a Job Demand-Resources model or the Job-Person Fit model. Research by Schaufeli and Bakker[20] confirmed that burnout was predicted by increased work demands and reduced resources at work, as described by the Job Demand-Resources model of Demerouti and Bakker.[21] The Conservation of Resources model by Hobfall and Freedy[22] followed the theory which assumed that burnout resulted from continuous or impending threats to available resources. Maslach and Leiter[23] developed a burnout model that centred around the "degree of match or mismatch between the individual and the organisational environment"[23] namely, the Job-Person fit. They identified the six areas of work-life, "workload, control, rewards, community, fairness and values",[23] that influence workplace experience of burnout or engagement. Maslach and Leiter[23] postulated that a mismatch in any of these six areas would be predictive of burnout while a match of these areas would increase the level of engagement with work. These theoretical frameworks have implications for effective intervention strategies that have been proposed to treat and prevent burnout.[24-25]

Over the decades, many different measures of burnout have evolved, all assessing distinct dimensions of burnout.[23] The Bergen Burnout Inventory assessed three dimensions of burnout (exhaustion, cynicism, and sense of inadequacy at work) while the Oldenburg Burnout Inventory (OLBI) assessed two dimensions, namely, exhaustion and disengagement from work.[23] In contrast, the Shirom-Melamed Burnout Measure and Copenhagen Burnout Inventory, focus only on exhaustion, but differentiate between the physical and psychological aspects of exhaustion.[23]

Over time, burnout steadily expanded from being just a psychological diagnosis to a medical diagnosis as well.[23-25] While Sweden and the Netherlands have shifted to diagnosing burnout as a disorder or disability, many other countries including the United States have not been as eager to recognise burnout as a clinical diagnosis.[17] This lack of official diagnosis of burnout has not only limited access to treatment, but has affected workplace accommodation and disability coverage as well.[23-25]

1.2.3 Burnout in doctors

While an extensive body of literature exists regarding burnout in HCWs globally, the literature reviewed in this study focused on studies mainly involving burnout in doctors. A study by Shanafelt and Noseworthy[26] indicated that at least 50% of United States physicians experienced burnout. Rotenstein et al.,[27] described variable burnout prevalence estimates amongst physicians, ranging from 0% to 80.5%. While burnout in doctors has been well researched in developed countries, there remains a dearth of research in low- and middle-income countries (LMICs) regarding the prevalence of burnout amongst doctors.[28] Table 1 lists the prevalence rates of burnout amongst doctors in LMICs, which range from 5.5% in Nigeria[29] to 93.8% in Syria.[30] The considerable variability in the prevalence of burnout may result from the heterogeneity of methods or tools used to objectively assess burnout in various studies, differing study populations involving various categories of HCWs, and wide-ranging contexts in which the participants live and work.[28] These differences may reflect selection and recall bias, social desirability bias, and a healthy worker effect, which introduces challenges when comparing burnout rates amongst doctors across different countries.[28,31] With the exception of the research conducted by Nwosu et al.[32] which used the OLBI amongst Nigerian physicians, in all other studies reviewed burnout prevalence was measured using the MBI.

Table 1: Prevalence of burnout among doctors in low- and middle-income countries

Author	Publication year	Country	Study Design	Study population (n)	Emotional exhaustion %			Depersonalisation %			Personal Accomplishment %			Burnout % (n)
					Low	Med	High	Low	Med	High	Low	Med	High	
Rossouw[33]	2014	South Africa	Cross-sectional	Doctors working in Cape Town Metropolitan Municipality clinics and district hospitals (132)	22	25	53	13	23	64	26	31	43	76
Van der Walt[34]	2015	South Africa	Cross-sectional	Anaesthetists in public hospital (124)			45.2			50	46			21
				Anaesthetists in private practice (86)			20.9			26.7	37.2			8.1
Sirsawy et al.[35]	2016	South Africa	Cross-sectional	Registrars and medical officers at public healthcare facilities in Bloemfontein (205)	24.9	27.3	47.8	28.3	31.7	40	18.5	43.4	38.1	High degree of burnout found in 15.6% of participants
Talih et al.[36]	2016	Lebanon	Cross-sectional	Residents in an academic medical centre (311)										27%
Malik et al.[37]	2016	Pakistan	Cross-sectional	Surgical residents in public hospitals in Pakistan			50.4			49.6	53.4			57.9

Author	Publication year	Country	Study Design	Study population (n)	Emotional exhaustion %			Depersonalisation %			Personal Accomplishment %			Burnout % (n)
					Low	Med	High	Low	Med	High	Low	Med	High	
Langade et al.[38]	2016	India	Cross-sectional	Medical practitioners across India (482)	22.4	32.8	45.0	8.3	25.7	65.9	87.1	10.8	2.1	High
Liebenberg, Coetzee and Conradie[39]	2018	South Africa	Cross-sectional	Doctors working in district health system in Overberg and Cape Winelands (36)	11	33	56	11	14	75	14	42	44	81
Lrago, Asefa and Yitbarek[40]	2018	Ethiopia	Cross-sectional	Physicians at public hospitals (491)	2.7	32.2	65.1	0.5	14.4	85.1	91	7.2	1.8	High
Rajan and Engelbrecht [41]	2018	South Africa	Cross-sectional	Doctors in public sector Emergency centres in Gauteng (93)	7.5	25.8	66.7	19.3	26.9	53.8	30.1	47.3	22.6	Moderate to high risk
Alhaffar, Abbas and Alhaffar[30]	2019	Syria	Cross-sectional	Residents from different specialities (3550)	6	16.1	77.9	16.1	29.3	54.6	64.5	21.8	13.7	93.8% had high level in one of 3 domains. 19.3% had high levels in all 3 domains
Zeijlemaker[5]	2019	South Africa	Cross-sectional	Registrars in School of medicine at University of Witwatersrand (201)	14.1	19.4	66.5	5.9	19.4	74.7	52.4	25.3	22.4	84

Author	Publication year	Country	Study Design	Study population (n)	Emotional exhaustion %			Depersonalisation %			Personal Accomplishment %			Burnout % (n)
					Low	Med	High	Low	Med	High	Low	Med	High	
Ugwu et al.[29]	2019	Nigeria		Physicians at ICU units (183)										5.5
Abdel hafiz et al.[10]	2020	Egypt	Cross-sectional	Egyptian physicians (220)	49.1	22.7	28.2	42.7	20.5	31.8	4.5	6.4	89.1	36.4
Ali et al.[42]	2020	Malaysia	Cross-sectional	Medical Officers in a Malaysian Tertiary Hospital (255)	51.2	30.8	18	47.2	30.8	22	51.2	30.8	18	25.2
Nwosu et al.[32]	2020	Nigeria	Cross-sectional	Physicians in five tertiary health institutions in Nigeria(535)										75.5
Naidoo, Tomita and Paruk[31]	2020	South Africa	Cross-sectional	Medical doctors at five Kwa-Zulu Natal public sector training hospitals(150)	30	21.3	48.7	32.7	22	45.3	43.3	34.7	22	59
Coetzee and Kluyts[43]	2020	South Africa	Cross-sectional	Anaesthetists in public sector (189)	49	21	49	34	28	38	41	29	30	36.5
				Anaesthetists in Private Sector (309)	61	17	22	62	18	20	28	25	47	14.2
Hain et al.[44]	2021	South Africa	Cross-sectional	Doctors in 15 rural hospitals in KwaZulu-Natal Province (96)	22.5	19.1	58.4	23.6	16.9	59.6	48.3	24.7	27.0	68.5

Author	Publication year	Country	Study Design	Study population (n)	Emotional exhaustion %			Depersonalisation %			Personal Accomplishment %			Burnout % (n)
					Low	Med	High	Low	Med	High	Low	Med	High	
Morar and Marais[45]	2022	South Africa	Cross-sectional	Psychiatric registrars at the University of Witwatersrand (33)	16.1	32.2	51.6	41.9	19.4	38.7	16.1	48.4	35.5	67.8% had scores in high category for any one of three subscales

Prior to the pandemic, Dubale et al.[28] described burnout prevalence rates among HCWs in LMICs as high as 91% in Ethiopia and 95% in Kenya. The prevalence of burnout amongst Egyptian physicians, during the pandemic, was 36.6%.[10] Dugani[46] posited that the variability in burnout prevalence between countries was a result of disparate resources available in health systems of LMICs, compared to high-income countries (HICs). LMICs have limited resources, understaffing, and poor working conditions, which aggravate burnout in these countries. Nevertheless, despite the variability across and within studies, the literature demonstrated that the burnout prevalence in LMICs was high.[28] Interestingly, Morgatini et al.[9] described lower burnout prevalence among HCWs in LMICs and reflected that this may be owing to these HCWs having greater experience of working in adverse conditions with limited resources. Ghahramani et al.[47] noted that this experience led to greater resilience and less burnout in HCWs in LMICs.

In the South African context, a few studies have been conducted on burnout amongst doctors. A national cross-sectional survey conducted in 2003 by Peltzer et al.[48] reported high rates of burnout amongst South African doctors. Sirsawy et al.[35] found a high level of burnout on all three subscales, among 15.6% of doctors working at Bloemfontein public healthcare facilities. Rossouw et al.[33] reported that 76% of medical doctors working at Cape Town community clinics and district hospitals experienced burnout. In comparison to van der Walt et al.[34] who identified burnout in 21% of anaesthetists at the University of Witwatersrand, Coetzee and Kluyts[43] found a burnout prevalence of 36.5% in anaesthetists employed in the public sector and 14.2% in the private sector. Zeijlemaker[5] reported a burnout prevalence rate of 84% amongst registrars at the University of Witwatersrand, whilst in a study conducted by amongst doctors at five Kwa-Zulu Natal public hospitals, 59% screened positive for burnout.[31] Recent studies[44] conducted among medical doctors working at KwaZulu-Natal rural hospitals reported a prevalence rate of 68.5% while Morar and Marais[45] reported that 67.8% of University of Witwatersrand psychiatric registrars had scores in the high category of any subscales. As

indicated by the literature, the prevalence of burnout both globally and locally remains highly variable.

1.2.4 Factors contributing to burnout in doctors

1.2.4.1 Individual (host) factors contributing to burnout in doctors

Burnout occurs due to the interaction between occupational and individual factors.[7] Individual factors associated with burnout include demographics, personality type, job dissatisfaction, and level of social support.[39]

Age, gender, marital status, level of education, and years employed in post are sociodemographic characteristics associated with burnout in doctors.[49] Evidence suggests that burnout was more prevalent amongst younger doctors, with the risk of burnout decreasing with age.[50] Liebenberg et al.,[41] reported that junior doctors were more vulnerable to burnout due to their lack of experience. Conversely, Talih and colleagues[36] reported a notable association between burnout and age at a Lebanese medical center, with 62.5% residents aged 26-35 years experiencing burnout compared to 37.5% of those aged 18-25 years. This was confirmed by Alhaffar et al.[30] and Langade et al.[38] who reported increasing burnout prevalence with increasing age. They postulated that increase in age implies longer time spent in the profession, exacerbating the disturbed work-life balance, resulting in higher levels of burnout.[30,36,38]

A considerable number of studies concluded that, as a consequence of work-life imbalance, female doctors had a greater prevalence of burnout.[50] While gender was not a consistent independent predictor of burnout, West et al.[51] found that female physicians in the United States had 20–60% increased odds of burnout. Locally, high degrees of burnout were also found amongst female doctors in Bloemfontein and Kwa Zulu Natal due to females having to balance more family responsibilities.[35,44] However, these findings were in contrast to other

studies which, having found no associations linking social and demographic factors to burnout, suggested that the cause of burnout should be quested at the workplace.[5,33]

Single status appeared to be a risk factor in doctors, with married doctors having lower levels of burnout owing to increased social support.[37,49] However, while other studies negated any association between marital status and burnout,[31,33] Amoafo et al.[50] showed increased burnout resulting from work-home conflict in married doctors.

In a systematic review by Rotenstein,[27] there was great variability in prevalence estimates in burnout amongst doctors across the different specialities. Amoafo et al.[50] suggested that specialities at greatest risk of burnout were frontline specialities, such as emergency medicine, internal medicine, and family medicine. This was confirmed by West and colleagues[51] who reported that specialities of emergency medicine, general internal medicine, and neurology had an up to three-fold increased odds of burnout. In contrast, specialities of preventive and occupational medicine were associated with forty percent lower burnout rates. However, Rodrigues et al.[49] found that surgery and urgency specialities residents (general surgery, anaesthesiology, orthopaedics, obstetrics and gynaecology) had higher burnout prevalence as well.

Studies have attempted to demonstrate the physiological processes related to burnout. Since burnout is a state related to stress, some researchers hypothesised that during the stressful state, the sympathetic aspect of the autonomic nervous system was activated and the parasympathetic aspect was downregulated, resulting in the release of catecholamines into the peripheral blood.[52] They further speculated that because of the stress related to burnout, the hypothalamus-pituitary-adrenal axis released cortisol. Accordingly, some biomarkers were tested to check for association with burnout.[52] Mommersteeg et al.[53] sampled the salivary cortisol levels in clinically diagnosed burnout individuals compared to a healthy control group and found no differences. They concluded that the hypothalamus-pituitary-adrenal axis functioning in burnout individuals seemed to be normal. Furthermore, in their review which compared biomarkers in healthy controls with biomarkers in individuals with burnout, Danhof-

Pont et al.[54] found no potential biomarkers for burnout. Therefore, they posited that, due to the incomparability of studies, biomarkers cannot conclusively be associated with burnout.

Individuals differ in their reaction to occupational stress and these differences may be influenced by characteristics such as gender, age, personality and general disposition.[55] Individual factors, such as cognitive abilities and personality traits, are not easily modifiable but coping strategies and resilience can be mediated to reduce burnout.[46] While acknowledging that individual factors may be associated with burnout, it must be emphasized that socio-demographic factors are not always modifiable through workplace interventions.[46]

1.2.4.2 Occupational factors contributing to burnout in doctors

According to the Job Demand-Resources model, in any job, two sets of variables involving occupational factors are recognised: job demands and job resources.[21] Demerouti and Bakker[21] postulated that job demands include increased workload, shift work and time pressure while job resources are described by peer support, performance management, job control and increased participation in decision making.

Table 2: Job Demands and Job Resources affecting burnout in doctors

Job Demands	Job Resources
Workload	Rewards
Time Pressure	Supervision and Support
Shift Work	Job Control and autonomy
Moral Distress	Job Satisfaction
Inadequate staffing	Organisational Culture
Administrative burden	Work-life integration

Adapted from Work System Factors of the Systems Model of Clinician Burnout and Professional Wellbeing[56]

According to Demerouti and Bakker,[21] unmanageable work schedules and inadequate staffing are variables which increase work demands. Job demands are not always deemed negative but may cause occupational stress when increased effort is required to meet those demands. Schaufeli and Bakker[20] confirmed that burnout can be predicted when increased job demands are accompanied by a lack of job resources. The Job-Person fit model, formulated by Maslach and Leiter,[25] address these job demands and resources, under the six areas of work life, described earlier.

Workload was found to be the most significant cause of burnout in doctors in several studies.[31,33,51] Work overload occurs when, due to insufficient time or resources, there is a mismatch between job demands and the individuals' capability to meet those demands,.[24] Objectively, workload can be assessed by organisational metrics such as shift frequency and duration, patient load, and staffing ratios.[56] Patient workload predicted burnout in HCWs.[24] The number of hours, workload, and working conditions were ranked the important burnout contributing factors by Rossouw et al.[33] Additionally, Amoafo et al.[50] reported positive

associations between burnout in doctors and working greater than forty hours/week. West and colleagues, in a multivariate analysis of cross-sectional studies of physicians,[51] reported a 3% increased odds of burnout, for every additional hour worked per week. They also reported a 3–9% increased odds of burnout, for every additional night or week- end on call.[51]

Lack of job control occurs when HCWs have little control over the decisions regulating their work activities.[24] The hierarchical nature of the medical profession does not allow doctors decision latitude.[24] Furthermore, time pressure results from the lack of time to complete clinical documentation with the resultant completion of work after hours.[56] Continuing medical education, required by medical regulatory bodies, by attendance of webinars or completion of questionnaires, normally takes place after working hours. Compliance with these requirements encroach on time spent on personal activities or with family,[56] as confirmed by West and colleagues,[51] who reported a 2% increased odds of burnout, for every additional hour per week of home time spent on work-related tasks. Work inefficiencies result from increased administrative burden due to constant documenting of clinical tasks.[56] These administrative duties that contribute to clerical burden potentiate burnout, especially when inefficient work processes do not contribute meaning in doctor's work activities.[51]

Moral distress occurs when doctors are unable to abide by ethical values under conditions of organisational constraint.[56] Value conflicts arise when there is conflict between the personal and organisational values,[24] with resultant psychological distress.[57] Consequently, working daily under unfavourable, resource-limited circumstances, in the South African public health system, challenges doctors. Under these circumstances, their inability to fulfil their moral and ethical commitments to care for their patients, increases their moral distress.

Job resources can be found at three levels: organisational, interpersonal, and task level.[21] At an organisational level, job resources include rewards such as salaries, career development, and job security. Job resources, at an interpersonal level, involve supervisory and peer

support, which can buffer against detrimental stress. At a task level, job resources can be described by job control and autonomy.[21] Insufficient resources and rewards, due to inadequate salary or lack of recognition, devalue the efforts of HCWs, resulting in feelings of inefficacy.[24]

Finding meaning and purpose in work can be protective against burnout.[46] Dugani et al.[46] noted an inverse association between job satisfaction and burnout. They described intrinsic job satisfaction as relating to professional development opportunities while extrinsic job satisfaction related to wages and financial incentives. West et al.[51] reported that doctors who spent less than twenty percent of their job effort on meaningful acts, were nearly three times more likely to be burned out, than doctors who spent at least 20 percent of job effort doing meaningful activities.

Organisational culture relates to the beliefs held by workers in an organisation, and is demonstrated by actions and behaviours of organisational and leadership structures, which influence decision-making and resource allocation.[58] Organisational factors such as negative leadership behaviours, limited career advancement opportunities, restricted interprofessional collaboration, and minimal social support for doctors potentiate burnout.[59] Maslach[24] described the absence of fairness as the perception that the workplace is unfair and unequal, which increases cynicism. Hierarchical cultures are found in most healthcare organizations, and most hospitals are structured workplaces with strict procedures, formal rules, and rigid policies.[5] As a result of the hierarchical culture, the medical profession is not characterized by high levels of mutual support. Maslach[24] described breakdown in community as resulting from lack of support, trust and unresolved conflict in the workplace. The absence of supportive supervision at an organizational level appears to be related to burnout.[46,59] Doctors disclosing physical, mental health, or substance abuse issues are faced with stigma and discrimination, which perpetuates poor help-seeking behaviour.[51] To address this hierarchical culture and

mitigate burnout, more investment is required in training, mentoring, and support offered to doctors.

Work-life integration describes a merging of professional with personal responsibilities. By influencing work-home conflicts, poor work-life integration can increase burnout risk. West and colleagues[51] reported that work-home conflicts, more than doubled the risk of burnout. They also reported that by having a non-physician spouse and a child younger than 21-years-old, burnout risk would increase by 23% and 54%, respectively. The imbalance relating to job demands and job resources are occupational factors mediating burnout, which are potentially modifiable with interventions at an organizational level.[51,59]

1.2.5 Burnout and COVID-19

In December 2019, SARS-CoV-2 was identified in Wuhan city, China and the WHO recognised this emerging infectious disease as a pandemic on 11 March 2020.[60] Due to its widespread transmission, COVID-19 has further increased the burden on doctors as HCWs by increasing the health demands globally.[8,10] It has also increased the stress associated with the availability of PPE, the fear of contracting the infection and the risk of infecting loved ones.[5,11] These additional stressors have increased the burnout risk amongst doctors during the COVID-19 pandemic.

1.2.5.1 COVID-19 related factors contributing to burnout in doctors

While the threat that infectious disease outbreaks pose to public health is often vociferously emphasised, the burden of psychological symptoms experienced by doctors, resulting from infectious disease outbreaks is often not as well understood.[61] However, the negative effect on doctors' mental health during challenging health crises is not a novel consideration. Lee et al.[62] noted that sixty-four percent of medical personnel experienced symptoms of Post-

Traumatic Stress Disorder (PTSD) during the early phases of the Middle East Respiratory Syndrome (MERS) outbreak. In their review on physician experiences during and after seven infectious disease outbreaks, Fiest et al.[61] described that 92.3% of physicians experienced symptoms of anxiety, while PTSD affected 75.2% of physicians. Fiest et al.[61] also reported that, the prevalence of physicians with burnout symptoms, ranged from 14.7% in Canada to 76% in Romania. This was confirmed by an umbrella systematic review conducted by Magnavita et al.,[63] in previous SARS and MERS outbreaks, that reported almost 33% of HCWs manifesting burnout.

The pandemic has overwhelmed not only the capacity but also the resources of health systems in many countries.[64] While attempting to continue delivering quality health care, health systems were repeatedly challenged by more infectious variants of the virus.[64] Consequently, HCWs faced increased occupational stressors due to the challenges brought about by the pandemic, resulting in increased burnout.[9] In their study on burnout among HCWs during COVID-19, Ghahramani et al.[47] reported an overall burnout prevalence of 52%. This differed from a review by Tang et al.,[65] that reported a 39.95% prevalence of burnout among HCWs. Importantly, Tang et al. described a cohort study, which compared burnout among HCWs before and during COVID-19, which reported a significant increase in both emotional exhaustion and personal accomplishment scores.[65]

To prevent occupational COVID-19 infections, the WHO recommends the implementation of a hierarchy of controls to prioritise the protection of employees through engineering and administrative controls, as well as the provision of PPE.[66] Engineering controls involve the provision of natural or mechanical ventilation in workplaces. Administrative controls involve the protection of vulnerable workers with co-morbidities as well as infection prevention control (IPC) strategies (involving the screening and triage of suspected COVID cases, hand hygiene, safe physical distancing).[66] Rational use of PPE for COVID-19 has also been advised, noting that PPE is dependent on individual behaviour and should therefore not be the sole

occupational control.[66] In their study of 2702 HCWs from 60 countries, Morgatini et al.[9] demonstrated that 51% of HCWs reported burnout, but that differences existed regarding the predictors of burnout between HICs and LMICs. Factors contributing to burnout among respondents from HICs included, feeling pushed beyond their training, work impacting on their quality of life and difficulty in obtaining COVID testing and mental health support. However, for respondents from LMICs, factors contributing to burnout included poor work-life integration and inadequate PPE. The uncertainty regarding the provision of PPE, not only increases the occupational stress related to the risk of COVID infection, but it also heightens the fear of spreading the disease to relatives.[10-11] In their study, Morgatini et al.[9] reported that adequate PPE was protective against burnout. This was confirmed by Smith et al.[67] who noted that among respondents whose PPE and IPC needs were met, there were lower symptoms of anxiety and depression. Morgatini et al.[9] also noted higher burnout levels in countries experiencing peaks of COVID-19 infection, during the period of data collection, compared with countries where COVID-19 was declining.

As a result of the pandemic, HCWs, including doctors, experienced challenges in adapting to greater patient volumes, increased workload and new technologies.[9] Other occupational stressors included gross understaffing at healthcare institutions, resulting in HCWs working long hours with limited resources.[68] At times, doctors worked in unfamiliar roles as they were redeployed to different units, and often provided care outside of their scope of practice, which accentuated the work-related stress by increasing liability.[69]

The uncertainty related to the chronicity of the pandemic, together with moral distress, lengthened shifts, difficult triage decisions, and fear of getting infected and infecting loved one's perpetuates the psychological stress, burnout and elevated risk of mental health disease faced by physicians.[61,64] HCWs also faced uncertainty when managing the complex clinical manifestations of the COVID-19 infection in patients.[68-69] Di Trani et al.[70] reported strong

correlations between stress from uncertainty, resilience, and burnout in HCWs who, as a result of the pandemic, find themselves in a situation with no immediate resolution.

While HCWs are recognized for their stoic resilience, they now face added responsibilities as well as physical and mental challenges.[8] Chinese frontline HCWs exposed to SARS-CoV-2, had an increased risk of poor mental health.[71] Wu et al.[72] reported a notable percentage of Chinese physicians experiencing greater burnout, following the COVID-19 outbreak, compared to before the pandemic. The findings of Wu et al.[72] were confirmed by a survey of American physicians,[73] which reported that 58% of physicians in the United States experienced burnout in 2020, compared to 40% in 2018. Furthermore, due the effect of the pandemic on their work situation,18 percent of physicians in the United States, reported increased use of medications, alcohol or illicit drugs.[73] Due to fragmented health systems and limited PPE, these issues were worse in LMICs.[74] A scoping review by Moitra et al.[74], indicated that among HCWs in LMICs during the pandemic, depression, anxiety, burnout, insomnia and fatigue were regarded as the main negative mental health outcomes. Interestingly, Ghahramani et al.[47] reported that almost half of HCWs experienced burnout during COVID-19 but described HCWs in HICs having higher overall burnout.

In their review on psychological symptoms experienced by doctors during infectious disease outbreaks, Fiest et al. [61] noted that female, younger-aged doctors and frontline doctors had an increased risk of burnout. This was confirmed in a review study by Moitra et al.[74] on the impact of the pandemic on the mental health of HCWs working in LMICs. In comparison, Dinibutun[75] reported that burnout levels were reduced in Turkish doctors who actively treated COVID-19 patients. These findings resonated with the study done by Wu et al.,[72] who reported that those HCWs working on the frontline during the pandemic, had lower frequency of burnout, than HCWs working in non-COVID wards. Shreffler et al.[8] suggested that since frontline workers were perceived to have more control over their environment, they experienced lower concerns about becoming unwell and had less burnout in comparison to HCWs in usual wards. Studies

suggested that physicians, actively involved in the frontline experienced a stronger sense of meaningfulness and personal accomplishment, which reduced their incidence of burnout.[75] In a study among Italian frontline healthcare professionals, Barello et al.[76] posited that personal accomplishment and gratification may protect mental health during the pandemic.

The sudden increase in incidence of emerging infectious diseases often surpasses healthcare facility capacities.[77] During outbreaks of infectious diseases, HCWs are in close contact with suspected or confirmed patients, despite social distancing recommendations. Invariably, they also get infected.[77] It is expected that an efficient healthcare system, would prioritise the protection of HCWs. However, in a South African study on SARS-CoV-2 hospital admissions in South Africa, Totleng et al.[78] reported that by 30 April 2021, 6364 (3.8%) of the hospital patients were HCWs. According to the Compensation for Occupational Injuries and Diseases Act No. 130 of 1993,[79] COVID-19 has been declared a compensable disease. However, much more needs to be done to avoid occupational exposure to COVID-19 and prevent the mental health consequences thereof. Contrary to expectations, La Torre et al.[80] in their description of a case-control study in Italy, noted no differences in the burnout levels between HCWs infected with COVID-19 compared with non-infected HCWs.

As healthcare workers, doctors have the autonomy to choose to remain in healthcare systems. However, regardless of perceived safety risks, their altruism and shared responsibility compels them to serve people in a humanitarian crisis, such as the pandemic.[81] Doctors are also vulnerable to moral dissonance, and they often struggle to balance institutional priorities with the best interests of their patients. This results in doctors experiencing moral distress when being requested to serve many patients with limited institutional resources during the pandemic.[81]

Subsequent to the ‘first wave’ of SARS-CoV-2 infections, many countries were faced with subsequent “second” and “third waves” of the pandemic. As new variants emerge with

resultant immune escape from vaccination, the likelihood of more 'COVID-19 waves' remains high. During the fourth wave of COVID-19, Ahmed et al.[81] reported that because of the chronic physical and mental impacts of COVID-19, HCWs in Pakistan experienced high rates of burnout. Due to the chronicity of the pandemic, doctors and other HCWs will continue to face challenging working conditions, which will influence their mental health.[64] This pandemic will in all likelihood, continue to impact on HCWs' mental health, suicide and burnout rates, particularly in LMICs, like South Africa, with limited protective measures for HCWs.[64] The adverse effects of the pandemic on the wellbeing of HCWs will most likely continue for years or decades.[63]

In recent years, the health crisis in Gqeberha has been well publicized.[83] The pandemic has exposed the chronic institutional and political impediments facing HCWs in Gqeberha public hospitals. For example, Livingstone Tertiary Hospital in Gqeberha has not had a permanent Chief Executive Officer since November 2018, after the last management team was suspended pending investigations into corruption.[83] Dora Nginza Hospital, a regional hospital in Gqeberha, also faced critical staff shortages, poor infrastructure, and overcrowding of wards.[83] Both hospitals have been plagued by poor staff retention in most specialist departments.[12] These chronic challenges brought about by inefficient management contribute to the organisational stressors faced by doctors working at public hospitals in Gqeberha in the midst of the pandemic.

1.2.6 Consequences of burnout

The presence of burnout in doctors has significant consequences for the individual healthcare worker, patients, healthcare organizations and society.[4] Personal consequences include increased occupational injuries (such as needlestick injury), detrimental alcohol use or substance abuse, and an increased risk of suicidal ideation.[31,55,85] As indicated in the literature, burnout has negative impacts on the mental wellbeing of HCWs,[71] and can result in depression and anxiety in physicians.[71,85] Burnout also affects physical health, resulting in

headaches, gastrointestinal disorders, poor eating habits and sleep disturbances.[24,85] Doctors with burnout, being more dissatisfied with their work duties have greater intention to leave their job.[26] Some doctors may also consider leaving the medical profession to pursue a non-healthcare related career.[26]

Burnout in doctors has substantial effects on their patients and has been associated with increased risks of medication and diagnostic errors. Studies[55,86] reported that burnout in physicians was associated with poor physician-patient rapport. Substandard attitudes to patients,[4] resulted in reduced quality of care and poor patient outcomes. Consequently, burnout has been associated with increased malpractice litigation risk.[51,55]

Burnout has substantial negative consequences for both organisations and health systems.[87] Burnout is not only related to increased absenteeism, presenteeism and low productivity, but also increased litigation, reduced satisfaction, and increased staff turnover in healthcare institutions.[51,86,87] Presenteeism occurs when doctors with burnout may attend work but demonstrate sub-optimal performance even though they are present.[32]

In South Africa, there is a disparity in health care delivery. At present, 84% of the population receives care in the public healthcare system by 30% of doctors, while 16 % of the population is served in the private healthcare system by 70% of the country's doctors.[88] As a result of mismanagement and underfunding, a dysfunctional and weak public health infrastructure exists, which has caused a state of crisis in public hospitals.[89] Burnout negatively impacts on patient care and in South Africa, where health resources are already limited, burnout has the potential to be detrimental to the compromised healthcare system.[5] These dire conditions are exacerbated by the overwhelming demands placed upon the public healthcare system by the pandemic.

1.2.6 Prevention of burnout

Burnout is often stigmatised as an indication of an individual's weakness or incompetence.[16-19] To avoid potential litigation, it has become simpler for organisations to view burnout as resulting from a weakness in the individual rather than acknowledging that burnout results from an unsafe work environment.[16-19] Rather than perceiving burnout as an occupational hazard, organisations often focus on burnout as an individual problem or conceive burnout as a mental illness.[16-19] However, years of burnout research has shown that situational or environmental factors are important in the pathology of burnout and the significance of the workplace should not be ignored.[16-19]

Identifying and addressing the risk factors of burnout can assist in the development of appropriate preventive interventions in the healthcare organisation. Interventions can be divided into categories: individual-focused interventions (to fix the person) and organisation-directed interventions (to fix the job).[19,87] Previously, burnout was defined as an individual experience with the presumption that the cause of burnout lay within the worker. As a result, the search for a solution has focussed on fixing the individual rather than fixing the job.[19] Most healthcare institutions continue to operate under the framework that burnout is the responsibility of the individual doctor and much focus has been on the individual interventions involving resilience strategies.[57] However, it has been propositioned that by defining burnout as a workplace hazard, the prevention of burnout lies in improving job safety, by fixing the job rather than the person.[19] Evidence available from systematic reviews and meta-analysis studies suggest that organization-directed interventions surpass individual-directed interventions at mitigating burnout.[59,87] As a result, there has been a call for organisations to recognise burnout as an occupational disease,[35] because mitigating burnout relies on both individual- and organizational-directed interventions.[11]

In keeping with the Job-Person Fit model, Maslach[19] proposed preventing burnout by using the public health framework for managing workplace hazards, thereby not only fixing the

person but the job as well. Primary prevention eliminates or modifies occupational stressors by fixing the job.[19] To limit the incidence of new cases, primary prevention involves organisation-directed interventions aimed at reducing occupational stress by means of changes in work schedule (instituting more rest breaks) and modification of shift work or overtime systems.[19] Changes in job design by reducing employee's workload, amending performance evaluations and enhancing teamwork, are organizational interventions that may assist in ameliorating burnout.[19] Encouraging participation in decision-making and increasing both supervisory and peer support at work will reduce job demand and improve job control in organisations to prevent burnout.[7,86]

Secondary and tertiary prevention involves individual-directed interventions. To reduce the prevalence of burnout, secondary prevention focusses on strengthening resilience and coping skills to assist employees with job stressors.[19] Resilience is conceptualised as "the ability to adapt" and "thrive in the face of adversity".[90] Resilience is a personality trait, which allows a "process of positive adaptation in the face of adversity".[90] However, work-related challenges can impede resilience and can manifest as acute traumatic events (when dealing with complex or emotionally taxing patients) or chronic continuous strain (caused by increased workload, the threat of litigation as well as insufficient organisational resources resulting from low staffing and equipment shortages).[91] West et al.[92] reported that while resilience is greater in physicians than the average worker, despite that resilience, burnout rates amongst physicians were significant. As doctors rely on personal attitudes to remain resilient, McKinley et al.[90] proposed that interventions to improve resilience at an individual level were warranted. Personality factors impacting on resilience include having positive attitudes, regulating emotions, and viewing failure as beneficial feedback.[90] Therefore, McKinley et al.[90] suggested that resilience could be improved by counselling doctors to improve their insight and modifying these personality traits. Resilience strategies also include mindfulness-based stress reduction programmes which focus on meditation techniques to promote relaxation. [93] To improve resilience, Zwack and Schweitzer[94] proposed the use of traditional Balint group models,

involving the regular meeting of a group of doctors to present clinical cases to improve the understanding of the doctor-patient relationship.

Tertiary prevention involves treating employees who are already diagnosed with burnout with cognitive behavioural therapy, mindfulness and self-understanding, to reduce residual deficits following burnout.[19] Implementing cognitive behavioural techniques to improve job competence, communication techniques and coping skills, may ameliorate burnout symptoms, allowing for return to work.[86] Cognitive behavioural stress prevention, focussing on challenging negative thoughts, could reduce burnout by improving resilience.[94] La Torre[80] described the use of mental health initiatives as PPE for employees' emotional and mental health, to reduce occupational stress and prevent burnout. Self-care skills training would promote physical health, self-compassion and harm avoidance as interventions to reduce burnout.[85,90] Organisational wellness initiatives promoting healthy diets, exercise and sufficient rest would assist in mitigating burnout at primary, secondary and tertiary levels of prevention.[19,85]

However, it must be emphasised that while individual-focused interventions may be of some benefit, mandatory attendance of individual interventions (like mindfulness training) may lead to resentment. Therefore, Houtrow[57] suggested that these interventions should rather be offered as optional strategies. Both Houtrow[57] and Sharma et al.[95] voiced concerns that, by focussing more on resilience and wellness rather than managing organisational factors, only the symptoms of burnout were being treated rather than the cause.

McCain et al.[96] showed that although resilience in doctors is high, doctors continue to suffer from burnout. They concluded that improving resilience further at an individual level may not improve quality of life and, therefore, advocated for implementation of organisation-directed interventions targeting resilience, rather than emphasising individual-directed interventions. Both McCain et al.[96] and O' Dowd et al.[91] agreed that to prevent burnout and improve resilience in doctors, organisations should focus on resilience and burnout at an organisational level to address the workplace stressors aggravating burnout.

As noted above, individual- and organizational-directed interventions are both effective at reducing burnout.[9,51] With the demands brought on by the COVID-19 pandemic, healthcare organisations may find themselves within a phase of crisis. As a result, organisational or systemic factors may not be easily controllable. Therefore, Di Trani et al.[70] recommended not only the provision psychological support, but also strengthening of individual skills. They endorsed training in the development of practical competencies, which would improve the ability to tolerate uncertainty, increase resilience, and reduce burnout.[70] To address burnout in health professionals, Maslach[24] suggested the identification of six key areas of work life that affect doctor's experience of burnout and proposed that organisations reduce burnout by altering workplace policies and practices that shape these specific areas of work life. To alleviate the impact of burnout in doctors during the pandemic, doctors should be involved in developing intervention strategies focused on improving engagement.[68,81] As indicated by the literature, organizational provision of coping skills training and mental health resources would increase job resources and strengthen organizational support for doctors' physical and emotional needs.[68,81]

The factors that contribute to burnout are varied and context-dependant.[97] As a result, Khasne et al.[97] recommended that organisations adopt multi-pronged strategies to combat the factors which drive burnout. In LMICs, such as South Africa, where a high demand for medical services is limited by reduced professional resources,[35] burnout can be prevented through timely organisational interventions aimed at addressing potentially modifiable factors involving improved workflow management, reducing workload, and acquiring PPE.[81] Smith et al.[67] suggested that employer-based infection control strategies and provision of adequate PPE be addressed to improve psychological well-being amongst HCWs. As recommended by Sharifi et al.,[84] organisations can mitigate burnout by ensuring manageable workloads and creating efficient workflows. Increasing flexibility and autonomy in the workplace and facilitating career

development opportunities, as proposed by Sharma and colleagues,[95] would positively correlate with workplace engagement and resiliency. The utilization of nurse practitioners and medical assistants to reduce workload and administrative responsibilities would allow doctors to allocate more time to procedures.[95] To mitigate burnout, Kumar et al.[87] proposed implementation of standard hospital protocols regarding work duty division and observance of work hour restriction guidelines in healthcare facilities.[87] The use of digital technologies to provide valid and updated information, was recommended by Sharifi et al.,[84] to increase knowledge in doctors during times of uncertainty caused by the pandemic. Digital communication could also be utilised to provide peer support and mental health resources to doctors.[84] As substantiated by the above literature, to balance both organisational and personal responsibilities, organisations need to complement individual-based interventions with the resolution of the workplace stressors and organisational culture which compromise resilience and engagement.[7] West et al.[59] and Sirsawy et al.[35] agreed that, only by recognizing burnout as an occupational health issue, and targeting clinician concerns, can organizations attempt to prevent burnout. Comprehensive, sustained, deliberate efforts are required by organisations to mitigate burnout and promote engagement to protect the health of doctors and thus protect the health of the nation.[26]

1.2.8 Conclusion

Burnout in HCWs is a global concern and the literature reports substantial variability in prevalence of burnout amongst doctors.[27] This literature review confirmed that burnout in doctors is prevalent in developed countries and in LMICs. As a low- and middle-income country, South African healthcare facilities face challenges in terms of resource limitations, structural issues of staff shortages and lack of leadership. Studies demonstrated that South African doctors are experiencing a high degree of burnout.[5,31,33-35] This review has evaluated the various individual and occupational factors contributing to burnout and has also described the significant consequences burnout has for individual doctors, patients, as well as healthcare

systems.[4] Due to the pandemic, healthcare systems have been overwhelmed in terms of resources and capacity. HCWs, including doctors, faced occupational challenges which increased burnout risk.[64] This review has discussed individual and organisational factors contributing to burnout in doctors and has also focussed on the proposed preventative interventions at individual and organisational levels that may reduce burnout amongst medical doctors. The following chapter will describe the aims, objectives and methods used to conduct the research study, to determine the prevalence and the determinants of burnout in medical doctors in Gqeberha during the pandemic.

CHAPTER 2: AIM, OBJECTIVES AND METHODS

2.1 Justification and purpose

Burnout among HCWs is concerning as it has significant consequences for the individual healthcare worker, patients as well as healthcare systems.[4] Studies reported considerable variability in the prevalence of burnout amongst doctors.[27] In the South African context, some studies demonstrated that doctors are experiencing a high degree of burnout.[5,31,33-35] By negatively impacting the capacity and resources of healthcare system, the COVID-19 pandemic has exacerbated the occupational stressors faced by doctors as HCWs, increasing the risk of burnout.[63] The Eastern Cape Provincial Department of Health has historically experienced numerous financial and human resource issues.[13] Despite the increase in challenges experienced during the pandemic, there is a paucity of knowledge regarding the prevalence and determinants of burnout in doctors, working at public hospitals in Gqeberha or the preventative organisational interventions which would successfully reduce burnout in doctors.

The aim of this study was to determine the prevalence and determinants of burnout in doctors working at public hospitals in Gqeberha. This study explored the role of individual and organisational factors that contribute to burnout in these doctors. The study outcomes will assist with:

a) Proposing preventative interventions at an organisational level to hospital leadership and the Eastern Cape Department of Health to reduce burnout amongst medical doctors
b) Designing of appropriate programs to identify doctors at risk of burnout
c) Developing guidelines for preventative and remediation measures which address individual-focussed and organisational interventions to mitigate the effect of burnout on doctors.

2.2 Hypothesis

Individual and occupational factors during the COVID-19 pandemic (independent variable), contribute to burnout (the dependent variable), in medical doctors at public hospitals in Gqeberha.

2.3 Research question

What is the prevalence of burnout and factors associated with the burden of disease, in medical doctors at public hospitals in Gqeberha, during the COVID-19 pandemic?

2.4 Aim:

To estimate the prevalence of burnout and identify its determinants amongst medical doctors at public hospitals in Gqeberha during the COVID-19 pandemic.

2.5 Objectives:

- The prevalence of burnout in medical doctors at public hospitals in Gqeberha during the COVID-19 pandemic was determined.
- Individual (host) and occupational stressors which contribute to burnout in doctors during the COVID-19 pandemic were identified and the level of resilience in doctors was assessed.
- Preventative interventions at an organizational level to successfully reduce burnout amongst medical doctors were proposed.

2.6 Methods

2.6.1 Study design

This quantitative, descriptive study was performed at three hospitals in Gqeberha. The following hospitals were included in this cross-sectional study: Livingstone Hospital (LVH), Port Elizabeth Provincial Hospital (PEPH) and Dora Nginza Hospital (DNH). LVH and PEPH combined make up the Livingstone Tertiary Hospital (LTH) and DNH is the regional hospital.

2.6.2 Study population

There was a total of 330 doctors employed at LTH and 100 employed at DNH. The doctors consisted of interns, medical officers, community service medical officers, registrars, specialist consultants and clinical managers registered with the HPCSA. Doctors have a unique context which predisposes them to developing burnout. In comparison with other HCWs, doctors work longer hours, have more decision-making responsibility, and have less decision latitude in their work environments. Inclusion criteria included all medical doctors who were working at LVH, PEPH and DNH, during April and May 2022 (the fifth wave of COVID-19 in South Africa). Doctors were excluded if they elected not to participate in the study and were not employed at the participating hospital (LVH, PEPH and DNH), or did not work during the COVID-19 pandemic or study period (April and May 2022) due to reasons such as long-term incapacity leave.

2.6.3 Sampling strategy

The sample size for this study was determined by using the software program, STATA 15 (StataCorp, College Station, Texas, USA). This was based on an $\alpha=0.05$ and power of 80%. Based on a background prevalence of burnout in workers of 13-18% and an anticipated prevalence of burnout in doctors similar to what other studies in South Africa have yielded,

various sample sizes were calculated and explored to inform sample size calculations (Table 3). There were no average estimates for burnout in doctors in sub-Saharan Africa as a result of the heterogeneity of studies reported in a recent review.[28]

Table 3. Sample size calculations for burnout based on general population studies compared to studies conducted in South African doctors and anticipated prevalence

General Population prevalence	Burnout in doctors prevalence (South African studies)	Sample size (power 80%)
13% Norland et al.[98]	15.6% Sirsawy et al.[35]	1041
	21 % Van der Walt[34]	157
	25% (anticipated prevalence)	73
	30% (anticipated prevalence)	38
17.9 % Lindblom et al.[99]	21 % Van der Walt[34]	1335
	36% Coetzee and Kluyts[43]	42
	25% (anticipated prevalence)	255
	30% (anticipated prevalence)	91

Only lesser and more conservative estimates were used from the SA studies and those that yielded prevalence's of >50% were not used in the sample size calculation.

2.6.4 Sample size

With reference to Table 3, a minimum sample size of 255 was chosen for this study, to yield an anticipated estimated prevalence of burnout of 25% (α=0.05 and power 80%).

2.6.5 Data Collection

Preceding data collection, a data collection tool (English Questionnaire), consisting of five self-report questionnaires, was devised (Appendix 1).

2.6.5.1 A sociodemographic and occupational profile questionnaire (designed by authors)

The participants recorded demographic information, which included age intervals, gender, marital status, number of children, caregiver status, and personal risk behaviour variables (smoking, alcohol use and use of illicit/prescription drugs). Participants provided details on job-related variables: occupation, occupational rank, speciality, service years, salary, overtime worked, overtime hours worked per month, length of overtime call, overtime site and change in job on past two years.

2..6.5.2 The Oldenburg Burnout Inventory (OLBI)

The OLBI is a sixteen-item survey, based on the job demands-resources model.[32] The OLBI covers two dimensions (Exhaustion and Disengagement) processed separately as a continuous variable.[21] The OLBI consists of multiple questions for each dimension. The OLBI has responses in a four-point Likert scale that ranges from strongly agree (1) to strongly disagree (4). The OLBI includes both positively and negatively framed items, that improves psychometric balancing of the OLBI and reduces the likelihood of answering bias.[32] Professional efficacy or accomplishment is not included in the OLBI as it is considered to be the weakest burnout dimension.[100]

The MBI was previously regarded as the gold standard of burnout surveys but has been criticized for having exhaustion and cynicism items framed negatively and all professional efficacy items phrased positively,[21] which may lead to answering bias.[32] For this study, the OLBI authors provided written permission to use the inventory (Appendix 2).

2.6.5.3 Five subscales of the NIOSH Generic Job Stress Questionnaire

In this study work stress was measured by using the Generic Job Stress Questionnaire (GJSQ) that was developed by the National Institute for Occupational Safety and Health (NIOSH). [101,102] The NIOSH permits that subscales of GJSQ be used independently to determine work stress. While the NIOSH GJSQ has not been validated in this country, it was validated in another low- to medium-income country, namely, Iran. [101,102] This study focused on five subscales (workload and responsibility, conflict at work, role ambiguity and role conflict, job satisfaction and support at work) to evaluate occupational stress. In the GJSQ, some items, like job satisfaction and support at work, are positively oriented. Accordingly, high scores for these items indicate lower stress levels. In contrast, conflict at work and job ambiguity, are negatively oriented items and high scores for these items represent higher stress levels. [101,102]

2.6.5.4 The Connor-Davidson Resilience Scale to assess resilience

To measure resilience, this study used the Connor-Davidson Resilience Scale (CD-RISC) which has 10-items and uses a 5-point Likert scale that ranges from not true at all (0) to true nearly all of the time (4).[33] Greater resilience was implied by higher scores. The CD-RISC has previously been reported as a reliable and efficient measure of resilience.[33] The CD-RISC was used locally by Rossum et al.[33] to measure resilience. The CD-RISC authors provided written permission for use of the scale in this study (Appendix 3).

2.6.5.5 COVID-19 related questions and workplace interventions

COVID-19 questions related to previous infection in participants and their transmission of COVID-19 to their family members. It also addressed a few work-related issues regarding the provision of PPE and IPC, redeployment to other workstations and the cancelling of annual leave. To address interventions to reduce stress at work, participants chose from a list of thirteen interventions which would assist with reducing stress at work namely: reducing

workload, reducing overtime, increasing salary, increasing supervision and support, and improving working conditions, improving equipment, employing more staff, improving management support, improving communication, provision of psychological counselling, provision of more time off work, provision of skills training and provision of a doctors' tearoom. A pilot of the study was conducted among five doctors before embarking on the main study. The pilot study enlisted the doctors' feedback about the relevance as well as clarity of the questionnaires. Amendments were minor and involved simplifying of questionnaire instructions.

Email addresses and mobile phone numbers of the doctors were provided by the head of departments and clinical managers. Using the Redcap web application, an invitation to engage in this study, was emailed to the doctors, with an attached link to the questionnaire. The mailed invitation included details regarding the purpose and background of the study as well as instructions for participants on how to answer the questionnaire. A list of mental health resources was included in the email. The invitation included the contact details of the Occupational Medical Practitioner, the Staff Psychologist and Occupational Health Co-ordinator for any for participants requiring assistance. To encourage participation, phone calls, WhatsApp Instant Messenger reminders and follow-up emails, with the survey link attached, were sent to participants during April and May 2022. Electronic informed consent was obtained from all the participants before they could access the questionnaire. Participant's involvement in the study was completely voluntary. To protect confidentiality of all participants, identifying information and hospital names were not declared on the questionnaires.

2.6.6 Data Management and analysis

In this study, the participants' data was analysed by using the statistical software package STATA 15 (College Station, Texas, USA). Analysis included:

1. Descriptive statistics of sample demographics, burnout prevalence, work-related factors, and attitudes to preventative interventions.
2. Bivariate analysis to evaluate associations between key outcomes such as burnout and sociodemographic, behavioural, and work-related factors e.g., working hours, perceived stress.
3. Multivariate analysis adjusting for confounders identified during bivariate analysis.
4. Comparisons of attitudes to interventions between demographic groups.

2.6.6.1 Dependant variables

OLBI

In this study, each domain of exhaustion and disengagement had eight items. The mean score for the OLBI domains were obtained by first totalling the scores for each item in the domain and then dividing the total scores of the items in the domain by eight. To determine the burnout group, participants with mean scores greater than or equal to 2.25 on the exhaustion domain were regarded as having high exhaustion, while those participants who scored less than 2.25 were considered to have low exhaustion. To determine the disengagement group, mean scores greater than and equal to 2.1 were defined as high disengagement and those scores less than 2.1 were defined as low disengagement. The cut-off scores were adapted from two previous studies conducted on HCWs using the OLBI. [32,103] From the results, different groups emerged: The group with high exhaustion and high disengagement made up the Burnout group. The Exhausted group was made up by high exhaustion and low disengagement. The Non-burnout group was made up of low disengagement and low exhaustion and the Disengaged group was made up of high disengagement and low exhaustion. The Burnout category represented the main outcome of interest.

2.6.6.2 Independent variables

For this study, the explanatory variables entailed the socio-demographic, occupational and environmental predictors, general and mental health status and aspects of COVID-19 infection and workplace interventions. Burnout was the outcome variable. To clarify specialties and subspecialties of the doctors, surgical specialties referred to general surgery, urology, orthopaedic surgery, ophthalmology, ENT, maxillofacial surgery and obstetrics and gynaecology. Medical specialties referred to internal medicine, neurology, psychiatry, ICU, radiology, oncology, dermatology and haematology. Emergency medicine and family medicine were analysed together while anaesthetics and paediatrics were analysed separately. Medical officers and interns were grouped together as both groups had less than 4 years experience.

NIOSH GJSQ

For the estimation of job stress, 5 subscales of the NIOSH GJSQ were used. Splitting the scores into thirds, allowed for the GJSQ subscales to be subdivided into low, moderate, and high tertiles. The highest tertile of job satisfaction and support at work, and the lowest tertile of workload and responsibility, conflict at work and role ambiguity and role conflict were defined as reference categories in the model.

2.6.6.3 Confounding factors

Age and gender were recognised as confounders.

2.6.7 Statistical Analyses

All the data collected was analysed using Stata 15.0 statistical computer software (StataCorp, College Station, Texas, USA). Descriptive statistics was presented in this study as proportions for categorical variables, mean and standard deviation for normal numerical variables, as well

as medians and interquartile ranges for non-normal numerical variables. Examinations of normal distributions for numerical variables was assessed using the Shapiro-Wilk test.

Regression analyses

The association of burnout with demographic variables, work-related variables, COVID-19-related variables, and the five GJSQ subscales was analysed with logistic regression analysis. Unadjusted and adjusted logistic regression was conducted to investigate the association of burnout with host factors and work-related factors of interest. Statistical significance was set at $p < 0.05$.

2.7 Ethics:

Approval for this research study was sought from and granted by both the University of Cape Town, Faculty of Health Sciences, Human Research Ethics Committee (HREC Ref 616/2021) and the Eastern Cape Health Research Committee (Appendices 4 and 5). In addition, permission to conduct research at LTH and DNH was also sought and granted, from both LTH and DNH hospital management (Appendices 6 and 7). This research study was conducted, by following ethical principles of:

2.7.1 Autonomy

The participants in this study volunteered to participate and they were informed that neither they nor the employers would incur any cost. Prior to the completion of the questionnaires, electronic informed consent was sought. Withdrawal from this study was allowed at any time (Appendix 8).

2.7.2 Confidentiality

The information obtained from the participants was kept confidential. No personal or identifying information was used. Only the research team members were allowed access to the coded data. By using password protected computers and software, confidentiality was maintained. For academic presentations, data would be provided in summarised form with no identifiers present.

2.7.3 Benefit

Findings from this study provided information on individual and occupational stressors contributing to burnout in doctors. The study described interventions proposed by participants to reduce stress at work. Information gained from this study can be used to develop interventions to prevent burnout. The results of this study can also inform the development of programmes to reduce occupational stress for doctors working in public hospitals.

2.7.4 No harm

The study was of low risk to the participants. To support participants who may require support, the Occupational Medical Practitioner, the Staff Psychologist and Occupational Health Coordinator were available throughout the study period. Contact details for mental health support services were provided. Doctors gave informed consent, only after the benefits and risks of the study had been provided. Every participant was informed that there would be no impact on their job security. Doctors were advised that they would be allowed to stop the study at any point. Participants were allowed the option of being approached by members of the research team, if the study results indicated an increase in burnout risk. Participants identified to be at increased risk of burnout, were contacted telephonically or by email, advised and appropriately referred for care.

2.7.5 Justice

The increased risk of burnout in medical doctors reported in both locally and internationally, justified that research be conducted on this occupational group. It was anticipated that this study would identify individual and occupational stressors contributing to burnout which would inform interventions required to mitigate burnout amongst medical doctors working at public hospitals in Gqeberha.

2.8 Research Findings and Dissemination of results

The outcomes of this research quantified burnout prevalence among doctors at public hospitals in Gqeberha during the COVID pandemic. It determined the correlates, both personal and organizational, associated with increased risk for burnout. It identified organizational stressors which contribute to burnout in doctors during the pandemic and it proposed preventative interventions at an organizational level which would reduce burnout amongst doctors. A report on this study will be sent to the employer as well as hospital management, employee representatives and the occupational health team at the different hospitals to effect policy changes and enable implementation of recommendations. This study was used to form the basis of a MPhil dissertation and will also be forwarded to the participants. The results of this study will be forwarded to scientific journals. It is expected that presentations of this study will made to the employer, employees and employee representatives.

CHAPTER 3: RESULTS OF THE STUDY

3.1 Demographic and general health characteristics of participants

A total of 296 doctors participated out of 430 eligible candidates, representing a response rate of 68%. However, thirty-six questionnaires were not completed and were not used in the analysis. Therefore, 260 questionnaires were analysed for the study (Figure 1).

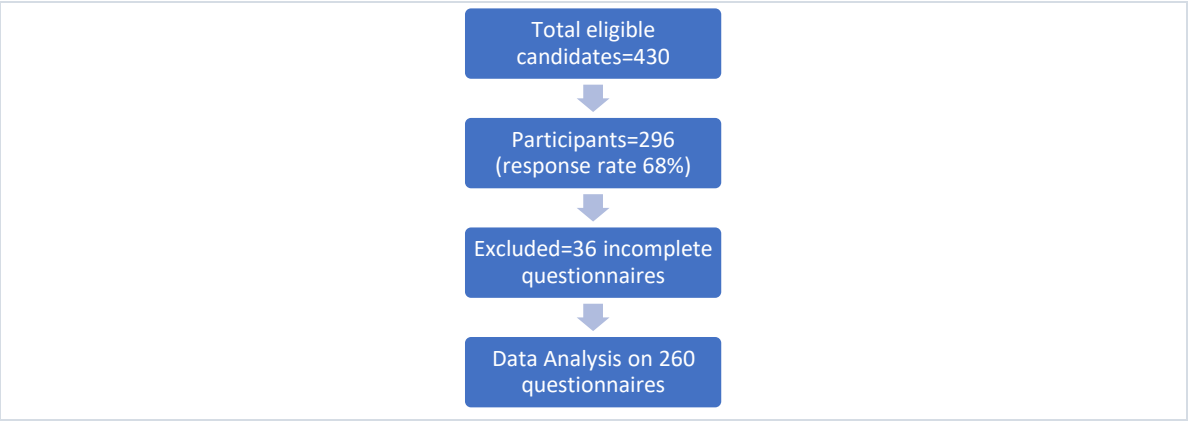

Figure 1. Study sample

Table 4. outlines the demographic characteristics of the study population. Participants were predominantly female (58%) and young, with 43% of participants in the 20-29 years age group. The majority were English speaking (66%) and less than half were married (45%). Only 20% of subjects had children living at home and of these, 80% assumed the role of primary caregiver for the children. A few respondents (10%) were primary caregivers for elderly or disabled family members. The prevalence of smoking was 9% while only 3% reported currently using alcohol or illicit drugs. The mean age at which participants started smoking and using illicit drugs was 20 years.

3.2 Occupational characteristics of participants

Medical interns formed the dominant occupational group (32%), followed by medical officers (29%) and medical specialists/consultants (21%). The median years of service were 2 years

(IQR = 1-5) and 96% of participants reported working full-time. A high proportion worked overtime (96%) with 45% reported working between 60-80 hours overtime per month with 67% performing their overtime on-site. The majority of participants (55%) earned a monthly salary between R50 000-R100 000 (Table 4).

Table 4. Demographic and occupational qualities of participants (N=260)

Participant characteristics	N (%)
Gender	
Man	109 (41.92)
Woman	150 (57.69)
Gender Non-Conforming	1 (0.38)
Age	
20-29	111 (42.69)
30-39	73 (28.08)
40-49	50 (19.23)
>50	26 (10)
Language	
English	172 (66.15)
Afrikaans	54 (20.77)
IsiXhosa	31 (11.92)
Other	3 (1.15)
Relationship status	
Married	117 (45.00)
Single	101 (38.85)
In a committed relationship	42 (16.15)
Children living at home	
Yes	99 (38.08)
No	161 (61.92)
Primary caregiver of children	
Yes	79 (79.80)
No	20 (20.20)
Primary caregiver of elderly or disabled family members	
Yes	26 (10.00)
No	234 (90.00)
Job Title	
Medical Intern	84 (32.31)
Community Service Medical Officer	2 (0.77)
Medical Officer	76 (29.23)
Registrar	39 (15.00)
Medical Specialist/Consultant	54 (20.77)
Clinical Manager	5 (1.92)

Table 4. (continued): Demographic and occupational qualities of participants (N=260)

Participant characteristics	N (%)
Speciality	
Internal Medicine*	54 (20.76)
Surgical**	53 (20.38)
Anaesthetics	22 (8.46)
Family Medicine	35 (13.46)
Emergency Medicine	22 (8.46)
Obstetrics & Gynaecology	31 (11.92)
Paediatrics	41 (15.76)
Administrative	2 (0.76)
Employment	
Full-time	250 (96.15%)
Part-time	10 (3.85%)
Overtime	
Yes	251 (96.54%)
No	9 (3.46%)
Overtime worked, per month (hours)	
0-60	43 (17.13)
60-80	113 (45.02)
80-100	60 (23.90)
>100	35 (13.95)
Average length of overtime call (hours)	
8-11	18 (7.17)
12-15	61 (24.30)
16-19	50 (19.92)
20-23	39 (15.54)
>24	83 (32.07)
Overtime site	
On-site	169 (67.33)
Off-site	82 (32.67)
Monthly Salary (ZAR)	
30 000-50 000	89 (34.23)
50 000-100 000	145 (55.77)
>100 000	26 (10.00)
Employment years (median, IQR) ***	2 (4)
Changed job in past 2 years	
Yes	68 (26.15)
No	192 (73.85)

*Internal Medicine speciality comprised of Internal Medicine, Neurology, Psychiatry, ICU, Radiology, Oncology, Dermatology and Haematology

**Surgical speciality comprised of General surgery, Urology, Orthopaedic surgery, Ophthalmology, ENT and Maxillofacial surgery

***Data are presented as median (interquartile range)

3.3 Mental health status and work-related stress management

Mental health disorders were highly prevalent with 25% of participants reporting a diagnosis of a mental health condition. A further 18% of participants reported being on treatment for a mental health condition currently. The most commonly diagnosed mental health disorders in these participants were depression (41%), depression with anxiety (18%), and generalised anxiety disorder (17%). Only 8% had a prior diagnosis of burnout. To assist with the management of work-related stress (WRS), participants used different substances, which included, cigarette smoking (17%), drinking alcohol (21%), illicit drug use (5%), and the use of non-prescription medication (7%). Using the OLBI, the prevalence of burnout (as defined by a cut-off score of >2.1 for disengagement and >2.25 for exhaustion) in the participants was 78%. An equal number of participants (9%) were exhausted and (9%) experienced non-burnout. In contrast, only 4% of participants were disengaged (Table 5).

Table 5. Frequency and distribution of general and mental health specific variables (N=260)

Participant characteristics	N(%)
Age started smoking (m, SD)*	20.21 (3.69)
Age started illicit drugs (m, SD)*	20.33 (3.85)
Smoking history	
Never	213 (81.92)
Previous smoker	24 (9.23)
Current	23 (8.85)
Alcohol history	
Never	54 (20.77)
Previous alcohol use	40 (15.38)
Current	166 (63.85)
Illicit drug use	
Never	239 (91.92)
Previous illicit drug use	14 (5.38)
Current	7 (2.69)
Substance use to manage work related stress (WRS)	
Feel need to smoke to manage WRS	45 (17.31)
Non-prescription drug use to manage WRS	17 (6.59)
Feel need to drink alcohol to manage WRS	53 (20.62)
Feel need to use illicit drugs to manage WRS	13 (5.10)
Mental health	
Ever diagnosed with a mental health condition	66 (25.48)
Diagnosed with mental health condition in last 12 months	27 (10.38)
Currently on treatment for mental health condition	46 (17.69)
Prevalence of burnout	
Burnout	203 (78.08)
Exhausted	23 (8.85)
Disengaged	11 (4.23)
Non-burnout	23 (8.85)

*Data presented as mean and standard deviation

3.4 Aspects of COVID-19 and Workplace Interventions

The evaluation of COVID-19 impacts revealed that over half of the participants had been infected with COVID-19 (56%). A small number of participants (6%) were still experiencing symptoms, with almost half (49%) reporting a full recovery. Some participants reported transmitting COVID-19 to family members (18%) and 38% had to care for family members who had contracted COVID-19. Workplace interventions to mitigate COVID risk such as the adequate supply of PPE (49%) and adequate implementation of IPC measures and policies in their workplaces (45%) were also reported with majority (93%) also having received vaccination against COVID-19 (Table 6).

Table 6. Factors reflecting COVID-19 infections, transmission and workplace interventions

Aspects of COVID-19	N (%)
Infection and Transmission	
Infected with COVID-19	146 (56.15)
Fully recovered from COVID-19 infection	128 (49.23)
Still experiencing symptoms	16 (6.15)
Transmitted COVID-19 infections to family members	47 (18.36)
Had to care for family members who contracted COVID-19	100 (38.46)
Workplace Interventions	
Given an adequate supply of PPE* during COVID-19 pandemic	127 (48.85)
Adequate implementation of IPC$ measures and policies	117 (45.00)
Redeployed to another department during pandemic	60 (23.08)
Had to change annual leave because of COVID-19	147 (56.54)
Received vaccination against COVID-19	244 (93.85)

*PPE: Personal Protective Equipment
$IPC: Infection Prevention and Control

3.5 Interventions proposed by participants to reduce stress at work

Participants supported organizational measures to mitigate workplace-related stress such as: employing more staff (93%), improving working conditions (83%), improving equipment supplies (67%) and improving management support (66%). Other measures such as

improving communication and the need for skill training were also supported. The least supported interventions (39%) were reducing workload or improving supervision (Figure 2).

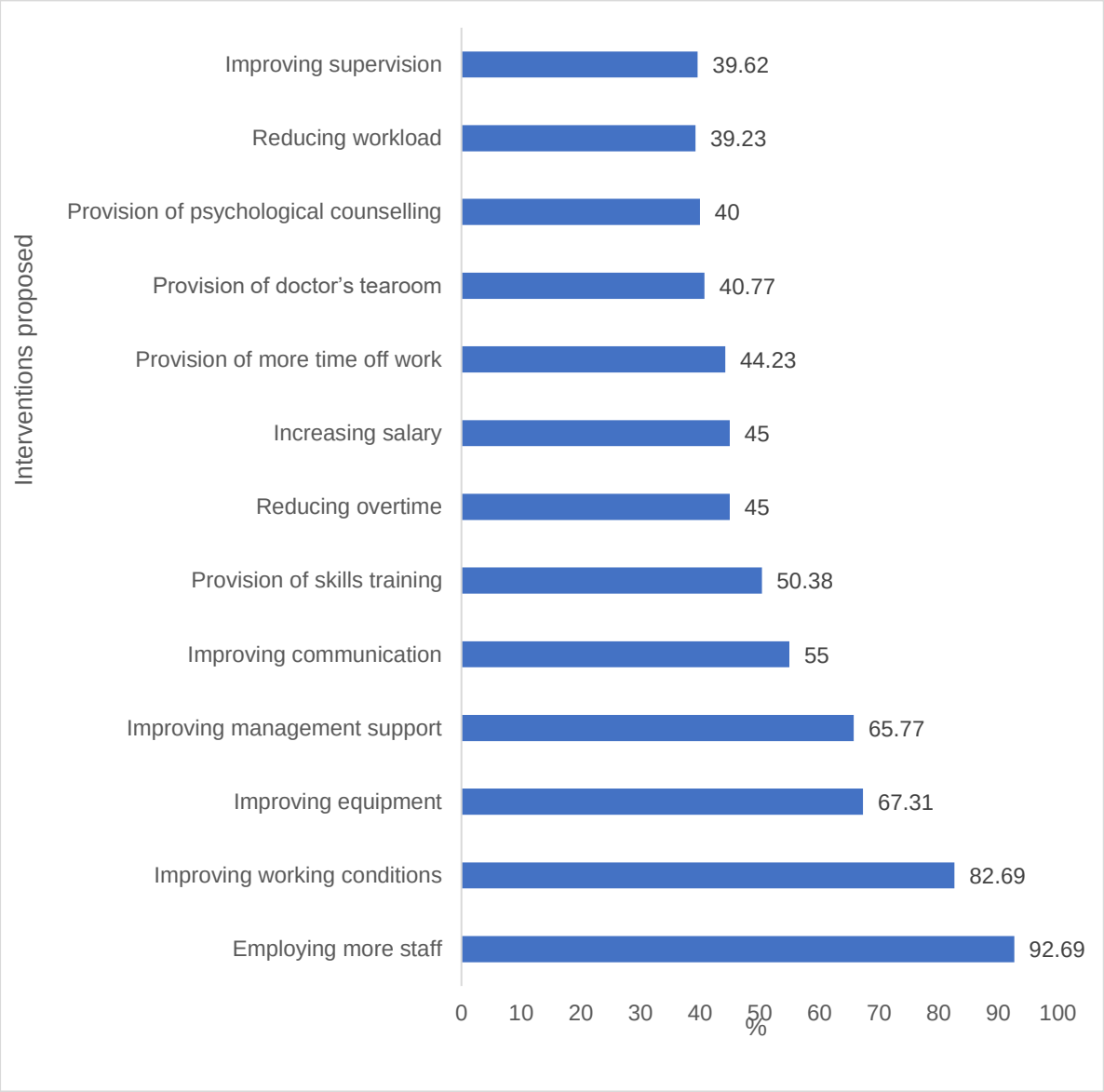

Figure 2. Interventions proposed by participants to reduce stress at work

3.6 Occupational and Individual Predictors of burnout

As regards the NIOSH GJSQ risk factors, fifty percent of participants experienced medium levels of workload and responsibility (Figure 3 and Table 7). Over a quarter of the participants (29%) experienced high levels of conflict at work and a third (34%) experienced high levels of role ambiguity and role conflict. Almost a third (32%) experienced low job satisfaction and 24% experienced low levels of support at work.

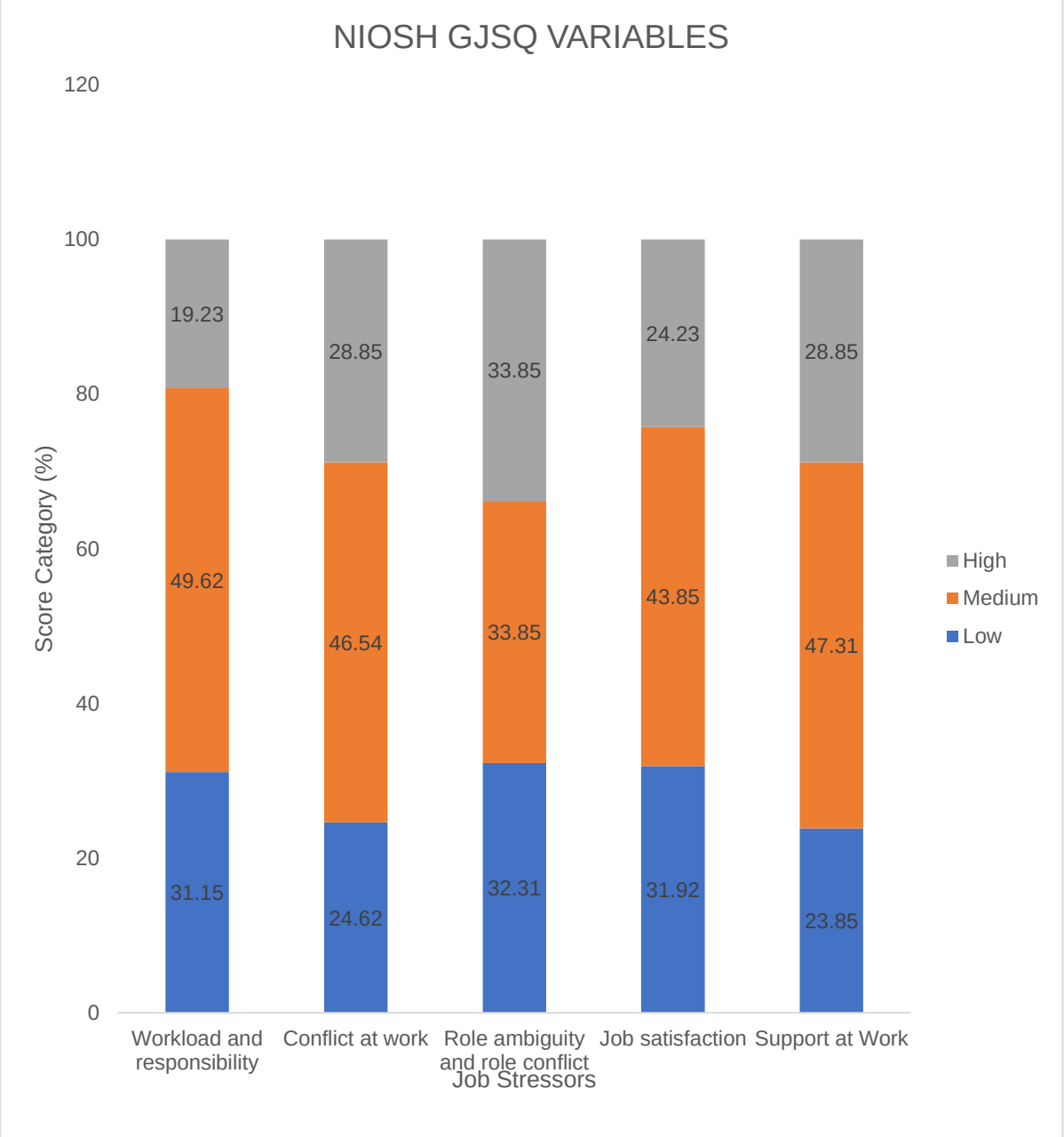

Figure 3: Proportions of doctors who scored in the high, medium and low tertiles for the selected NIOSH GJSQ variables

Based on the CD-RISC score, a quarter of the participants had high levels of resilience while about half (46%) had medium resilience and the remaining quarter had low levels of resilience (Table 7).

Table 7. Frequency table for NIOSH GJSQ subscales and CDRISC (according to tertiles)

Risk factors	N (%)
NIOSH GJSQ	
Workload and responsibility	
Low (14)	81 (31.15)
Medium (14-16)	129 (49.62)
High (>16)	50 (19.23)
Conflict at work*	
Low (<9)	64 (24.62)
Medium (9-13)	121 (46.54)
High (>13)	75 (28.85)
Role ambiguity and role conflict	
Low (<13)	84 (32.31)
Medium (13-16.26)	88 (33.85)
High (>16.26)	88 (33.85)
Job satisfaction**	
Low (<7)	83 (31.92)
Medium (7-9)	114 (43.85)
High (>9)	63 (24.23)
Support at Work**	
Low (<7)	62 (23.85)
Medium (7-10)	123 (47.31)
High (>10)	75 (28.85)
Resilience (CDRISC score)	
Low (<35)	75 (28.85)
Medium (35-40)	120 (46.15)
High (>40	65 (25.00)

*Conflict at work (Questions on Intergroup conflict and Intragroup conflict combined)
**Job satisfaction and Support at work reverse coded to reflect increased risk with increased scoring category

3.7 Logistic regression analyses

3.7.1 Unadjusted univariate logistic regression analysis

Unadjusted logistic regression analysis was performed for this study (Table 8). Burnout was significantly associated with working overtime (OR=4.78, 95% CI:1.24-18.44), belonging to the lowest income band (OR=3.39, 1.23-9.33), and feeling the need to use alcohol to manage

WRS (OR=3.2, 1.20-8.47). With respect to the job stress correlates, burnout was significantly associated with high conflict at work (OR=5.08, 2.00-12.94), high role ambiguity and conflict (OR=4.33, 1.95-9.59). Participants with medium role ambiguity and conflict (OR=2.32, 1.16-4.63) were also more likely to have burnout.

Those participants with low job satisfaction (OR=25.75, 5.90-112.37), low support at work (OR=8,87, 3.35-23.48), medium job satisfaction (OR= 4.81, 2.45-9.43) and medium support at work (OR=3.18, 1.62-6.22) were also at increased risk for burnout. These factors reflected a dose-response relationship with those in the highest categories of job stress factors at greater risk of burnout when compared to those in the medium and low risk categories.

Medium and high resilience was found to be significantly protective against burnout, (OR=0.28, 0.10-0.78) and (OR=0.09, 0.03-0.26) respectively. Although both medium workload (OR=1.53, 0.78-2.98) and high workload and responsibility (OR=1.10,0.48-2.50) as well as medium conflict at work (OR=1.73, 0.89-3.38) was associated with burnout, this was not statistically significant.

Unadjusted logistic regression analysis was further performed for exhaustion and disengagement with results presented in Table S1 (Appendix 9).

3.7.2 Adjusted multivariate logistic regression analysis

Multivariate regression analysis was computed (Table 8), with each model adjusted for age and gender. Burnout was significantly associated with being a medical intern or community service medical officer (OR=6.72, 1.71-26.40). The association between burnout and working overtime was attenuated and was no longer significant. However, there were few associations between burnout and some risk factors, which strengthened after adjusted analysis. These associations involved being in the lowest income band (OR= 10.78, 2.55-45.49) as well as feeling the need to use alcohol to manage WRS (OR=3.01, 1.12-8.04).

Regarding the job stress predictors, burnout was significantly associated with high conflict at work (OR=5.04, 1.92-13.20) and high role ambiguity and role conflict ((OR=4.49,1.98-10.18).

Participants with medium role ambiguity and role conflict (OR=2.25, 1.11-4.57) were also more likely to have burnout. Those participants with low job satisfaction (OR=27.82, 6.27-123.45), low support at work (OR=9.99, 3.66-27.23), medium job satisfaction (OR= 5.38, 2.65-10.93) and medium support at work (OR=3.39, 1.71-6.73) were also at increased risk of burnout.

With multivariate regression analysis, medium resilience (OR=0.28, 0.10-0.80) and high resilience (OR=0.08, 0.03-0.25) were once again found to be significantly protective against burnout.

Regarding the logistic regression analysis of aspects of COVID-19 infection, while some factors related to COVID-19 infection and workplace interventions were associated with burnout, none of the associations were statistically significant as in the unadjusted analysis.

Table 8. Unadjusted and adjusted regression analysis for the correlates of burnout: Demographic and general health characteristics of participants, Resilience, Job Stress and Aspects of COVID-19 and Workplace interventions (N=260)

Correlates	Unadjusted univariate analysis[$]		Adjusted multivariate analysis*[$]	
	OR (95% CI)	P value	OR (95% CI)	P value
Age				
20-29	1.00		-	-
30-39	1.28 (0.62-2.67)	0.49	-	-
40-49	1.22 (0.53-2.77)	0.63	-	-
>50	0.83 (0.31-2.19)	0.70	-	-
Gender				
Man	1.00		-	-
Woman	1.37 (0.76-2.49)	0.29	-	-
Language				
English	1.00			
Afrikaans	1.42 (0.65-3.06)	0.37	1.37 (0.63-2.99)	0.41
isiXhosa	2.18 (0.72-6.59)	0.16	2.09 (0.68-6.37)	0.19
Other	0.64 (0.57-7.30)	0.72	0.61 (0.05-7.12)	0.69
Relationship status				
Married	1.00			
Single	1.48 (0.77-2.84)	0.23	1.69 (0.79-3.61)	0.17
In a committed relationship	1.46 (0.61-3.51)	0.39	1.66 (0.63-4.34)	0.29
Children living at home	1.06 (0.58-1.96)	0.82	1.02 (0.48-2.15)	0.95
Primary caregiver of children	1.15 (0.60-2.20)	0.66	1.09 (0.52-2.30)	0.80
Primary caregiver of elderly or disabled family members	1.61 (0.53-4.87)	0.39	1.60 (0.50-5.08)	0.41

Correlates	Unadjusted univariate analysis[$]		Adjusted multivariate analysis*	
	OR (95% CI)	**P value**	**OR (95% CI)**	**P value**
Job Title/Category				
Medical Specialist/Consultant	1.00			
Medical Officer	1.07 (0.48-2.41)	0.85	1.82 (0.63-5.22)	0.26
Registrar	0.62 (0.25-1.52)	0.29	0.47 (0.14-1.54)	0.21
Medical Intern (community service medical officers included)	1.74 (0.75-4.05)	0.19	**6.72 (1.71-26.40**)	**0.006**
Department/Speciality				
Anaesthetics	1.00			
Paediatrics	0.68 (0.18-2.51)	0.57	0.72 (0.19-2.67)	0.62
Emergency & Family Medicine	1.58 (0.41-6.07)	0.50	2.10 (0.51-8.55)	0.30
Surgical and Obstetrics & Gynaecology	0.55 (0.17-1.81)	0.33	0.61 (0.18-2.04)	0.43
Internal Medicine	0.77 (0.22-2.73)	0.69	0.80 (0.22-2.88)	0.74
Employment				
Part-time	1.00			
Full-time	0.88 (0.18-4.29)	0.88	0.40 (0.04-3.37)	0.40
Overtime				
No	1.00			
Yes	**4.78 (1.24-18.44)**	**0.02**	4.01 (0.93-17.23)	0.06
Overtime worked, per month (hours)				
0-60	1.00			
60-80	1.89 (0.84-4.24)	0.11	2.22 (0.90-5.45)	0.08
80-100	1.73 (0.69-4.29)	0.23	1.95 (0.72-5.24)	0.18
>100	2..09 (0.70-6.25)	0.18	2.28 (0.74-7.00)	0.14

Correlates	Unadjusted univariate analysis[$]		Adjusted multivariate analysis*[$]	
	OR (95% CI)	**P value**	**OR (95% CI)**	**P value**
Average length of overtime call (hours)				
8-11	1.00			
12-15	1.96 (0.57-6.73)	0.28	1.96 (0.55-7.03)	0.29
16-19	1.09 (0.32-3.66)	0.88	1.10 (0.31-3.91)	0.87
20-23	1.11 (0.31-3.92)	0.86	1.07 (0.29-3.86)	0.91
>24	1.89 (0.58-6.17)	0.28	1.87 (0.54-6.44)	0.31
Overtime site				
Off-site	1.00			
On-site	1.38 (0.73-2.60	0.31	1.99 (0.82-4.85)	0.12
Years employed in post	0.99 (0.94-1.04)	0.85	0.99 (0.92-1.08)	0.98
Monthly salary (ZAR)				
>100 000	1.00			
50 000-100 000	1.60 (0.65-3.90)	0.30	2.40 (0.76-7.63)	0.13
30 000-50 000	**3.39 (1.23-9.33**)	**0.01**	**10.78 (2.55-45.49)**	**0.001**
Changed job in past 2 years	0.98 (0.50-1.92)	0.97	0.95 (0.47-1.90)	0.89
Age started smoking	0.99 (0.83-1.19)	0.98	1.11 (0.87-1.43)	0.38
Age started illicit drugs	1.16 (0.87-1.56)	0.29	1.89 (0.92-3.90)	0.08
Smoker				
Never	1.00			
Previous smoker	0.63 (0.24-1.61)	0.33	0.81 (0.29-2.27)	0.69
Current	0.73 (0.27-1.98)	0.54	0.84 (0.30-2.35)	0.74

Correlates	Unadjusted univariate analysis[$]		Adjusted multivariate analysis*[$]	
	OR (95% CI)	**P value**	**OR (95% CI)**	**P value**
Alcohol use				
Never	1.00			
Previous alcohol use	2.17 (0.76-6.24)	0.14	2.71 (0.88-8.36)	0.08
Current	1.38 (0.68-2.79)	0.35	1.47 (0.70-3.04)	0.30
Drug/illicit drug use				
Never	1.00			
Previous illicit drug use	0.47 (0.15-1.48)	0.20	0.64 (0.18-2.28)	0.49
Current illicit/non-prescription drug use	0.66 (0.12-3.51)	0.62	0.67 (0.12-3.66)	0.65
Substance use to manage work related stress (WRS)				
Feel need to smoke to manage WRS	1.14 (0.51-2.55)	0.73	1.16 (0.51-2.63)	0.70
Feel need to use alcohol to manage WRS	**3.2 (1.20-8.47)**	**0.019**	**3.01 (1.12-8.04)**	**0.02**
Feel need to use illicit drugs to manage WRS	NC		NC	
Feel need to use prescription drugs to manage WRS	4.84 (0.62-37.33)	0.13	5.01 (0.64-39.14)	0.12
Mental health				
Ever diagnosed with mental health diagnosis	1.08 (0.55-2.14)	0.81	1.10 (0.54-2.23)	0.77
Diagnosed with mental health diagnosis last year	2.41 (0.69-8.32)	0.16	3.53 (0.80-15.47)	0.09
On treatment for mental health diagnosis	1.18 (0.53-2.63)	0.67	1.28 (0.55-2.96)	0.56
Resilience (CDRISC score)				
Low	1.00			
Medium	**0.28 (0.10-0.78)**	**0.015**	**0.28(0.10-0.80)**	**0.01**
High	**0.09 (0.03-0.26)**	**0.000**	**0.08 (0.03-0.25)**	**0.000**

Correlates	Unadjusted univariate analysis[$]		Adjusted multivariate analysis*[$]	
	OR (95% CI)	P value	OR (95% CI)	P value
Job Stress				
Workload and responsibility				
Low	1.00			
Medium	1.53 (0.78-2.98)	0.21	1.44 (0.72-2.86)	0.29
High	1.10 (0.48-2.50)	0.80	1.06 (0.44-2.51)	0.89
Conflict at work				
Low	1.00			
Medium	1.73 (0.89-3.38)	0.10	1.69 (0.85-3.35)	0.12
High	**5.08 (2.00-12.94)**	**0.001**	**5.04 (1.92-13.20)**	**0.001**
Role ambiguity and conflict				
Low	1.00			
Medium	**2.32 (1.16-4.63)**	**0.017**	**2.25 (1.11-4.57)**	**0.02**
High	**4.33 (1.95-9.59)**	**0.000**	**4.49(1.98-10.18)**	**0.000**
Job satisfaction				
High	1.00			
Medium	**4.81 (2.45-9.43)**	**0.000**	**5.38 (2.65-10.93)**	**0.000**
Low	**25.75 (5.90-112.37)**	**0.000**	**27.82 (6.27-123.45)**	**0.000**
Support at work				
High	1.00			
Medium	**3.18 (1.62-6.22)**	**0.001**	**3.39 (1.71-6.73)**	**0.000**
Low	**8.87 (3.35-23.48)**	**0.000**	**9.99 (3.66-27.23)**	**0.000**

Correlates	Unadjusted univariate analysis[$]		Adjusted multivariate analysis*[$]	
	OR (95% CI)	P value	OR (95% CI)	P value
Aspects of COVID-19				
Infection and transmission				
Infected with COVID-19	1.2 (066-2.16)	0.54	1.11 (0.60-2.04)	0.72
Fully recovered from COVID-19 infection	0.44 (0.09-2.05)	0.30	0.96 (0.52-1.74)	0.89
Still experiencing symptoms	15 (0.48-464.20)	0.12	4.15 (0.51-33.13)	0.17
Transmitted COVID-19 infections to family members	2.14 (0.86-5.35)	0.10	2.11 (0.84-5.30)	0.11
Had to care for family members who contracted COVID-19	1.32 (0.71-2.46)	0.36	1.33 (0.70-2.51)	0.37
Workplace Interventions				
Given an adequate supply of PPE during COVID-19 pandemic	0.62 (0.34-1.13)	0.12	0.59 (0.32-1.09)	0.09
Adequate implementation of IPC measures and policies	0.73 (0.41-1.33)	0.31	0.78 (0.43-1.42)	0.42
Redeployed to another department during pandemic	0.89 (0.45-1.78)	0.76	0.83 (0.41-1.68)	0.61
Had to change annual leave because of COVID-19	0.93 (0.51-1.68)	0.81	0.80 (0.40-1.61)	0.54
Received vaccination against COVID-19	1.20 (0.37-3.87)	0.75	1.26 (0.38-4.13)	0.70

NC- non-computable
*Data adjusted for age and gender
$ Statistically significant results indicated in bold
WRS: work-related stress
CD-RISC: Connor-Davidson Resilience Scale

CHAPTER 4: DISCUSSION

This study aimed to estimate the burnout prevalence and the determinants of burnout amongst medical doctors at public hospitals in Gqeberha, South Africa during the COVID-19 pandemic. It found the prevalence of burnout amongst medical doctors to be high at 78%. A strong association was shown between burnout and being a junior doctor (medical intern or community service medical officer). There was a strong association between burnout and substance use, as many doctors with high risk for burnout, felt the need to use alcohol to manage work-related stress (WRS). While work-related factors such as conflict at work and role ambiguity and role conflict increased the risk of burnout, other occupational factors like support at work, job satisfaction and resilience mitigated this risk. Contrary to expectations, this study found no significant associations between burnout and COVID-19 factors that were explored.

While the prevalence of burnout in this study is higher than global trends,[50,72] it is consistent with the high burnout prevalence found in some other local studies, conducted before the COVID pandemic, which ranged between 59% and 84%.[5,31,33,39,44,45] Previous studies evaluating the prevalence of burnout in other LMICs observed high variability in prevalence rates between 62% and 95% due to the different burnout inventories and cut-off scales used.[27,28] The prevalence of burnout found in this study is, however, consistent with the 75.5% found in a multicentre cross-sectional study in Nigeria which also used the OLBI and matching cuff-off scales.[32]

This study supports evidence from previous observations[5,45,50] that did not show any significant association with burnout and sociodemographic factors such as age, gender, relationship status and being the primary caregiver of children or elderly or disabled family members. This corroborates the suggestion that the source of burnout resides in contextual factors such as occupational and organisational factors and are independent of individual factors.[5]

Across occupational demographic characteristics, this study revealed a strong association between burnout and being a medical intern or community service medical officer and burnout. This supports previous local and global studies which describe high prevalence burnout as an early career phenomenon in which junior doctors are at greater risk of burnout than their senior peers due to lack of experience in handling occupational stressors such as high workload, lack of role clarity, lack of control and poor support in an overburdened health system.[31,43-45,104-107] This study also found that the doctors earning salaries in the lowest income band (which correlates to being a junior doctor) had greater levels of burnout in comparison to more experienced doctors earning in the highest income band.

About a quarter of the participants used alcohol (21%) to manage WRS while feeling the need to use alcohol was associated with an increased risk of burnout. Since this study was cross-sectional in design, it is unclear whether alcohol use preceded or followed burnout. However, it is possible that participants were using alcohol, as a maladaptive coping mechanism, to ease the stressors associated with burnout.[51,74] Previous studies have reported burnout to be independently associated with a 25% increased odds of alcohol abuse/dependence.[51,74] This result may be explained by distressed doctors being more likely to use alcohol, to help them cope and/or feel better during stressful events.

Based on the Job Demands-Resources model, the higher the demands placed on the individual and the fewer resources the individual has available, the more maladaptive the coping will be. This maladaptive coping results in burnout.[5,19,100,107,108] The result of the present study supports this model as multivariate analysis revealed statistically significant relationships between burnout scores and the job stressors of conflict at work, role ambiguity and role conflict, job satisfaction and support at work. Conflict at work tends to increase the level of burnout in doctors and our findings are similar to a study by Elshaer,[102] suggesting that discordancy within a group or between groups increases strain and job demands, which increase the risk of burnout.

Both role ambiguity and role conflict are positively correlated with burnout in this study and are in accord with other studies. [102,107,108] This suggests that by increasing qualitative demands, role conflict (due to conflicting demands at work) and role ambiguity (due to ill-defined tasks), there is a positive correlation with burnout due to increasing workplace demands.

Many systematic reviews have indicated that workload as a quantitative job demand, is an occupational factor resulting in burnout.[28,46,51] Surprisingly, in the current study, while participants reported high levels of workload, this was not significantly associated with burnout. This might be explained by the timing of the study, as participants had had a chance to recover from increasing demands and high workloads experienced during the earlier peak periods of the COVID-19 pandemic.

In accordance with prior studies,[51,56,93] the results of this study show that job satisfaction and support at work, protect against burnout. By increasing job resources, support by both supervisors and colleagues assists in mitigating burnout in doctors.[46,50,51,56,93]

As expected, the results of this study reflected a negative correlation between burnout and resilience score. While building resilience in doctors could assist in mitigating the challenges related to the job stressors in the healthcare setting, focussing only on resilience training of the individual doctor may distract from the broader organizational and operational concerns that are determinants of burnout.[90-92,94,96]

Contrary to expectations, in this study, no statistically significant association was noted between burnout and COVID-19-related factors. A possible explanation for this may be that this study was conducted during the fifth wave of COVID-19, by which time the acute workplace stress resulting from increased hospital admissions for COVID-19 had reduced, and the threat of COVID-19 together with the uncertainty it brought, had lessened. Vaccination was at this stage also widely available substantially mitigating risk of COVID infection in the workplace.

It may also be that the high burnout level in this study is less affected by COVID-19 and rather attributable to the ongoing organisational challenges faced by doctors working in these institutions, as reported in negative media reports. To establish the veracity of the repeated media reports,[12,83] in 2021 the Public Protector investigated conditions within LTH in the Eastern Cape Province.[13] The report noted that the instability in leadership, due delays in filling senior management positions, as a cause of the chronic institutional challenges.[13] The report further revealed systemic, administrative and infrastructural deficiencies such as "acute staff shortages, inadequate physical infrastructure, shortage of medical equipment or machinery and insufficient supply of other resources like PPE, which are necessary to sustain an effective health facility".[13]

In an attempt to explore how these issues could potentially be addressed, this study also explored the acceptability of preventative interventions at an organisational level to successfully reduce burnout amongst doctors. Poor working conditions and staff shortages have been identified in previous studies to be contributory to burnout, while management support was found to be protective.[3,28,31,33,50,51,55] It is therefore not surprising that the interventions most supported by participants in this study include employing more staff, improving working conditions, improving equipment and management support. In contrast to the recommendations of global as well as local studies, provision of psychological counselling was one of the less supported interventions. This may be related to the fact that weekly debriefing sessions for doctors by the Staff Psychologist, were already in place in the high-risk areas of Emergency Medicine, Internal Medicine and ICU, during the five waves of the COVID pandemic.

Limitations

The study had several limitations. Recall bias was unavoidable as data collected were based on participant's self-reports. Selection bias, caused by doctors who preferred not to participate and may have answered differently and altered the overall burnout prevalence obtained. The

lack of participation may have been due to the stigma associated with a mental health condition like burnout. Response fatigue may be another possible reason for lack of participation, as another burnout survey was conducted a few months before the start of this study. Participant concerns regarding confidentiality or future work advancement may also have contributed to bias. However, this was mitigated by an introductory letter explaining not only the study methodology, but also the data handling concerns. Response bias may have resulted in doctors experiencing burnout symptoms being more eager to participate, leading in their over-representation while social desirability bias may lead to reduced study estimates. The healthy worker effect may have resulted in an underestimation of burnout, since doctors impaired by burnout, may have resigned, leaving the healthier doctors behind. Another limitation resulted from the difficulty to control for multiple survey entries when the survey was completed via online social network applications (WhatsApp Instant Messenger) by some participants. However, the introductory letter requested that participants not submit more than one response. Furthermore, no incentives were provided to participants, thus there was no motivation for completing the survey more than once.

To keep the questionnaire to an acceptable length, not all potential job stressors from the NIOSH GJSQ as risk factors for burnout were assessed. As a result of financial limitations, the MBI, largely regarded as the gold standard in the diagnosis of burnout, was not used in this study. Although the evidence for the validity of the OLBI, CDRISC and NIOSH GJSQ in LMICs populations is limited, the inventories and scales are appropriate since they have been widely used as validated tools.

As a result of the cross-sectional design, this study precludes the evaluation of temporality and causality of the observed associations since there was simultaneous collection of both exposures and outcome data. However, the correlation of this study's findings with the results from local and international studies, tend to suggest that the significant findings and associations found in this study, may be a reflection of risk factors identified in the development of burnout in doctors working in public hospitals in Gqeberha.

Conclusion

This study found the prevalence of burnout amongst doctors working in public hospitals in Gqeberha during the COVID-19 pandemic to be high and that occupational as well as organizational factors, more than individual factors, may be responsible for burnout in doctors.

The high prevalence of burnout among doctors is concerning because in an already low-resource setting like the Eastern Cape, it constitutes a public health crisis with detrimental consequences for, not only individual doctors, but for patients, healthcare facilities and society too. Despite different work contexts and preparedness, the agreement between this study's findings and other local and international studies, indicates that the COVID-19 pandemic impacted doctors similarly. COVID-19 has highlighted the existing systemic organisational challenges faced by doctors working in public hospitals in Gqeberha, which potentiates burnout. Consequently, to ensure the viability of the public healthcare system in Gqeberha, both during and following the pandemic, policy makers and stakeholders will need to address the organisational factors rooted within healthcare systems which are contributing to burnout in doctors.

RECOMENDATIONS

Since the outbreak of COVID-19, many studies have evaluated the impact of COVID-19 on the mental health of doctors, but few have focussed on effective interventions to support well-being. It is anticipated that this study's results would present provincial managers, hospital board trustees, employee representatives and organisational leaders with a comprehensive review regarding factors contributing to burnout amongst doctors working in public hospitals in Gqeberha, during the COVID-19 pandemic.

Based on this study, several recommendations, using a hierarchy of controls, are proposed at an organisational level, to mitigate burnout in doctors. Environmental controls recommended to mitigate occupational stress and burnout involve employing more staff, improving working conditions, increasing equipment supply and intensifying management support. This would create a better work environment for all doctors, reduce burnout and enhance job satisfaction for doctors and all HCWs. Recommended administrative controls include developing clear policies and guidelines to resolve role ambiguity and role conflict to mitigate burnout in doctors. Implementing guidelines to address organisational culture by promoting civility and mitigating conflict at work, would ameliorate discordancy amongst doctors and between doctors and other HCWs. To reduce fatigue and exhaustion in doctors, this study recommends re-evaluation of human resource policies regarding overtime and proposes planning reasonable time limitations on the duration of shifts. It also recommends evaluation of the effectiveness of interventions and wellness initiatives in the healthcare setting.

This study furthermore highlights the need for the implementation of acceptable and sustainable mental health interventions as PPE to reduce occupational stress and burnout in the workplace. To mitigate burnout, during the current pandemic and post pandemic, it is recommended that specific therapeutic programmes addressing coping skills, resilience, mindfulness and self-care strategies should be offered to all doctors, particularly junior doctors and medical students starting their careers. To assist doctors with mental health conditions or substance use issues, specific interventions should be aimed at identifying and assisting this group without stigmatisation. This study supports a strategy of involving doctors, at an organisational level, in planning and designing guidelines to improve the working conditions of doctors, as they are pivotal to the healthcare system.

While an extensive body of literature regarding the prevalence of burnout in doctors exists, there is great variability in study design, study instruments and cut-off scores. It is advisable

that future research be based on standardised and validated open access instruments with universal cut-off scores, which will afford a fair comparison of results. Additional longitudinal studies investigating the relationship between burnout and job stressors (conflict at work, role ambiguity and role conflict, job satisfaction and insufficient support at work) on quality of patient care delivery would provide valuable insight to the impact of burnout on service delivery within the hospital setting. Investigating job satisfaction and its impact on turnover intentions of doctors could provide insight to the impact of burnout on future healthcare needs in public hospitals in Gqeberha.

It is envisaged that these recommendations, by addressing both the individual and organisational factors driving burnout in doctors, would assist in mitigating the consequences of burnout to doctors, patients and healthcare systems in Gqeberha.

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APPENDICES

APPENDIX 1: ENGLISH QUESTIONNAIRE

UCT STUDY ON THE PREVALENCE AND DETERMINANTS OF BURNOUT AMONGST MEDICAL DOCTORS AT PUBLIC HOSPITALS IN GQEBERHA DURING THE COVID-19 PANDEMIC

Note: Answer ALL questions. Insert a cross (X) where appropriate
Do not put your name on any of the forms provided. The information which you provide will be confidential and will be combined with other answers and presented as group data only with no individual identification data included.

PART ONE
Identification data

1.1 Age:

a) 20-29 ☐
b) 30-39 ☐
c) 40-49 ☐
d) 50-59 ☐
e) >60 ☐

1.2 To which gender do you most identify?

a) Man ☐
b) Woman ☐
c) Trans ☐
d) Gender Non-conforming ☐

1.3 Language:

a) English ☐
b) Afrikaans ☐
c) isiXhosa ☐
d) other ☐

1.4 Relationship status

a) Married ☐
b) Single, Never married ☐
c) Single, Divorced ☐
d) Single, Widowed ☐
e) In a committed relationship ☐

1.5 If you have children living at home, how many are in each of the following age groups:

a) Less than 4 years old ☐
b) 4 through 12 years old ☐
c) 13 through 20 years old ☐
d) 21 and over ☐

1.6.1 Are you the primary caregiver of the children?

Yes ☐
No ☐

1.6.2 Are you the primary caregiver of elderly or disabled family members?

a) Yes
b) No

Occupational data

1.7 What is your current job title?

a) Intern
b) Medical Officer
c) Registrar
d) Consultant
e) Clinical Manager
f) Other (please specify)

1.8 Which department are you working in?

a) Internal Medicine
b) Surgical
c) Anaesthetics
d) Family Medicine
e) Emergency Medicine
f) Obstetrics and gynaecology
g) Paediatrics
h) Other

1.9 Are you employed full-time or part-time?

1.10 How many hours OVERTIME do you work per month, on average?

a) 0-60 hours
b) 60-80 hours
c) 80-100 hours
d) 100-120 hours
e) >120 hours

1.11 How long is your average overtime call?

a) 8 hours
b) 8-12 hours
c) 12-16 hours
d) 16-20 hours
e) 20-24 hours
f) >24 hours

1.12 Where is the majority of your overtime done?

a) On-site
b) Off-site

1.13 How many years have you been employed in this post?

1.14 What is your monthly salary (after tax)?

a) R30 000-R50 000
b) R50 000-R100 000
c) R100 000-R150 000
d) >R150 000

1.15 Have you had to change your job/role in the past 2 years?

a) Yes
b) No

1.16 What were the reasons for changing your job/role?

Below is a series of statements with which you may agree or disagree.
Indicate the degree of your agreement by selecting Yes or No.

Smoking History

1.17 Have you ever smoked cigarettes for as long as a year?
("Yes" means at least 20 packs of cigarettes in a lifetime or at least one cigarette per day for one year)

a) Yes
b) No

If YES, go on to Question 1.17.1
If NO, skip to Question 1.17.2

1.17.1 How old were you when you started smoking?

1.17.2 Do you now smoke? ("Yes" means smoking cigarettes in the last month or more)

a) Yes
b) No

If YES, go on to Question 1.17.3
If NO, skip to Question 1.18

1.17.3 Do you ever feel the need to smoke to manage work-related stress or problems in the workplace?

a) Yes
b) No

Alcohol History

1.18 Have you ever drunk alcohol?

a) Yes
b) No

1.19 Do you drink alcohol now?

a) Yes
b) No

If YES, go on to Question 1.19.1
If NO, skip to Question 1.20

1.19.1 How frequently do you consume alcohol?

a) Daily
b) Over weekends
c) Weekly
d) Monthly

1.19.2 How many units per week do you consume?

1.19.3 Do you ever feel the need to drink alcohol to manage work related stress or problems in the workplace?

a) Yes
b) No

Drug and Substance use History

1.20 Have you ever used illicit or non-prescription drugs?

a) Yes
b) No

If YES, go on to Question 1.20.1
If NO, skip to Question 1.21

1.20.1 How old were you when you started using illicit drugs?

1.20.2 Do you now use illicit or non-prescription drugs?

a) Yes
b) No

If YES, go on to Question 1.20.3
If NO, skip to Question 1.21

1.20.3 Do you ever feel the need to use illicit drugs to manage work-related stress or problems in the workplace?

a) Yes
b) No

1.20.4 Do you ever use non-prescription drugs to manage work-related stress or problems in the workplace?

a) Yes
b) No

Mental Health History

1.21 Have you ever been diagnosed with a mental health condition?

a) Yes
b) No

1.22 Have you been diagnosed with a mental health condition in the last 12 months?

a) Yes
b) No

1.23 If you have answered "Yes" to either 1.21 or 1.22, could you specify what your mental health condition/s is/are?

1.24 Are you on any treatment for a mental health condition?

a) Yes
b) No

PART TWO

The following statements refer to your feelings and attitudes during work.
Please indicate to what extent you agree with each of the following statements by selecting the category that corresponds with the statement.

2.1 I always find new and interesting aspects in my work.

a) Strongly agree
b) Agree
c) Disagree
d) Strongly Disagree

2.2 There are days when I feel tired before I arrive at work

a) Strongly agree
b) Agree
c) Disagree
d) Strongly Disagree

2.3 It happens more and more often that I talk about my work in a negative way

a) Strongly agree
b) Agree
c) Disagree
d) Strongly Disagree

2.4 After work, I tend to need more time than in the past in order to relax and feel better

a) Strongly agree
b) Agree
c) Disagree
d) Strongly Disagree

2.5. I can tolerate the pressure of my work very well

a) Strongly agree
b) Agree
c) Disagree
d) Strongly Disagree

2.6 Lately, I tend to think less at work and do my job almost mechanically

a) Strongly agree
b) Agree
c) Disagree
d) Strongly Disagree

2.7 I find my work to be a positive challenge

a) Strongly agree
b) Agree
c) Disagree
d) Strongly Disagree

2.8 During my work, I often feel emotionally drained

a) Strongly agree
b) Agree
c) Disagree
d) Strongly Disagree

2.9 Over time, one can become disconnected from this type of work

a) Strongly agree
b) Agree
c) Disagree
d) Strongly Disagree

2.10 After working, I have enough energy for my leisure time activities

a) Strongly agree
b) Agree
c) Disagree
d) Strongly Disagree

2.11 Sometimes, I feel sickened by my work tasks

a) Strongly agree
b) Agree
c) Disagree
d) Strongly Disagree

2.12 After work, I usually feel worn out and weary

a) Strongly agree
b) Agree
c) Disagree
d) Strongly Disagree

2.13 This is the only type of work I can imagine myself doing

a) Strongly agree
b) Agree
c) Disagree
d) Strongly Disagree

2.14 Usually, I can manage the amount of work well

a) Strongly agree
b) Agree
c) Disagree
d) Strongly Disagree

2.15 I feel more engaged in my work

a) Strongly agree
b) Agree
c) Disagree
d) Strongly Disagree

2.16 When I work, I usually feel energised

a) Strongly agree
b) Agree
c) Disagree
d) Strongly Disagree

PART THREE
The next few items are concerned with various aspects of your work activities.
Please insert a cross where appropriate.

Workload and Responsibility

3.1. How much workload do you have in your present (clinical/administrative) role?

a) Hardly
b) A little
c) Some
d) A lot
e) A great deal

3.2 How much time do you have to do all your (clinical/administrative) work?

a) Hardly
b) A little
c) Some
d) A lot
e) A great deal

3.3 How much responsibility do you have for the morale of patients and colleagues?

a) Hardly
b) A little
c) Some
d) A lot
e) A great deal

3.4 How much responsibility do you have for the welfare and lives of patients and colleagues?

a) Hardly
b) A little
c) Some
d) A lot
e) A great deal

Conflict at work

3.5 There is harmony within my group.

a) Strongly disagree
b) Moderately disagree
c) Neither agree nor disagree
d) Moderately agree
e) Strongly agree

3.6 The members of my group are supportive of each other's ideas

a) Strongly disagree
b) Moderately disagree
c) Neither agree nor disagree
d) Moderately agree
e) Strongly agree

3.7 There is agreement between my group and other groups

a) Strongly disagree
b) Moderately disagree
c) Neither agree nor disagree
d) Moderately agree
e) Strongly agree

3.8 The relationship between my group and other groups is harmonious in attaining the overall organisational goals

a) Strongly disagree
b) Moderately disagree
c) Neither agree nor disagree
d) Moderately agree
e) Strongly agree

Role Conflict and Role Ambiguity

3.9 I feel certain about how much authority I have

a) Very inaccurate
b) Mostly inaccurate
c) Slightly inaccurate
d) Uncertain
e) Slightly accurate
f) Mostly accurate
g) Very accurate

3.10 There are clear, planned goals and objectives for my job

a) Very inaccurate
b) Mostly inaccurate
c) Slightly inaccurate
d) Uncertain
e) Slightly accurate
f) Mostly accurate
g) Very accurate

3.11 I receive an assignment without the help I need to complete it

a) Very inaccurate
b) Mostly inaccurate
c) Slightly inaccurate
d) Uncertain
e) Slightly accurate
f) Mostly accurate
g) Very accurate

3.12 I have to bend or break a rule or policy in order to carry out an assignment

a) Very inaccurate
b) Mostly inaccurate
c) Slightly inaccurate
d) Uncertain
e) Slightly accurate
f) Mostly accurate
g) Very accurate

Job Satisfaction

3.13 Knowing what you know now, if you had to decide all over again whether to take the type of job you now have, what would you decide?

a) I would decide without hesitation to take the same job
b) I would have some second thoughts
c) I would decide definitely not to take this type of job

3.14 If you were free right now to go into any type of job you wanted, that would your choice be?

a) I would take the same job
b) I would take a different job
c) I would not want to work

3.15 If a friend of yours told you he/she was interested in working in a job like yours, what would you tell him/her?

a) I would strongly recommend it
b) I would have some doubts about recommending it
c) I would advise against it

3.16 All in all, how satisfied would you say you are with your job?

a) I am satisfied
b) I am somewhat satisfied
c) I am not too satisfied
d) I am not at all satisfied

Support at work

3.17 How easy is it to talk with each of the following people?

3.17.1 Your immediate supervisor

a) Very Much
b) Somewhat
c) A little
d) Not at all
e) Don't have any such person

3.17.2 Other people at work

a) Very Much
b) Somewhat
c) A little
d) Not at all
e) Don't have any such person

3.18 How much can each of these people be relied on when things get tough at work?

3.18.1 Your immediate supervisor

a) Very Much
b) Somewhat
c) A little
d) Not at all
e) Don't have any such person

3.18.2 Other people at work?

a) Very Much
b) Somewhat
c) A little
d) Not at all
e) Don't have any such person

PART FOUR

Please indicate how much you agree with the following statements as they apply to you over last month. If a particular situation has not occurred recently, answer according to how you think you would have felt.

4.1 I am able to adapt when changes occur.

a) Not true at all
b) Rarely true
c) Sometimes true
d) Often true
e) True nearly all the time

4.2 I can deal with whatever comes my way.

a) Not true at all
b) Rarely true
c) Sometimes true
d) Often true
e) True nearly all the time

4.3 I try to see the humorous side of things when I am faced with problems.

a) Not true at all
b) Rarely true
c) Sometimes true
d) Often true
e) True nearly all the time

4.4 Having to cope with stress can make me stronger.

a) Not true at all
b) Rarely true
c) Sometimes true
d) Often true
e) True nearly all the time

4.5 I tend to bounce back after illness, injury, or other hardships.

a) Not true at all
b) Rarely true
c) Sometimes true
d) Often true
e) True nearly all the time

4.6 I believe I can achieve my goals, even if there are obstacles.

a) Not true at all
b) Rarely true
c) Sometimes true
d) Often true
e) True nearly all the time

4.7 Under pressure, I stay focused and think clearly.

a) Not true at all
b) Rarely true
c) Sometimes true
d) Often true
e) True nearly all the time

4.8 I am not easily discouraged by failure.

a) Not true at all
b) Rarely true
c) Sometimes true
d) Often true
e) True nearly all the time

4.9 I think of myself as a strong person when dealing with life's challenges and difficulties.

a) Not true at all
b) Rarely true
c) Sometimes true
d) Often true
e) True nearly all the time

4.10 I am able to handle unpleasant or painful feelings like sadness, fear, and anger.

a) Not true at all
b) Rarely true
c) Sometimes true
d) Often true
e) True nearly all the time

PART FIVE

The next few items are concerned with various aspects of COVID-19 and workplace interventions. Please insert a cross where appropriate.

5.1 Were you infected with COVID-19?

a) Yes
b) No

If YES, go on to Question 5.1.1
If NO, skip to Question 5.2

5.1.1 Have you fully recovered?

a) Yes
b) No

5.1.2 If no, are you still experiencing symptoms?

a) Yes
b) No

5.1.3 Did you transmit COVID-19 infection to your family member?

a) Yes
b) No

5.2 Did you have to care for any of your family members who contracted COVID-19?

a) Yes
b) No

5.3 Were you given adequate supply of personal protective equipment (PPE) during the COVID-19 pandemic?

a) Yes
b) No

5.4 Were infection prevention and control (IPC) measures and policies (e.g. staff symptom screening and workplace cleaning) adequately implemented during the COVID-19 pandemic?

a) Yes
b) No

5.5 Were you redeployed to another department during the COVID-19 pandemic?

a) Yes
b) No

5.6 Did you have to change your annual leave because of the COVID-19 pandemic?

a) Yes
b) No

5.7 Have you received vaccination against COVID-19?

a) Yes
b) No

5.8 **Interventions**

Which interventions will assist most with reducing stress at work? (Choose one or more)

a) Employing more staff
b) Reducing workload
c) Reducing overtime
d) Increasing my salary
e) Improving working conditions
f) Provision of psychological counselling
g) Provision of a doctor's restroom
h) Provision of more time off work
i) Provision of skills training
j) Improving equipment
k) Improving supervision
l) Improving management support

5.9 Specify any other interventions which will reduce your stress at work.

PART SIX
Further Assistance

Should this study identify that you are at risk of burnout or raise any other concerns , would you like to be contacted?
If so, please provide your contact details below.

1. Surname:
2. First Name:
3. Address:
4. Contact Number:

If you do not wish to be contacted, please find attached a list of service providers where an assessment can be made and assistance offered, if required. **THANK YOU FOR ANSWERING THE QUESTIONNAIRE!**

APPENDIX 2: PERMISSION TO USE OLBI

Dear colleague,

I would like to thank you for your interest in the burnout instrument. The OLBI is free of charge for academic purposes.
In the attachment, you can find the OLBI in several languages including English.

If you decide to apply it eventually, please let us know whether the instrument has the same structure in your sample as in the German and the Dutch ones.

For information regarding the validity of the instrument see this publication:
https://www.isonderhouden.nl/doc/pdf/arnoldbakker/articles/articles_arnold_bakker_219.pdf
For information regarding the cutoff scores of the OLBI see this publication:
https://www.tandfonline.com/doi/full/10.1080/00140139.2018.1464667

I look forward to hearing your results.

Best regards,

Prof. Dr. Evangelia Demerouti
Chief Diversity Officer TU/e
e.demerouti@tue.nl
Human Performance Management Group
Department of Industrial Engineering & Innovation Sciences
Eindhoven University of Technology
Atlas Building, Room 7.405
5600 MB Eindhoven, The Netherlands

APPENDIX 3: PERMISSION TO USE CD-RISC

Dear Saajida:

Thank you for your interest in the Connor-Davidson Resilience Scale (CD-RISC). We are pleased to grant permission for use of the CD-RISC-10 in the COVID-19-related project you have described under the following terms of agreement:

1. You agree (i) not to use the CD-RISC for any commercial purpose unless permission has been granted, or (ii) in research or other work performed for a third party, or (iii) provide the scale to a third party without permission. If other colleagues or off-site collaborators are involved with your project, their use of the scale is restricted to the project described, and the signatory of this agreement is responsible for ensuring that all other parties adhere to the terms of this agreement.

2. You may use the CD-RISC in written form, by telephone, **secure electronic format whereby the scale is protected from copying, downloading, alteration, repeated use, unauthorized distribution, or search engine indexing. In all use of the CD-RISC, including electronic versions, the full copyright and terms of use statement must appear with the scale. The scale should neither be distributed as an email attachment, nor appear on social media, nor in any form where it is accessible to the public and should be removed from electronic and other sites once the activity or project has been completed. The RISC can only be made accessible in electronic form after subjects have logged in through a link, password, or unique personal identifier.**

3. Further information on the CD-RISC can be found at the www.cd-risc.com website. The scale's content may not be modified, although in some circumstances the formatting may be adapted with permission of either Dr. Connor or Dr. Davidson. If you wish to create a non-English language translation or culturally modified version of the CD-RISC, please let us know and we will provide details of the standard procedures.

4. Three forms of the scale exist: the original 25 item version and two shorter versions of 10 and 2 items, respectively. When using the CD-RISC 25, CD-RISC 10, or CD-RISC 2, whether in English or other language, please include the full copyright statement and use restrictions as it appears on the scale.

5. The scale is provided at no cost for this project.

6. Complete and return this form via email to mail@cd-risc.com. **The scale will only be sent after the signed agreement has been returned.**

7. In any publication or report resulting from use of the CD-RISC, you do not publish or partially reproduce items from the CD-RISC without first securing permission from the authors.

If you agree to the terms of this agreement, please email a signed copy to the above email address. Upon receipt of the signed agreement, we will email a copy of the scale.

For questions regarding use of the CD-RISC, please contact Jonathan Davidson at mail@cd-risc.com.

Sincerely yours,

Jonathan R. T. Davidson, M.D.

Agreed to by:

___Saajida Khan_____ __11/08/2021_____
Signature (printed) Date

_____M Phil (Occupational Health) candidate_____
Title

_University of Cape Town- Division of Occupational Health

APPENDIX 4: UCT HUMAN RESEARCH ETHICS COMMITTEE APPROVAL LETTER

UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee

Room 45, E-52- Old Main Building
Groote Schuur Hospital
Observatory 7925
Telephone [021] 406 6492
Email: hrec-enquiries@uct.ac.za
Website: www.health.uct.ac.za/fhs/research/humanethics/forms

17 January 2022

HREC REF: 616/2021

A/Prof S Adams
Division of Occupational Medicine
Public Health & Family Medicine
Email: Shahieda.adams@uct.ac.za
Student: drsaajidakhan@gmail.com

Dear A/Prof Adams

PROJECT TITLE: THE PREVALENCE AND DETERMINANTS OF BURNOUT AMONGST MEDICAL DOCTORS AT PUBLIC HOSPITALS IN GQEBERHA DURING THE COVID 19 PANDEMIC-MASTER CANDIDATE-DR SAAJIDA KHAN

Thank you for your response letter, addressing the issues raised by the Faculty of Health Sciences Human Research Ethics Committee (HREC).

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

This approval is subject to strict adherence to the HREC recommendations regarding research involving human participants during COVID -19, dated 17 March 2020: 06 July 2020 & 01 July 2021.

Approval is granted for one year until the 30 January 2023

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.
(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

The HREC acknowledge that the student: -Dr Saajida Khan will also be involved in this study.

Please quote the HREC REF 616/2021 in all your correspondence.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate institutional approval, where necessary, before the research may occur.

Yours sincerely

PROFESSOR M BLOCKMAN
CHAIRPERSON, FACULTY OF HEALTH SCIENCES HUMAN RESEARCH ETHICS COMMITTEE
Federal Wide Assurance Number: FWA00001637.
Institutional Review Board (IRB) number: IRB00001938
NHREC-registration number: REC-210208-007
This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use: Good Clinical Practice (ICH GCP), South African Good Clinical Practice Guidelines (DoH 2020), based on the Association of the British Pharmaceutical Industry Guidelines (ABPI), and Declaration of Helsinki (2013) guidelines. The Human Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95) and FDA Code Federal Regulation Part 50, 56 and 312.

APPENDIX 5: EASTERN CAPE RESEARCH ETHICS COMMITTEE APPROVAL LETTER

Province of the
EASTERN CAPE
HEALTH

Enquiries: Yvonne Gixela Tel no: 079 074 0859

Email: Yvonne.Gixela@echealth.gov.za / ygixela@gmail.com

Date: 31 January 2022

The prevalence and determinants of burnout in medical doctors at public hospitals in Gqeberha during the COVID 19 pandemic: a cross-sectional study (EC_202201_028)

Dear Prof S. Adams, Dr. S. Khan, Dr. I. Ntatamala

The department would like to inform you that your application for the abovementioned research topic has been approved based on the following conditions:

1. During your study, you will follow the submitted protocol with ethical approval and can only deviate from it after having a written approval from the Department of Health in writing.

2. You are advised to ensure, observe and respect the rights and culture of your research participants and maintain confidentiality of their identities and shall remove or not collect any information which can be used to link the participants.

3. The Department of Health expects you to provide a progress update on your study every 3 months (from date you received this letter) in writing.

4. At the end of your study, you will be expected to send a full written report with your findings and implementable recommendations to the Eastern Cape Health Research Committee secretariat. You may also be invited to the department to come and present your research findings with your implementable recommendations.

5. Your results on the Eastern Cape will not be presented anywhere unless you have shared them with the Department of Health as indicated above.

Your compliance in this regard will be highly appreciated.

SECRETARIAT: EASTERN CAPE HEALTH RESEARCH COMMITTE

TOGETHER, MOVING THE HEALTH SYSTEM FORWARD

APPENDIX 6: PERMISSION TO CONDUCT RESEARCH AT LIVINGSTONE TERTIARY HOSPITAL

Province of the
EASTERN CAPE
HEALTH

Office of the Senior Manager: Medical Services • 1st Floor • Nurses' Home • Livingstone Hospital • Stanford Road • Korsten • Port Elizabeth
PO Korsten • Port Elizabeth • 6014 • REPUBLIC OF SOUTH AFRICA
Tel.: +27 (0)41 405 2100/2101/2102 • Fax: +27 (0)41 405 2103

07 February 2022

Dr S. Khan MBChB (UCT) Dip Occupational Health (UCT).

Dear Sir/Madam,

Via e-mail: drsaajidakhan@gmail.com

Re: Permission to conduct research at Livingstone Tertiary Hospital.

Your e-mail request of 07 February 2022, refers.

Authorisation is herewith granted to do your research at Livingstone Tertiary Hospital; this includes the PE Provincial Hospital site. Dora Nginza Hospital is not approved by this office and need to be contacted directly on telephone no: 041 406 4111 (Clinical Directorate).

You are advised to ensure, observe and respect the rights and culture of your research participants and maintain confidentiality at all times.

Regular reports detailing your findings and recommendations are to be made available to the hospital.

Wishing you success with your ongoing the research.

.....
DR AR KNOCK
CLINICAL MANAGER LIVINGSTONE TERTIARY HOSPITAL
ARK/jhm

APPENDIX 7: PERMISSION TO CONDUCT RESEARCH AT DORA NGINZA HOSPITAL

Province of the
EASTERN CAPE
HEALTH

Room DG 28A • Dora Nginza Regional Hospital • Spondo Street • Zwide • Port Elizabeth • Eastern Cape
Private Bag X11951 • Algoa Park • Port Elizabeth • 6005 • REPUBLIC OF SOUTH AFRICA
Tel: +27 (0)41 406 4014 • Cell: +27 (0)82 956 6709 • Fax: +27 (0)866 413 211• Email: jaline.kotze@echealth.gov.za

9 February 2022

Dr S Khan

RE: REQUEST TO DO RESEARCH

Dear Dr Khan

Your request to do research at Dora Nginza Regional Hospital is hereby approved.

The approval is granted with the following conditions attached:

1. Adherence to the conditions as set out in the ethics approval from UCT (HREC Ref: 616/2021)
2. Adherence to the conditions as set out in the approval from the ECDOH research committee (EC_202201_028)

I wish you all the success with your research.

Regards,

Dr Jaline Kotze
Senior Manager: Medical Services
Dora Nginza Regional Hospital

APPENDIX 8: INFORMATION SHEET AND CONSENT FORM

UNIVERSITY OF CAPE TOWN

UCT STUDY ON THE PREVALENCE AND DETERMINANTS OF BURNOUT IN MEDICAL DOCTORS AT PUBLIC HOSPITALS DURING THE COVID-19 PANDEMIC IN GQEBERHA, SOUTH AFRICA – 2022

ENGLISH CONSENT FORM

1. Title of research project
A study on burnout and the determinants of burnout in medical doctors at public hospitals during the COVID-19 pandemic in Gqeberha.

2. Purpose of the research
This research will form the basis for a Master's in Philosophy Degree (MPhil) in Occupational Health and will help to determine the prevalence of burnout in medical doctors at Public Hospitals in Gqeberha during the COVID-19 pandemic. This research will also identify individual (host) and occupational stressors which contribute to burnout in doctors during the COVID-19 pandemic and will propose preventative interventions at an organizational level which may reduce burnout amongst medical doctors.

The study has received ethical approval from the UCT Faculty of Health Sciences Human Research Ethics Committee.

3. Description of the research project
If you agree to participate you will be asked to complete the following tasks during working time allocated for participation in the research project:
a) Complete a questionnaire
You will be requested to complete a confidential questionnaire during work time. It is expected that it will take you approximately 15 to 20 minutes to complete this survey. You will be asked questions about yourself, burnout symptoms, current and previous employment history as well as questions related to potential risk factors for the development of burnout. You will also be asked questions regarding the impact of COVID-19 on your work life and forms of support or interventions preferred by yourself in managing work related stress.

4. Confidentiality of information collected
Your name will not appear in any reports on this study. The information gathered will be kept completely confidential and will be seen only by the researcher.

5. Risks and discomforts of the research
From the questionnaire
There is negligible risk associated with completion of the questionnaire and all information will be treated as confidential. Should you require support during or after the completion of the questionnaire, the researcher will refer you accordingly to the Staff psychologist at Livingstone Tertiary Hospital or a private psychologist.

6. Expected benefits to you and to others

Your participation will assist in the improved understanding of the extent of burnout in doctors in Gqeberha and will inform recommendations for better practices to safeguard health of all doctors.

7. **Costs to you resulting from participation in the study**
The study is offered at no cost to you. If you feel that you are at risk of burnout and require further assistance, contact the researcher so that you may be referred to the Staff psychologist/ private psychologist for further investigation and care with your consent.

8. Voluntariness
Your participation in this study is entirely voluntary and you are free to withdraw at any particular time and you will not be penalized for doing so. Your job security will not be affected by withdrawal from the study.

9. **Contact person(s)**.
You may contact the following person for answers to further questions about the research, your rights, or any injury you may feel is related to the study.

University of Cape Town Researcher:
Dr Saajida Khan,
Telephone No. 041 405 2328 and Mobile No. 072 391 0180
DWDSAA001@myuct.ac.za

Supervisor/Principal Investigator:
Prof Shahieda Adams
Telephone No. 021 406 6435
Shahieda.adams@uct.ac.za

Co-supervisor:
Dr. Itumeleng Ntatamala
Telephone No. 012 406 6435
Itumeleng.ntatamala@uct.ac.za

The Human Research Ethics Committee:
Floor E53, Room 46
Old Main Building, Groote Schuur Hospital
Observatory, 7925
Telephone number: 021 406 6492

Hrec-enquiries@uct.ac.za

10. Consent of the participant

I have read the information given above, or it has been read to me. I understand the meaning of this information. Dr./Mr./Ms. _____ has offered to answer any questions concerning the study. By signing this form electronically, I hereby consent to participate in the study. I also understand that I am free to withdraw from the study at any time without penalty.

11. Documentation of the consent

One copy of this signed document will be kept together with our research records for this study. A copy of the information sheet about the study can be given to you to keep if requested.

By completing the questionnaire, you are providing consent for your participation in this research and your responses to be used in the data analysis stage of the research. All the data will be completely confidential and fully anonymised.

PARTICIPANT'S CONSENT:

NAME: _____

SIGNATURE: _____

DATE: _____

PERSON TAKING CONSENT:

NAME: _____

SIGNATURE: _____

DATE: _____

APPENDIX 9: DETAILED UNADJUSTED UNIVARIATE REGRESSION ANALYSIS OF THE PREDICTORS OF BURNOUT, EXHAUSTION AND DISENGAGEMENT

Table S1. Detailed unadjusted univariate regression analysis of the predictors of burnout, exhaustion and disengagement: Demographic and general health qualities of participants, Resilience, Job Stress and Aspects of COVID-19 and Workplace interventions (N=260)

Correlates	Burnout		Exhausted		Disengaged	
	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
Age						
20-29	1.00					
30-39	1.28 (0.62-2.67)	0.49	0.73 (0.26-2.06)	0.56	NC	
40-49	1.22 (0.53-2.77)	0.63	0.52 (0.14-1.95)	0.33	0.72 (0.14-3.74)	0.70
>50	0.83 (0.31-2.19)	0.70	o.68 (0.14-3.27)	0.63	2.28 (0.53-9.80)	0.26
Gender						
Man	1.00					
Woman	1.37 (0.76-2.49)	0.29	1.61 (0.63-4.11)	0.31	**0.25 (0.06-0.99**)	**0.04**
Language						
English	1.00					
Afrikaans	1.42 (0.65-3.06)	0.37	1.41 (0.51-3.87)	0.50	0.30 (0.03-2.44)	0.26
isiXhosa	2.18 (0.72-6.59)	0.16	0.77 (0.16-3.60)	0.74	NC	
Other	0.64 (0.57-7.30)	0.72	5.64 (0.48-66.17)	0.16	NC	
Relationship status						
Married	1.00					
Single	1.48 (0.77-2.84)	0.23	0.71 (0.26-1.92)	0.51	0.27 (0.05-1.32)	0.10
In a committed relationship	1.46 (0.61-3.51)	0.39	1.30 (0.42-3.99)	0.64	0.33 (0.04-2.74)	0.30
Children living at home	1.06 (0.58-1.96)	0.82	0.42 (0.15-1.17)	0.09	1.37 (0.40-4.62)	0.60
Primary caregiver of children	1.15 (0.60-2.20)	0.66	0.45 (0.14-1.38)	0.16	1.32 (0.37-4.66)	0.66
Primary caregiver of elderly or disabled family members	1.61 (0.53-4.87)	0.39	0.38 (0.49-2.98)	0.36	NC	

Correlates	Burnout OR (95% CI)	P value	Exhausted OR (95% CI)	P value	Disengaged OR (95% CI)	P value
Job Title/Category						
Medical Specialist/Consultant	1.00					
Medical Officer	1.07 (0.48-2.41)	0.85	2.19 (0.55-8.67)	0.26	0.44 (0.10-1.93)	0.28
Registrar	0.62 (0.25_1.52)	0.29	2.74 (0.61-12.22)	0.18	NC	
Medical Intern (community service medical officers included)	1.74 (0.75-4.05)	0.19	1.65 (0.40-6.67)	0.48	0.39(0.08-1.70)	0.21
Department/Speciality						
Anaesthetics	1.00					
Paediatrics	0.68 (0.18-2.51)	0.57	NC		0.25 (0.02-2.92)	0.26
Emergency & Family Medicine	1.58 (0.41-6.07)	0.50			0.55 (0.08-3.57)	0.53
Surgical and Obstetrics & Gynaecology	0.55 (0.17-1.81)	0.33			0.63 (0.11-3.50)	0.60
Internal Medicine	0.77 (0.22-2.73)	0.69			NC	
Employment						
Part-time	1.00					
Full-time	0.88 (0.18-4.29)	0.88	0.86 (0.10-7.17)	0.89	NC	
Overtime						
No	1.00					
Yes	**4.78 (1.24-18.44)**	**0.02**	**0.10 (0.02-0.41)**	**0.00**	NC	
Overtime worked, per month (hours)						
0-60	1.00					
60-80	1.89 (0.84-4.24	0.11	2.43 (0.52-11.36)	0.25	0.36 (0.07-1.87)	0.22
80-100	1.73 (0.69-4.29	0.23	1.07 (0.17-6.75)	0.93	0.45 (0.07-2.87)	0.40
>100	2..09 (0.70-6.25)	0.18	1.24 (0.16-9.29)	0.83	1.25 (0.23-6.61)	0.79

Correlates	Burnout OR (95% CI)	P value	Exhausted OR (95% CI)	P value	Disengaged OR (95% CI)	P value
Average length of overtime call (hours)						
8-11	1.00					
12-15	1.96 (0.57-6.73)	0.28	0.27 (0.03-2.07)	0.20	NC	
16-19	1.09 (0.32-3.66)	0.88	1.30 (0.24-6.93)	0.75		
20-23	1.11 (0.31-3.92)	0.86	0.21 (0.01-2.49)	0.21		
>24	1.89 (0.58-6.17)	0.28	0.73 (0.13-3.88)	0.71		
Overtime site						
Off-site	1.00					
On-site	1.38 (0.73-2.60	0.31	1.89 (0.60-5.91)	0.26	0.38 (0.11-1.30)	0.12
Years employed in post	0.99 (0.94-1.04)	0.85	0.96 (0.87-1.06)	0.47	1.03 (0.94-1.12)	0.44
Monthly salary (ZAR)						
>100 000	1.00					
50 000-100 000	1.60 (0.65-3.90)	0.30	2.88 (0.36-22.83)	0.31	**0.15 (0.03-0.66**)	**0.01**
30 000-50 000	**3.39 (1.23-9.33**)	**0.01**	2.13 (0.25-18.18)	0.48	**0.19 (0.03-0.92)**	**0.03**
Changed job in past 2 years	0.98 (0.50-1.92)	0.97	0.99 90.37-2.64)	0.99	1.06 (0.27-4.12)	0.93
Age started smoking	0.99 (0.83-1.19)	0.98	0.83 (0.59-1.15)	0.26	1.03 (0.75-1.42)	0.82
Age started illicit drugs	1.16 (0.87-1.56)	0.29	0.91 (0.64-1.29)	0.61	0.71 (0.32-1.55)	0.39
Smoker						
Never	1.00					
Previous smoker	0.63 (0.24-1.61)	0.33	1.45 (0.39-5.34)	0.56	2.32 (0.46-11.66)	0.30
Current	0.73 (0.27-1.98)	0.54	0.46 (0.05-3.63)	0.46	1.16 (0.13-9.75)	0.88

Correlates	Burnout OR (95% CI)	P value	Exhausted OR (95% CI)	P value	Disengaged OR (95% CI)	P value
Alcohol use						
Never	1.00					
Previous alcohol use	2.17 (0.76-6.24)	0.14	0.64 (0.15-2.76)	0.55	0.66 (0.05-7.61)	0.74
Current	1.38 (0.68-2.79)	0.35	0.73 (0.26-2.02)	0.55	1.31 (0.27-6.39)	0.73
Drug/illicit drug use						
Never	1.00					
Previous illicit drug use	0.47 (0.15-1.48)	0.20	1.82 (0.38-8.72)	0.45	4.25 (0.82-21.92)	0.08
Current illicit/non-prescription drug use	0.66 (0.12-3.51)	0.62	1.82 (0.20-15.91)	0.58	NC	
Substance use to manage work related stress						
Feel need to smoke to manage WRS	1.14 (0.51-2.55)	0.73	1.36 (0.47-3.89)	0.55	0.46 (0.58-3.73)	0.47
Feel need to use alcohol to manage WRS	**3.2 (1.20-8.47)**	**0.01**	0.79 (0.25-2.44)	0.68	NC	
Feel need to use illicit drugs to manage WRS	NC		NC		NC	
Feel need to use prescription drugs to manage WRS	4.84 (0.62-37.33)	0.13	0.62 (0.07-4.91)	0.65	NC	
Mental health						
Ever diagnosed with mental health diagnosis	1.08 (0.55-2.14)	0.81	1.98 (0.81-4.82)	0.13	1.08 (0.27-4.21)	0.90
Diagnosed with mental health diagnosis last year	2.41 (0.69-8.32)	0.16	1.33 (0.36-4.81)	0.66	NC	
On treatment for mental health diagnosis	1.18 (0.53-2.63)	0.67	**2.79 (1.10-7.04)**	**0.03**	0.45 (0.05—3.63))	0.45
Resilience						
Low	1.00					
Medium	**0.28 (0.10-0.78)**	**0.015**	**8.22 (1.04-64-59)**	**0.04**	0.82 (0.18-3.80)	0.80
High	**0.09 (0.03-0.26)**	**0.000**	**13.45 (1.67-108.23)**	**0.015**	1.57 (0.33-7.30)	0.56

Correlates	Burnout OR (95% CI)	P value	Exhausted OR (95% CI)	P value	Disengaged OR (95% CI)	P value
Job Stress						
Workload and responsibility						
Low	1.00					
Medium	1.53 (0.78-2.98)	0.21	1.27 (0.42-3.88)	0.66	2.61 (0.54-12.61)	0.23
High	1.10 (0.48-2.50)	0.80	2.89 (0.89-9.41)	0.07	0.80 (0.07-9.12)	0.86
Conflict at work						
Low	1.00					
Medium	1.73 (0.89-3.38)	0.10	0.54 (0.21-1.34)	0.187	1.33 (0.25-7.08)	0.73
High	**5.08 (2.00-12.94)**	**0.001**	**0.14 (0.03-0.70)**	**0.016**	1.74 (0.30-9.86)	0.52
Role ambiguity and conflict						
Low	1.00					
Medium	**2.32 (1.16-4.63)**	**0.017**	0.39 (0.14-1.10)	0.07	6.07 (0.71-51.56)	0.09
High	**4.33 (1.95-9.59)**	**0.000**	**0.26 (0.08-0.83)**	**0.023**	3.95 (0.43-36.10))	0.22
Job satisfaction						
High	1.00					
Medium	**4.81 (2.45-9.43)**	**0.000**	**0.23 (0.08-0.62)**	**0.004**	0.71 (0.20-2.55)	0.60
Low	**25.75 (5.90-112.37)**	**0.000**	**0.06 (0.00-0.52)**	**0.01**	0.25 (0.28-2.20)	0.21
Support at work						
High	1.00					
Medium	**3.18 (1.62-6.22)**	**0.001**	0.41 (0.15-1.07)	0.06	2.08 (0.42-10.13)	0.36
Low	**8.87 (3.35-23.48)**	**0.000**	**0.29 (0.08-0.98)**	**0.04**	0.40 (0.03-4.57)	0.46

Correlates	Burnout		Exhausted		Disengaged	
	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
Aspects of COVID-19						
Infection and transmission						
Infected with COVID-19	1.2 (066-2.16)	0.54	1.23 (051-2.97)	0.63	1.38 (0.39-4.85)	0.61
Fully recovered from COVID-19 infection	0.44 (0.09-2.05)	0.30	1.92 (0.23-15.64)	0.54	0.83 (0.09-7.37)	0.87
Still experiencing symptoms	15 (0.48-464.20)	0.12	NC		NC	
Transmitted COVID-19 infections to family members	2.14 (0.86-5.35)	0.10	0.39 (0.08-1.75)	0.22	0.43 (0.05-3.46)	0.43
Had to care for family members who contracted COVID-19	1.32 (0.71-2.46)	0.36	0.84 (0.34-2.06)	0.70	0.58 (0.15-2.26)	0.44
Workplace Interventions						
Given an adequate supply of PPE during COVID-19 pandemic	0.62 (0.34-1.13)	0.12	0.64 (0.27-1.55)	0.33	1.88 (0.53-6.58)	0.32
Adequate implementation of IPC measures and policies	0.73 (0.41-1.33)	0.31	1.13 (0.48-2.66)	0.77	0.44 (0.11-1.71)	0.23
Redeployed to another department during pandemic	0.89 (0.45-1.78)	0.76	0.91 (0.32-2.58)	0.87	0.73 (0.15-3.48)	0.69
Had to change annual leave because of COVID-19	0.93 (0.51-1.68)	0.81	1.21 (0.50-2.092)	0.66	0.27 (0.70-1.05)	0.06
Received vaccination against COVID-19	1.20 (0.37-3.87)	0.75	1.48 (0.18-11.79)	0.70	NC	

NC- non-computable
$ Statistically significant results indicated in bold
WRS: work-related stress
CD-RISC: Connor-Davidson Resilience Scale
NC- non-computable