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Abstract

Objective: Assess physician and student burnout and job satisfaction at KPK physicians. Analyze the differences in workplace barriers according on designation and gender. Identify the systemic factors affecting career opportunities and mental wellbeing.

Method: 218 participants in a cross-sectional research conducted at kpk from January to May 2025. Employed validated surveys on job satisfaction, burnout, and worries. Furthermore this Data was analyzed using ANOVA (SPSS v26) and t-tests with a significance level of $p<0.05$.

Result: Males were more inclined to remain in Pakistan (p=0.027), whereas females felt less workplace security (p=0.002). Burnout (1.47±0.50) and anxiety about unemployment were highest among medical students (p=0.009).Salary discontent did not differ by gender (p=0.566).

Conclusion: At kpk, hierarchy and gender have a big influence on job satisfaction. Workplace safety precautions and mental health support are urgently needed.The results are consistent with issues related to physician well-being in resource-constrained environments worldwide.

Keywords: Physician burnout, Gender disparities, Workplace security, Job anxiety, Pakistan healthcare

Introduction: In contemporary healthcare systems around the world, the health and job satisfaction of healthcare workers—especially doctors and medical students—have become crucial concerns (West et al., 2018). With major ramifications for patient care and employee retention, burnout—which is typified by emotional tiredness, depersonalization, and diminished personal accomplishment—has been widely observed among medical professionals (Maslach et al., 1996). Additional stresses like job uncertainty, low pay, and difficult work situations make these difficulties worse in low-resource nations like Pakistan (Sipos et al., 2024). Developing focused treatments to raise physician morale and enhance healthcare delivery requires an understanding of these dynamics.The relationship between systemic problems and professional satisfaction at Medical institutes is still poorly understood. According to recent international research, different degrees of burnout and job unhappiness are caused by hierarchical systems and gender imbalances in medical institutions (Canadian Medical Association, 2022; Spilg et al., 2022). Female doctors, for example, frequently encounter particular obstacles, such as harassment at work and uneven chances, which can affect their career paths and mental health (Shanafelt et al., 2021). Similarly, scholastic constraints and uncertain job prospects cause early-career professionals, including house officers and medical students, to experience higher levels of stress (Dyrbye et al., 2020).These problems have been made worse by the COVID-19 pandemic, which has revealed weaknesses in healthcare systems and increased stressors such resource constraints and patient overload (Goldberg et al., 2024; Frenkel et al., 2022). Training hospitals like BKMC/MMC, HMC,KTH,LRH,STH etc are disproportionately affected by these demands in Pakistan, where the healthcare system is already under stress. In order to address burnout and foster resilience, studies from similar contexts highlight the necessity of institutional support, leadership involvement, and policy changes (Hu et al., 2024; Carlasare et al., 2024). To customize solutions to these institutions' unique requirements, regional data is essential.

With an emphasis on gender and designation-based disparities, this study looks at the degree of professional satisfaction and future-related worries among physicians and medical students at kpk. We want to uncover important stresses and their correlates by examining factors like joblessness fear, wage satisfaction, and workplace security. Our results are placed in the worldwide literature on physician well-being, highlighting particular difficulties in settings with limited resources while drawing comparisons with research from high-income nations (Gumas et al., 2024; Ladonna et al., 2022).By incorporating insights from recent studies on leadership, resilience training, and organizational support (Spilg et al., 2022; Heidinger et al.,

2023), we offer practical strategies to improve working conditions, ultimately aiming to inform policy recommendations for physicians at kpk, advocating for structural changes that enhance professional fulfillment and reduce burnout. The findings add to the growing body of evidence on physician well-being in low-resource environments, highlighting the urgency of addressing these issues to sustain a robust healthcare workforce.

Method and materials:The Mardan Medical Complex (MMC) and Bacha Khan Medical College (BKMC) in Mardan hosted this cross-sectional study between January and May of 2025. Medical students, house officers, trainee medical officers (TMOs), medical officers (MOs), and consultants who were actively involved with BKMC/MMC and other KPK hospitals during the study period were all included in the study population. To guarantee widespread participation, a standardized, self-administered questionnaire was delivered both in-person and electronically. Using validated scales modified from previous research on physician well-being, the questionnaire evaluated important variables such as burnout levels, workplace security, joblessness fears, professional satisfaction, and remuneration satisfaction.Those who gave their informed consent and were currently enrolled or employed at BKMC/MMC and other hopitals at kpk were included in the study. Eligible participants included house officers finishing their rotations, medical students of all academic years, and doctors (TMOs, MOs, and consultants) actively engaged in clinical or academic settings. Non-clinical employees, those on prolonged leave, and those who refused to fill out the survey were among the exclusion criteria. 218 people in all fulfilled the requirements for inclusion, and their answers were anonymised to maintain privacy.Descriptive statistics (means, standard deviations) and inferential tests (independent t-tests for gender comparisons, ANOVA for designation-based differences) were used in the analysis of the data using SPSS version 26. *p* < 0.05 was the threshold for significance, and effect sizes (η^2) were computed for noteworthy results. The institutional review board of BKMC/MMC granted ethical approval in accordance with the principles of the Helsinki Declaration. The removal of non-respondents and possible response bias were two of the study's shortcomings that could have an impact on generalizability.

Result:

TABLE 1: PROFESSIONAL SATISFACTION & FUTURE CONCERNS AMONG BKMC/MMC DOCTORS/STUDENTS (N=218)

variables	Male(n=170) Mean±SD	Female(n=48) Mean±SD	P-value	sig
Workplace security	1.41±0.49	1.67±0.48	0.002	yes
Work in pak future	1.75±0.44	1.58±0.50	0.027	yes
Jobless concern	1.32±0.47	1.27±0.45	0.537	no
Stress/burnout	1.44±0.50	1.35±0.48	0.316	no
Sallary satisfaction	1.84±0.37	1.88±0.33	0.566	no
Future improvement	1.64±0.48	1.67±0.48	0.764	no

Table 2: Professional Satisfaction & Future Concerns Among BKMC/MMC Doctors/Students (N=218)

variables	Medical student(n=165) Mean±SD	TMOS(n=41) Mean±SD	houseofficer(n=9) Mean±SD	P-value	sig
Workplace security	1.53±0.50	1.24±0.44	1.33±0.50	0.014	yes
Work in pak future	1.69±0.46	1.80±0.40	1.89±0.33	0.027	yes
Jobless concern	1.35±0.48	1.12±0.33	1.22±0.44	0.009	yes
Stress/burnout	1.47±0.50	1.20±0.40	1.44±0.53	0.008	yes
Sallary satisfaction	1.82±0.38	1.98±0.16	1.89±0.33	0.008	yes
Future improvement	1.58±0.50	1.88±0.33	2.00±0.00	<0.001	yes

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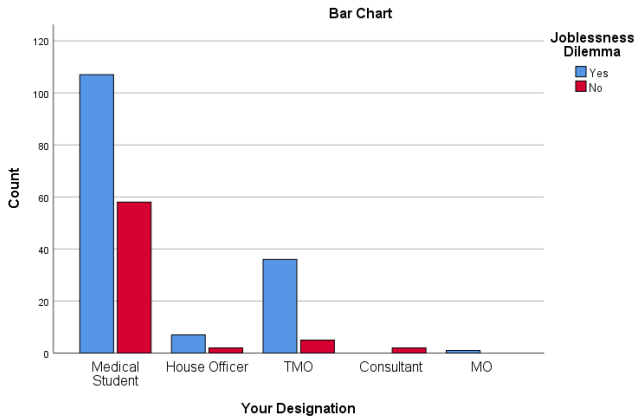
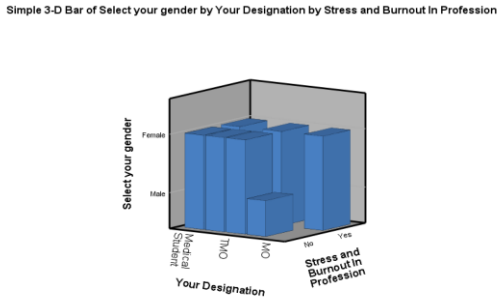


Fig 1: jobless dilemma Concerns about unemployment were most prevalent among medical students (107 Yes, 58 No), followed by TMOs (36 Yes, 5 No). There were 218 participants (151 Yes, 67 No), with less responses from House Officers (7 Yes, 2 No) and other participants (Consultants: 0 Yes, 2 No; MOs: 1 Yes, 0 No).,The Likelihood Ratio (χ^2 = 15.087, *p* =.005) confirmed the substantial connection found by the Pearson Chi-Square test (χ^2 = 13.389, *p* =.010). However, 50% of cells had anticipated counts <5, suggesting that small sample numbers in some categories should be interpreted with caution.



Discussion:

The study finds that among BKMC/MMC and other KPK hospital physicians, there are notable gender differences in terms of job security and future career goals. In line with global trends revealed by the Canadian Medical Association (2022), which emphasizes how structural injustices and harassment risks disproportionately affect women in medicine, female participants reported feeling less comfortable in their work environments (p=0.002). Male doctors, on the other hand, were more likely to intend to stay in Pakistan (p=0.027), which may be a result of gendered social norms or disparities in the chances they perceive elsewhere. Shanafelt et al. (2021) related leadership behaviors to organizational values alignment and burnout mitigation, and these findings support the necessity for institutional policies addressing workplace safety and retention measures targeted to gender-specific concerns.The highest levels of stress and burnout were reported by medical students (Mean=1.47±0.50), with significant differences seen by professional designation. This is in line with Maslach's Burnout

Inventory framework (1996), which notes that early-career professionals are especially at risk because of their demanding schedules and lack of independence. Despite experiencing job uncertainty (Mean=1.12±0.33 for joblessness), TMOs showed lower burnout (Mean=1.20±0.40), which may have been caused by their better clinical experience. Spilg et al. (2022) also noted that resilience improves with tenure. As Ladonna et al. (2022) address in their investigation of physicians' resistance to wellness interventions, survivorship bias may be reflected in House Officers' optimism about future improvements (Mean=2.00±0.00), as those who are still enrolled in training programs may be more robust. Gender-specific salary dissatisfaction was widespread (Male=1.84±0.37; Female=1.88±0.33; p=0.566), reflecting worldwide patterns of physician unhappiness with pay, especially in public health systems (Gumas et al., 2024). Because their transitional roles provide clearer development opportunities, TMOs had the highest salary satisfaction (Mean=1.98±0.16), according to the designation-based analysis. This contrasts with the lower satisfaction of medical students (Mean=1.82±0.38), which is consistent with the findings of West et al. (2018), who found that one of the main causes of trainee burnout was financial strain. In order to reconcile compensation with effort and inflation, reforms similar to those suggested by Sipos et al. (2024) are necessary, as the lack of gender inequalities points to structural problems in pay structures. These trends might be made worse by the COVID-19 pandemic's aftereffects. According to Goldberg et al. (2024), burnout was associated with pandemic-induced anxiety and depression by primary care providers, which may account for the high stress levels among our study's medical students. Furthermore, our participants' worries with infrastructure limits were similar to those of Heidinger et al. (2023), who observed that ICU physicians experienced moral distress amid resource shortages (Hospital Infrastructure Limitation: Medical Students=1.27±0.45). To address these issues, Frenkel et al. (2022) highlighted coping mechanisms that could be institutionalized, such as peer support. Crucial elements are organizational support and leadership. Our conclusion that TMOs, who frequently operate under structured supervision, reported lower stress was supported by Dyrbye et al. (2020), who showed that positive residency leadership behaviours linked with reduced burnout. Hu et al. (2024) made the case for giving doctors agency in order to lessen burnout; this strategy is pertinent to the situation at BKMC/MMC. The relevance of organizational support in pandemic-era professional fulfilment was further highlighted by Carlasare et al. (2024), who also suggested that focused treatments (like Spilg et al.'s SMART program, 2022) could improve resilience. Systemic reforms are needed to address these multifaceted pressures, including fair workplace practices and mental health resources that guarantee career-stage-specific support and gender parity.

Conclusion: Gender and professional designation have a substantial impact on job security, fatigue, and career satisfaction among BKMC/MMC physicians, according to the study. Targeted interventions, including as leadership development, equitable policies, and resilience training, are necessary to address these issues and create a positive, long-lasting workplace. Institutions can reduce burnout and increase professional contentment by putting evidence-based measures into practice, which will eventually improve healthcare delivery.

Conflict of interest: None

Funds: none

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Joint Liver-Kidney Transplantation for Primary Hyperoxaluria and Other Metabolic Conditions: A Review Paper

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Abstract

Combined liver-kidney transplantation (CLKT) represents a pivotal therapeutic advancement in the management of metabolic disorders, particularly primary hyperoxaluria type I (PH-I), a rare autosomal recessive condition resulting in systemic oxalosis and end-stage renal disease (ESRD). This review synthesizes clinical evidence from key studies, including the University of Kansas Medical Center and international registries, to assess the efficacy, outcomes, and current management strategies associated with CLKT in PH-I and other metabolic diseases. CLKT effectively corrects the underlying hepatic enzymatic deficiency and restores renal function, significantly improving patient and graft survival rates compared to kidney-alone transplantation, which is often compromised by recurrent oxalate deposition. The review outlines perioperative management strategies such as intensive dialysis, high-volume diuresis, and pyridoxine therapy, and highlights critical considerations like timing of transplantation, oxalate mobilization, and immunosuppressive regimens. Despite ongoing challenges, including persistent post-transplant hyperoxaluria and risk of graft rejection, CLKT remains the gold standard for pyridoxine-unresponsive PH-I. Emerging approaches such as gene therapy, improved diagnostic tools, and personalized treatment protocols offer promising avenues for future care.

Keywords: Combined liver-kidney transplantation, therapeutic advancement, metabolic disorders, hepatic enzymatic deficiency, risk of graft rejection,immunosuppressive.

Introduction: Combined liver-kidney transplantation (CLKT) has emerged as a critical therapeutic strategy for patients with metabolic disorders, particularly primary hyperoxaluria type I (PH-I), where hepatic enzyme deficiencies lead to systemic oxalosis and end-stage renal disease (ESRD). This review synthesizes findings from key studies, including the experience of the University of Kansas Medical Center (KUMC) and other institutions, to evaluate the efficacy, outcomes, and management strategies for CLKT in metabolic disorders[1-2]. This guideline supersedes prior recommendations from the British Society for Haematology (BSH).Antiphospholipid syndrome (APS) is an autoimmune disorder marked by thrombotic events (affecting venous, arterial, or microvascular systems) and/or pregnancy-related complications, alongside persistently elevated antiphospholipid antibodies (aPL). APS

may present as primary APS (occurring independently) or secondary APS (associated with other autoimmune conditions, most frequently systemic lupus erythematosus [SLE] or rheumatoid arthritis).To diagnose APS, both clinical and laboratory criteria must be met: Clinical evidence of at least one thrombotic event (objectively confirmed) or pregnancy morbidity & Laboratory confirmation of persistently positive aPL (lupus anticoagulant [LA], IgG/IgM anticardiolipin [aCL], and/or IgG/IgM anti-β2 glycoprotein-1 [aβ2GPI]) on two separate occasions, spaced at least 12 weeks apart[3-5].aPL are heterogeneous and primarily directed against phospholipid-binding proteins, the best recognized being β2GPI (primarily domain-I of the open form of the molecule) and prothrombin. Their presence is necessary but insufficient for the development of the thrombotic manifestations of APS. It is hypothesized that this requires a second trigger, such as infection, pregnancy or surgery, which leads to a more pronounced thrombo-inflammatory response[6-7].

BACKGROUND AND RATIONALE

Primary hyperoxaluria type I (PH-I) is an autosomal recessive disorder caused by a deficiency in the hepatic enzyme alanine:glyoxylate aminotransferase (AGT), leading to excessive oxalate production. Oxalate is primarily excreted by the kidneys, and its accumulation results in nephrolithiasis, nephrocalcinosis, and eventually ESRD. Without intervention, systemic oxalosis can lead to multi-organ failure and death. Traditional kidney-alone transplantation has been largely unsuccessful in PH-I due to recurrent oxalate deposition in the graft. The introduction of CLKT in the 1980s aimed to correct the underlying metabolic defect by replacing the liver while simultaneously addressing renal failure.

University of Kansas Medical Center (KUMC) Experience:

The KUMC study reviewed 16 patients with PH-I who underwent CLKT or kidney-alone transplantation. The results demonstrated that CLKT effectively corrected the metabolic defect, with plasma oxalate levels decreasing significantly post-transplantation. However, hyperoxaluria persisted for several months to years due to the mobilization of tissue oxalate stores.

Patient survival rates were 78% for CLKT and 89% for kidney-alone transplantation. Renal allograft survival rates at 5 years were 52% for CLKT and 36% for kidney-alone transplantation, highlighting the challenges of recurrent oxalosis in kidney-alone grafts. The PT or aPTT is prolonged in about 50–60% of cases of DIC at some point during the course of illness.This is mainly attributed to the consumption of coagulation factors but impaired synthesis, due to abnormal liver function, vitamin K deficiency or loss of the coagulation proteins, due to massive bleeding, may also play a role[8-9].

European and U.S. Registry Data:

European registry data (1984-1997) reported 1-, 2-, and 5-year patient survival rates of 88%, 80%, and 72%, respectively, for CLKT in PH-I. Renal allograft survival was 62% at 5 years.

U.S. registry data (1984-1996) showed similar patient survival rates for CLKT (69%) and kidney-alone transplantation (74%), with no significant difference in renal allograft survival between the two groups.

Management Strategies:

Pretransplantation: Intensive dialysis to reduce plasma oxalate levels is critical. Hemodialysis or continuous venovenous hemodiafiltration (CVVHDF) is recommended to maintain plasma oxalate levels below 20 µmol/L.

Posttransplantation: High-volume diuresis, neutral phosphate therapy, and pyridoxine (for pyridoxine-responsive patients) are essential to prevent calcium oxalate crystallization and stone formation. Close monitoring of urine oxalate levels and renal function is necessary to detect early signs of graft dysfunction.

INDICATIONS FOR TRANSPLANTATION

CLKT: Recommended for patients with PH-I who are pyridoxine-resistant, have significant systemic oxalosis, or have previously failed kidney-alone transplantation. CLKT is also indicated for patients with prolonged dialysis duration (>1 year) or those awaiting cadaveric organs with expected long waiting times.

Kidney-Alone Transplantation: Suitable for pyridoxine-responsive PH-I patients and those with PH-II, which has a milder clinical course. Kidney-alone transplantation may also serve as a bridge to CLKT in patients with available living donors.

CHALLENGES AND CONSIDERATIONS

Timing of Transplantation: Early transplantation before the development of significant systemic oxalosis is crucial. However, predicting the clinical course of PH-I is challenging, and preemptive liver transplantation in asymptomatic patients remains controversial due to the risks of immunosuppression and surgical complications.

Oxalate Mobilization: Post-CLKT, hyperoxaluria can persist for years due to the slow mobilization of tissue oxalate stores. Intensive dialysis and high fluid intake are necessary to prevent graft damage during this period.

Immunosuppression: The risk of acute and chronic rejection remains a concern, particularly in kidney-alone transplantation. Tailored immunosuppressive regimens are essential to balance graft survival and minimize complications.

FUTURE DIRECTIONS

Gene Therapy: Advances in gene therapy may offer a curative approach by correcting the underlying enzyme deficiency without the need for organ transplantation. However, challenges related to transfection efficiency and long-term efficacy need to be addressed.

Improved Diagnostics: Enhanced genetic testing and biomarkers for early detection of PH-I and PH-II could facilitate timely intervention and improve outcomes.

Personalized Medicine: Tailoring transplantation strategies based on individual patient characteristics, such as pyridoxine responsiveness and genetic mutations, may optimize outcomes.

CONCLUSION

Combined liver-kidney transplantation has revolutionized the management of primary hyperoxaluria type I, offering a curative approach by addressing both the metabolic defect and renal failure. While challenges remain, including persistent hyperoxaluria and graft rejection, advancements in transplantation techniques, immunosuppression, and supportive care have significantly improved patient outcomes. Future research into gene therapy and personalized medicine holds promise for further enhancing the quality of life for patients with metabolic disorders.

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