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An Analysis of Factors Influencing Career Transitions Among Emergency Physicians in Taiwan

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Abstract

This study investigates the factors influencing career transitions among emergency physicians in Taiwan, focusing on critical issues such as work pressure, workplace culture, and development opportunities. Through a combination of literature review and the DEMATEL method, the study employs expert questionnaires to analyze the key determinants of emergency physicians' turnover intentions and their interrelationships. The findings indicate that work pressure and burnout are primary factors, closely associated with work-life imbalance and perceived discrepancies in compensation. Additionally, legal risks and limited career development options serve as significant drivers. The study emphasizes that optimizing compensation structures, improving work environments, and providing interdisciplinary training (e.g., legal, engineering, financial management) could effectively enhance physician retention. These insights offer valuable references for policymakers aiming to support the sustainable development of the emergency medicine field.

Keywords: *Emergency Physicians*、*Career Transitions*、*Work Stress and Burnout*、*DEMATEL Method*、*Work-Life Imbalance.*

Introduction

The work behaviors of emergency specialists in Taiwan demonstrate a high level of professionalism and resilience, which are closely associated with the high-pressure environment of emergency medicine. Due to the unpredictable and urgent nature of emergency work, physicians often face heavy workloads, the need for rapid decision-making, and the challenges of managing complex cases (Wu, Y. L, 2016). Long shifts and night duties not only affect work efficiency but also impose stress on the physical and mental health of physicians, leading to professional burnout (Zhang, J. Z, 2016). Furthermore, work-life imbalance makes it difficult for many physicians to balance family responsibilities and leisure activities, further reducing job satisfaction (Lin, C. N, 2012). The compensation and rewards system is also considered a crucial factor affecting job satisfaction, as many physicians perceive their pay as disproportionate to the high-intensity nature of their work (Sun, L. Z, 2018). Organizational culture and the work environment play a significant role in this field, as supportive cultures and collaboration among colleagues have been proven to boost morale and improve retention rates (Wang, G.Y, 2010). Overall, the work behaviors of emergency specialists reflect the unique challenges and characteristics of their profession.

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Literature Review

As an integral part of the healthcare system, emergency medicine presents multifaceted challenges to physicians due to its unique nature of work. These challenges have led to growing attention on the phenomenon of job career transitions. This study synthesizes the literature to examine the potential factors influencing the career transitions of emergency physicians.

1. **Job Stress and Burnout** The high-pressure characteristics of emergency medicine subject physicians to substantial workload, uncertainty, and the stress of rapid decision-making. Studies have shown that these cumulative factors often lead to burnout, subsequently increasing career transitions intentions (Wu, Y. L, 2016; Chan, 2019; Ellermann & Weissman, 2018). A systematic review by Zhang (2016) further demonstrated the significant negative impact of burnout on physicians' health and job performance.

2. **Work-Life Imbalance** Long shifts, night duties, and a lack of time for family interactions hinder emergency physicians from achieving a balance between work and personal life. According to Lin (2012), this imbalance directly reduces job satisfaction and becomes one of the primary causes of career transitions.

3. **Compensation and Rewards** The remuneration of emergency physicians is often disproportionate to the high-intensity nature of their work, especially in the absence of additional incentives or overtime pay. Sun (2018) suggested that reforms in compensation systems could enhance physicians' retention. Similarly, Baker et al. (2020) found that many emergency physicians perceive their salaries as disproportionate to their workload. This sense of imbalance, particularly under long working hours and high stress, motivates them to seek more attractive job opportunities.

4. **Shortage of Human Resources** The global shortage of emergency department staffing leads to excessive workloads for physicians, exacerbating stress and burnout (Zhang, 2016). Studies recommend addressing this issue by increasing staffing levels and resources to reduce career transitions rates.

5. **Limited Career Development and Advancement Opportunities** A lack of clear career development paths or promotion mechanisms leaves emergency physicians with limited prospects for long-term growth. Research by Sun (2018) and Hoffman & Baker (2019) emphasized that a structured advancement system positively influences retention.

6. **Legal Risks and Medical Disputes** Emergency physicians face heightened legal risks due to the need for rapid diagnosis and decision-making, especially when dealing with complex patient cases. Ho (2018) highlighted legal disputes and associated stress as significant drivers of job career transitions.

7. **Organizational Culture and Work Environment** According to Gonzalez et al. (2021), emergency departments often operate under high-stress and tense conditions. Poor support and collaboration among physicians foster feelings of isolation, further prompting career transitions intentions. Additionally, hospital management practices and organizational culture directly affect job satisfaction and retention rates. Wang (2010) argued that a supportive organizational environment significantly enhances physicians' engagement and retention.

Methodology

Methodology Choice

1. Based on a comprehensive review of relevant literature, the factors influencing emergency physicians' career transitions have been identified and categorized as follows: A. Job Stress and Burnout, B. Work-Life Imbalance, C. Salary and Compensation Discrepancies, D. Staffing Shortages, E. Restricted Opportunities for Career Advancement and Promotion, F. Legal Risks and Medical Litigation, and G. Organizational Culture and Workplace Environment (Table 1).

2. Upon finalizing the design of the DEMATEL questionnaire regarding the factors influencing emergency physicians' career transitions, the questionnaire was distributed to emergency physicians across Taiwan to gather their insights and perspectives.

Potential Factors	Key Insights	References
(a)Job Stress and Burnout	High-pressure work increases workload, uncertainty, and stress, leading to burnout and career transitions intentions.	Wu, Y. L (2016); Chan (2019); Ellermann & Weissman (2018); Zhang (2016)
(b)Work-Life Imbalance	Long shifts and lack of family time reduce job satisfaction and cause career transitions.	Lin, C. N. (2012))
(c) Compensation and Rewards	Disproportionate pay motivates physicians to seek better jobs; reforms can boost retention.	Sun (2018); Baker et al. (2020)
(d) Shortage of Human Resources	Staffing shortages worsen workloads and stress, increasing burnout and career transitions.	Zhang (2016)
(e)Limited Career Development	Lack of promotion paths discourages long-term retention.	Sun (2018); Hoffman & Baker (2019)
(f) Legal Risks and Medical Disputes	Heightened legal risks create stress, prompting career transitions.	Ho (2018)
(g) Organizational Culture and Environment	Poor support and collaboration reduce satisfaction and increase career transitions.	Gonzalez et al. (2021); Wang, G.Y (2010)

Table 1:

Summary Table of Potential Factors Contributing to Emergency Physicians' Job Career transitions

Source: Literature Review and This Study

DEMATEL method

1. Questionnaire design

The second questionnaire designed for DEMATEL (Tzeng et al., 2007). This questionnaire designed for pairwise comparison to evaluate the influence of each score, where scores of 0, 1, 2, and 3 represent: (No relation), (Slightly related), (Related), and (Very strongly related),

respectively (Tamura and Akazawa, 2005). (Show on Table 2)

	Code	(a)	(b)	(c)	(d)	(e)	(f)	(g)
Code	Question	Job Stress and Burnout	Work-Life Imbalance	Compensation and Rewards	Shortage of Human Resources	Limited Career Development	Legal Risks and Medical Disputes	Organizational Culture and
(a)	Job Stress and Burnout	N/A						
(b)	Work-Life Imbalance		N/A					
(c)	Compensation and Rewards			N/A				
(d)	Shortage of Human Resources				N/A			
(e)	Limited Career Development					N/A		
(f)	Legal Risks and Medical Disputes						N/A	
(g)	Organizational Culture and Environment							N/A

Table 2

The DEMATEL questionnaire of Potential Factors Contributing to Emergency Physicians' Job Career transitions

Score: 0: No relation 1: Slightly related 2: Related 3: Very strongly related

2 Analyses process：

Step 1: Acquire and Compute the Average Initial Matrix

1. Suppose L experts and n factors are considered in a study. A pairwise comparison regarding the influence of factor i on factor j is quantified using a 4-point (0–3) measurement scale. (Refer to Table 2 for linguistic assignments.)

2. Each expert provides a completed non-negative $n \times n$ response matrix $\mathbf{u^n} = [u_{ij}^n]$, with $1 \leq x \leq L$.

○ Here, $\mathbf{u^1}, \mathbf{u^2}, \ldots \mathbf{u^L}$ represent the response matrices from L experts.

○ Each $\mathbf{u}_\gamma^n$ is an integer representing an element of $\mathbf{u_x}$, with diagonal elements set to zero.

3. An averaged $n \times n$ matrix $\mathbf{A}$ is determined by averaging the scores of the L experts, using:

$A = (f_{ij}) = 1/L \Sigma (x=1 \text{ to } L) [u_{ij}^n]$…… *(1)*

Step 2: Compute the Normalized Initial Direct-Relation Matrix (D)

1. Normalize the direct relation matrix by multiplying all elements of **A** by **S**, where:

$S = 1 / MAX(\Sigma(i=1 \text{ to } n) X_{ij})$ ..... *(2)*

2. The normalized initial direct-relation matrix **D** is computed as:

$D = A \times S = X / MAX(\Sigma(i=1 \text{ to } n) X_{ij})$…… *(3)*

Step 3: Compute the Total Relation Matrix (T)

1. Compute the total-relation matrix using:

$T = D / (I - D)$…… *(4)*

- Here, **I** is the identity matrix.

2. Calculate:

Matrix T = Matrix D + Matrix ID (indirect-relation matrix)

Using the expansion:

$T = D + D^2 + D^3 + \cdots$ (to infinity)….. *(5)*

- **$D \times T = D^2 + D^3 + \cdots$ (to infinity)…..** *(6)*

3. Based on this, using equations (11)–(12):

$(I - D) \times D = D - D^{\wedge}(\infty+1)$

- As **$D^{\wedge}(\infty+1) \approx 0$**, we have: **$T = D / (I - D)$**

4. The resulting total-relation matrix is **$T = [t_{ij}]$ (n×n)**, where **i, j = 1, 2, …, n**.

Step 4: Drawing the Causal Diagram

1. From the total-relation matrix **T**:

- **D_x** = Row sums of **T** (influence exerted by each criterion).
- **R_x** = Column sums of **T** (influence received by each criterion).

2. Calculate:

- **Degree of Effect (D + R)**: Represents the strength of relationships between criteria.
- **Degree of Cause (D - R)**: Represents the influence or impact of a criterion.

3. Plot **(D + R)** on the horizontal axis and **(D - R)** on the vertical axis to create the causal diagram (as shown in Figure 1).

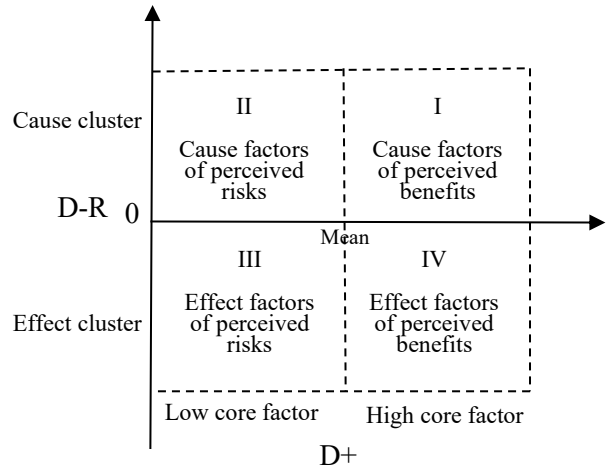

Figure 1：Causal Diagram

Sampling

To better analyze the factors influencing career transitions among emergency physicians in Taiwan, the "Expert Questionnaire" targets emergency medicine specialists practicing in Taiwan. The objective is to apply the Decision Making Trial and Evaluation Laboratory (DEMATEL) method to examine the expert questionnaire and identify genuinely significant and meaningful factors. This expert questionnaire is rigorously compiled based on a systematic review of relevant literature and is representative in nature.

Research Results

Sample Structure Analysis

Based on the classification of hospital sources, a total of 6 questionnaires were collected from local hospitals, accounting for 31.6%, 9 questionnaires were recovered from regional hospitals, accounting for 47.4%, and 4 questionnaires were received from medical centers, representing approximately 21.1%. According to the questionnaire responses, higher response rates were primarily observed among emergency medicine specialists from local hospitals and regional hospitals (see Table 3).

Category	Number of Responses	Response Rate	Cumulative Response Rate
Gender			
Male	10	50%	50%
Female	10	50%	100%
Years of Service			
Less than 5 years	2	10%	10%
6-10 years	5	25%	35%
More than 11 years	13	65%	100%
Hospital Source			
Local Hospital	6	31.6%	31.6%
Regional Hospital	9	47.4%	78.9%
Medical Center	4	21.1%	100%

Table 3 Sample Structure Analysis Table

N=20

Source: Compiled from Questionnaire Data

DEMANTEL Analysis Results

DEMANTEL Analysis Process

As follows DEMANTEL analyses process and found result below:

Step 1: Based on the questionnaire survey results, calculate the average initial matrix A (N = 20; see Table 4).

A=	**a**	**b**	**c**	**d**	**e**	**F**	**g**			
a	0.0000	2.4500	2.2000	2.2500	1.7500	2.2500	1.6500	Sum =	12.5500	Max 12.5500
b	2.4500	0.0000	2.2000	2.2500	1.7500	2.2500	1.6500		12.5500	
c	2.2000	2.0000	0.0000	2.1500	1.7000	1.8000	1.6500		11.5000	
d	2.2500	2.1000	2.1500	0.0000	1.4000	1.9000	1.6500		11.4500	
e	1.7500	1.7500	1.4500	1.7000	0.0000	1.4500	1.4500		9.5500	
f	2.2500	1.7000	1.8000	1.9000	1.4500	0.0000	1.5000		10.6000	
g	1.6500	1.5500	1.6500	1.6500	1.4500	1.5000	0.0000		9.4500	

Table 4 Overall Average Expert Opinion Matrix (Matrix A)

Data Source: Compiled from this study

Step 2: Compute the normalized initial direct-relation matrix *D*, show on table 5.

D= A/Sum	**a**	**b**	**c**	**d**	**e**	**f**	**g**
a	0.0000	0.1952	0.1753	0.1793	0.1394	0.1793	0.1315
b	0.1952	0.0000	0.1753	0.1793	0.1394	0.1793	0.1315
c	0.1753	0.1594	0.0000	0.1713	0.1355	0.1434	0.1315
d	0.1793	0.1673	0.1713	0.0000	0.1116	0.1514	0.1315
e	0.1394	0.1394	0.1155	0.1355	0.0000	0.1155	0.1155
f	0.1793	0.1355	0.1434	0.1514	0.1155	0.0000	0.1195
g	0.1315	0.1235	0.1315	0.1315	0.1155	0.1195	0.0000

Table 5 Normalized Direct Relation Matrix (Matrix D)

Data Source: Compiled from this study

Step 3: Compute the total relation matrix *T*, show on table 6.

T=	a	b	c	d	E	f	g	Dx
A	1.4651	1.4276	1.4024	1.4450	1.1753	1.3797	1.4651	9.7602
b	1.6284	1.2643	1.4024	1.4450	1.1753	1.3797	1.6284	9.9235
c	1.5170	1.3117	1.1637	1.3468	1.0972	1.2653	1.5170	9.2186
d	1.5201	1.3175	1.3103	1.2007	1.0788	1.2716	1.5201	9.2191
e	1.2850	1.1176	1.0902	1.1367	0.8293	1.0700	1.2850	7.8139
f	1.4245	1.2141	1.2102	1.2505	1.0154	1.0626	1.4245	8.6017
g	1.4651	1.4276	1.4024	1.4450	1.1753	1.3797	1.4651	9.7602
Rx	9.0806	8.9814	9.2696	7.5466	8.8087	10.3052	10.3052	

Table 6: Total Impact Matrix (Matrix T)

Data Source: Compiled from this study

Step 4: Drawing the Causal diagram

1. Analyzing the degree of central role and relation:

As get the analyzed result the matrix *T* (Show on table 8), then, we can calculate the degree of central role (Dx + Rx) and (Dx - Rx) values.

The degree of central role (Dx + Rx) and (Dx - Rx) in DEMATEL represents the strength of influences both dispatched and received. On the other hand, if the (Dx - Rx) is positive, then the evaluation criterion x dispatches the influence to other evaluation criteria more than it receives. If the (Dx - Rx) is negative, the evaluation criterion x receives the influence from other evaluation criteria more than it dispatched. The (Dx - Rx) values are reported in Table 7.

	a	**b**	**c**	**d**	**e**	**f**	**g**	**AVG**
D+R	20.0653	19.0041	18.2000	18.4888	15.3605	17.4104	20.0653	18.371
D-R	-0.5450	0.8429	0.2372	-0.0505	0.2673	-0.2069	-0.5450	0.0000

Table 7: The Degree of Central Role (D+R) Sheet

Data Source: Compiled from this study

2. Drawing Causal Diagram

The next step is to plot various criteria on two (X/Y) axes, highlighting the horizontal axis's degree of connectivity (D+R) and the vertical axis's degree of causality (D–R). Following the results shown in Table 9, draw the cause-effect diagram as shown in Figure 2, which represents the form and graphical relationships. This makes the structure and relationships of the criteria clearer.

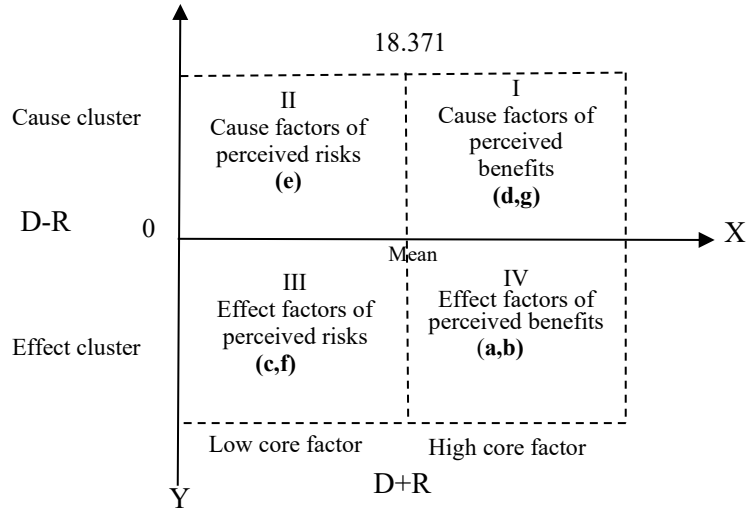

Figure 2：Causal Diagram

Discussion

This study employed the DEMATEL method to systematically analyze the factors influencing the career transitions intentions of emergency physicians in Taiwan, revealing the interrelations and causal relationships among these variables. Consistent with findings by Wu, Y. L (2016) and Zhang (2016), the results confirm that work stress and burnout serve as critical determinants of career transitions intentions. These factors not only directly drive physicians to consider leaving their positions but also significantly influence other aspects such as work-life imbalance and inadequate compensation. Emergency physicians frequently face high-pressure conditions requiring them to manage extensive workloads, make rapid decisions, and address complex medical scenarios, exacerbating burnout and undermining job satisfaction (Kellermann & Weissman, 2018; Gonzalez et al., 2021).

Furthermore, the study highlights that legal risks and medical disputes contribute directly to psychological stress, while indirectly eroding physicians' job satisfaction and sense of security. This aligns with Ho (2018), who emphasized that emergency physicians frequently encounter heightened legal risks due to the critical and urgent nature of their work, leading to elevated career transitions intentions.

On the other hand, organizational culture and work environment play a pivotal role in retention. As demonstrated by Wang (2010) and Gonzalez et al. (2021), supportive organizational cultures and collaborative work atmospheres not only enhance employee morale but also reduce career transitions rates. Despite these benefits, concerns regarding limited career development opportunities remain a significant issue for Taiwanese emergency physicians. Research by Hoffman & Baker (2019) and Sun (2018) suggests that clear career pathways and training programs are critical for maintaining long-term retention in emergency medicine. Addressing these concerns could not only alleviate dissatisfaction but also encourage professional growth.

Overall, the findings underscore the necessity for multi-faceted interventions, including adjustments to salary structures (Sun, 2018; Baker et al., 2020), legal protections (Ho, 2018), and enhanced opportunities for career development. These strategies collectively aim to stabilize the workforce in emergency medicine and ensure sustainable healthcare delivery.

Based on the findings of this study, the incorporation of cross-functional training programs for physicians, such as legal knowledge (e.g., physician-lawyer) (HAMADA, R., KAMEOKA, J., KANAYA, Y., & KAGAYA, Y. (2017)), engineering skills (e.g., physician-engineer) (Van Baalen, S., & Boon, M. (2024)), and financial management proficiency (e.g., physician-financial expert), could be considered (Igu, J. A., Zakaria, S., & Bar-Or, Y. D. (2022)). The development of interdisciplinary competencies may provide innovative solutions to address the challenges identified in this study, including mitigating legal risks, advancing medical technological innovation, and enhancing financial decision-making in medical practice. These approaches could facilitate career development for physicians, expand professional opportunities, and contribute to workforce stability within the healthcare industry.

Conclusion

This study utilized expert questionnaires and the DEMATEL method to comprehensively explore the primary factors influencing the career transitions intentions of emergency physicians in Taiwan, while also analyzing the interactions among these factors. The findings indicate that work stress and burnout, the mismatch between compensation and workload, as well as legal risks, are the core factors driving career transitions intentions. Moreover, work-life imbalance and the degree of organizational cultural support also significantly impact career transitions intentions.

Through the analysis of causal diagrams, this study provides concrete references for policymakers and hospital administrators. Future policies should focus on enhancing compensation, alleviating the work pressure faced by emergency physicians, and optimizing the work environment. Additionally, offering clear career development paths and robust legal support mechanisms should be prioritized as key strategies for improving physician retention.

Limitations and Further Research

Limitations

(a) Subjectivity in Expert Opinions: The reliance on expert evaluations in the DEMATEL method introduces inherent subjective biases, which may compromise the objectivity of the assessment.

(b) Simplification of Complex Interactions: The matrix representation employed by DEMATEL can oversimplify certain complex interrelationships among factors, potentially leading to the omission of nuanced dynamics.

(c) Constraints in Time and Resources: Conducting a comprehensive DEMATEL analysis requires significant time and resources, which may restrict the scope and depth of data collection and analysis.

(d) Exclusion of Potential Dimensions: Factors influencing success or failure may exist beyond those identified and included in the study, resulting in unexamined dimensions that could impact the findings.

Future Research:

(a) Expanding Regional and Institutional Scope: To enhance the generalizability of the findings, future studies should consider collecting data across diverse geographic regions and a variety of medical institutions, encompassing local hospitals, regional facilities, and medical centers.

(b) Integrating Quantitative and Qualitative Data: A mixed-methods approach, combining quantitative metrics with qualitative insights, could provide a more balanced and comprehensive understanding of the factors influencing career transitions intentions.

(c) Exploring Alternative Research Frameworks: Future studies could incorporate other multi-criteria decision-making techniques, such as the Analytic Network Process (ANP) and Analytic Hierarchy Process (AHP), to further unravel the intricate relationships and interdependencies among the influencing factors.

Funding

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Institutional Review Board Statement

This study solely utilized expert questionnaires to collect data, aiming to investigate respondents' assessments and perspectives on the factors influencing the career transition intentions of emergency physicians in Taiwan. The research process did not involve the collection of any personally identifiable information or sensitive medical data. All data were derived from the experts' feedback based on their professional experiences. Consequently, this study does not involve human subjects or patient-related data, and therefore, according to the relevant ethical review guidelines, it is exempt from requiring approval from an Institutional Review Board (IRB).

Informed Consent Statement

Not applicable.

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Conflicts of Interest

The authors declare no conflicts of interest.

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