

## Original Article

# The association of psychological capital and work outcomes among medical practitioners – a systematized review of the global literature

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**Abstract** *The aim of this review was to investigate the association between psychological capital (PsyCap) and work-related outcomes among physicians. Here, work outcomes were categorised as 'inward-facing' i.e., those affecting the doctor, including wellbeing and attitudes; and 'outward-facing' i.e., those affecting the patient, e.g., performance. A Boolean search, performed in APA PsycArticles and Medline retrieved 125 records which assessed PsyCap and work outcomes in physicians. Following assessment in Rayyan and appraisal using the JBI checklist, 15 of these records were included in this review; 13 of which were situated in China. Clustering of this research in such a restricted geographical location limits generalisability, as cultural nuances may apply. All studies reported that PsyCap was positively associated with positive work outcomes, e.g., job satisfaction and performance; and negatively associated with negative work outcomes like depression; All articles used a cross-sectional study design and reported on the inward-facing work outcomes, whereas only 2 reported on outward-facing outcomes. Research including performance measures as an outcome, and interventions to increase PsyCap in this population are therefore warranted.*

**Keywords:** Psychological capital, work outcomes, medical practitioners, wellbeing, performance

*WCPRR Apr 2024: 1-16* © 2024 WACP  
ISSN: 1932-6270

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## INTRODUCTION

Medicine is a high-stress job. In the course of work, physicians deal with critical decision-making and the anxieties of patients and family members whilst juggling their own work-life balance. This sometimes occurs in hostile environments surrounded by illness and death. These difficulties can exert a detrimental effect on work-related outcomes including the worker's health and well-being (e.g., burnout and depression), their attitudes (e.g., job satisfaction and motivation) and their performance (e.g., patient outcomes) (Borst et al., 2019). Performance measures have always been a priority in healthcare, as the quality control of medical centres is rated on clinical outcomes. Standards such as policies, peer reviewing, and continuing medical education have been established to enhance performance quality (Spaeth et al., 2003). More recently, physician well being has surfaced as a research and on-the-job agenda item, this has been further ingrained as the negative effects of COVID-19 on the physical and mental well-being of the medical workforce is highlighted (CIPD, 2016).

Resources available to counteract the negative impact of these stressors on work-related outcomes may be directed either at the organisational level which aims to reduce the job stressors, (e.g., job design), or at the individual level which aims to enable the worker to do well despite the present stressors (e.g., interventions to increase psychological capital (PsyCap)) (van der Klink et al., 2001).

PsyCap is defined as a positive psychological state comprising four factors: Hope – the will and the way to achieve the goal, Efficacy – putting in the necessary work to achieve the goal, Resilience – the ability to bounce back from setbacks and adapt to changing stimuli and Optimism – the confidence that the effort applied is sufficient to achieve the desired goal (Luthans & Youssef-Morgan, 2017). PsyCap is positively predictive of good outcomes and is negatively associated with adverse outcomes across multiple sectors and groups (Avey et al., 2011). For example, PsyCap protected against substance abuse in soldiers and university students and also positively influenced coping strategies used to alleviate stress among employees from various backgrounds (Akbarzadeh et al., 2015; Krasikova et al., 2015; Rabenu et al., 2017). With reference to work-related outcomes, PsyCap predicted empowerment and persistence in job searching, and was negatively associated with cynicism and intention to quit (Georgiou & Nikolaou, 2019; Lee & Kim, 2020). It also mediated the relationship between transformational leadership, authentic leadership, supportive climate and performance, and the relationship between workplace bullying and post-traumatic stress disorder among nurses (Gooty et al., 2009; Luthans et al., 2008; Sun et al., 2018). PsyCap has been found to enhance the positive association between perceived organisational support, job satisfaction, supervisory commitment, and depressive symptoms whilst also lessening the negative association between occupational stress and these

symptoms (Jin et al., 2019; Li et al., 2017). PsyCap exhibits trait-like qualities and hence can be cultivated (Avey et al., 2011). These interventions reported an increase not only in the measure of PsyCap but also diverse downstream variables across varying genders, ages, and nationalities (Da et al., 2020; Hernández Varas & García Silgo, 2021).

The aim of this article was to examine the relationship between PsyCap and work-related outcomes among doctors. For this discourse, work-related outcome has been stratified into ‘inward facing’ – those primarily concerned with the doctor, including well-being and attitudinal outcomes; and ‘outward facing’ – those primarily concerned with the patient (e.g., performance measures).

## METHOD

### Search strategy

The search strategy was guided by the PICOS framework (Table 1). The population was restricted to fully qualified medical practitioners. Studies must quantify PsyCap as a composite of all four of its components (i.e., hope, efficacy, resilience, and optimism). A comparison group was not needed. Outcomes must include at least one of the categories of work-related outcomes (i.e., well-being, work attitude, or performance). There were no restrictions on study design, data collection interval, country, or publication date; however, articles that were not peer-reviewed or did not have an English translation were excluded.

**Table 1: PICOS model for evidence-based health research questions**

<b>Population</b>	The population was restricted to fully qualified medical practitioners. Studies would be included if the relevant work-related outcomes were assessed for either individual doctors or teams. We would consider stratification of results by category, i.e., senior staff – consultants and registrars versus junior staff – senior house officers and interns.
<b>Intervention</b>	Any studies that aimed to quantify psychological capital (PsyCap) and its downstream effect on relevant outcomes were allowed. The studies must include PsyCap as a component of all 4 variables i.e., hope, efficacy, resilience and optimism.
<b>Comparison</b>	The comparison group can include any exposure to any other intervention or an intervention that impacts any 1, 2, or 3 of the PsyCap variables, or no intervention group.
<b>Outcomes</b>	Outcomes must include one of the two categories: (1) ‘inward facing’ work-related outcomes including but not limited to satisfaction, attitudes, psychological well-being and motivation and (2) ‘outward- or patient-facing’ performance outcomes: e.g., adverse effects and patient complaints.
<b>Study design</b>	All study designs were acceptable including cross-sectional, cohort, randomised control, quasi-randomised and longitudinal.

A Boolean search was performed on APA PsycArticles and Medline simultaneously. The search terms used were: “psychological capital” OR PsyCap OR (Hope AND efficacy AND resilience AND optimism) AND work OR occupation OR satisfaction OR attitudes OR “work outcomes” OR “work

satisfaction” OR “work attitudes” OR “psychological well-being” OR motivation OR performance OR assessment OR evaluation OR patient outcome OR wellbeing OR “well being” OR well-being AND “healthcare worker” OR “clinical worker” OR “healthcare professional” OR clinic OR ward OR hospital OR “healthcare setting” OR healthcare OR doctor OR physician.

## Data collection and assessment

Identified studies were uploaded to Rayyan, where articles were assessed based on the above criteria. The first author assessed all of the articles and the second author independently assessed a random selection of 20% of the articles. Included studies were appraised by the first author using the JBI critical appraisal checklist which considers 8 areas:

1. Were the criteria for inclusion in the sample clearly defined?
2. Were the study subjects and the setting described in detail?
3. Was the exposure measured in a valid and reliable way?
4. Were objective, standard criteria used for measurement of the condition?
5. Were confounding factors identified?
6. Were strategies to deal with confounding factors stated?
7. Were the outcomes measured in a valid and reliable way?
8. Was appropriate statistical analysis used?

The relevant data were extracted from the articles by the first author and managed in an excel sheet under the headings (1) citation (2) study design (3) population (4) aim (5) data instruments (6) relevant outcomes.

Data from articles were grouped by the work outcome measured and presented as a narrative synthesis.

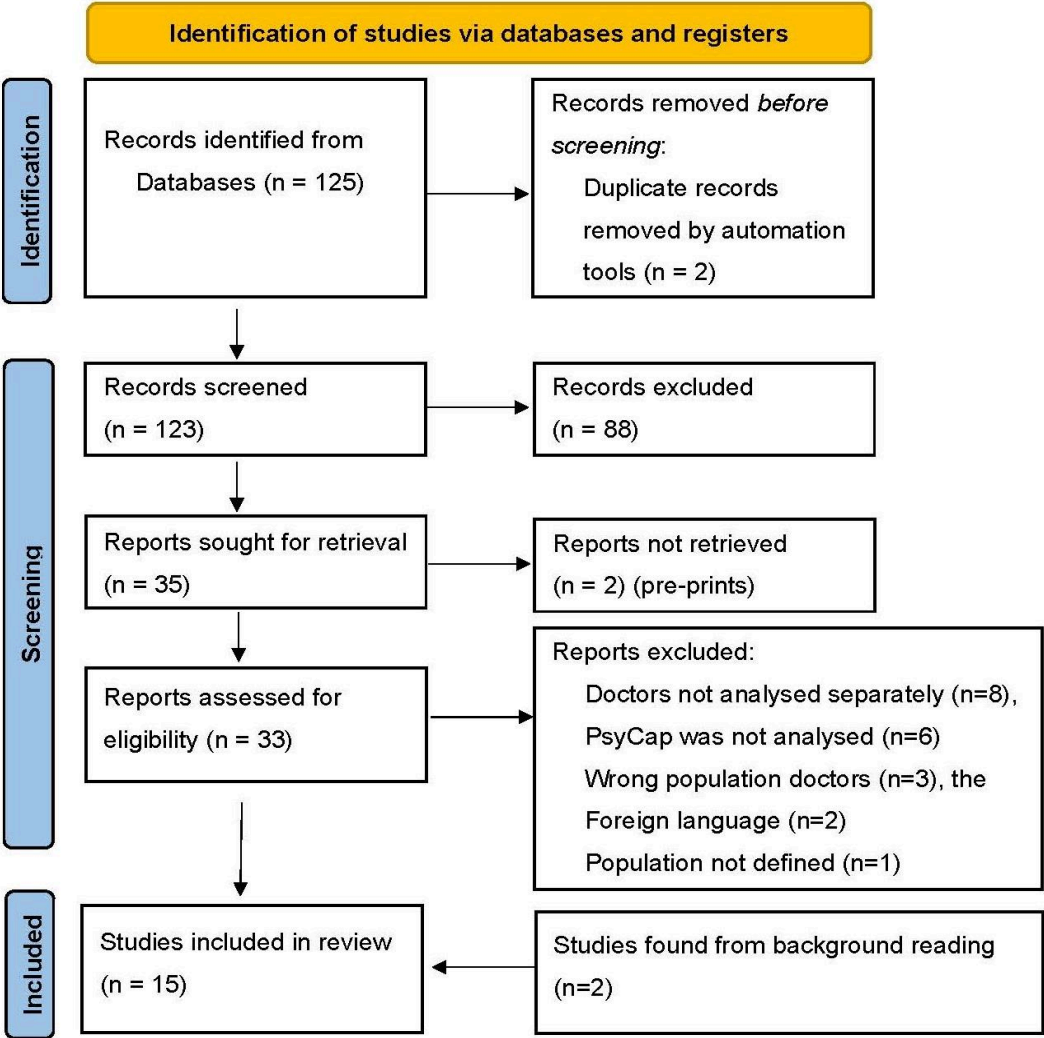
## RESULTS

### Search results

One hundred and twenty-five records were retrieved via electronic search. Two duplicates were automatically deleted leaving 123 unique entries to be assessed. Eighty-eight records were excluded based on title and abstract review, mostly because the population consisted of other healthcare workers besides doctors. Of the remaining 35 records, full texts were retrieved for 33 records. Another 20 records were excluded for various reasons, the most common being that the data for doctors were not analysed separately (n=8). Two additional relevant studies were found during the background reading resulting in a total of fifteen included studies (Fu et al., 2013; Jin et al., 2020; Li & Wu, 2021; Liu et al., 2015; Liu et al., 2012; Qiu et al., 2019; Solms et al., 2019; Sui et al., 2019; Tian et

al., 2020; Vincent et al., 2022; Wang et al., 2012; Xu et al., 2022; Xu et al., 2020; Yang et al., 2020; Zhang et al., 2021).

Figure 1: PRISMA flow diagram



**Critical Appraisal**

As all selected studies utilized a cross-sectional design, the JBI critical appraisal checklist for analytical cross-sectional studies was utilized. Seven of the eight criteria were relevant to this review. As a medical condition was not being assessed, criteria #4 – Were objective, standard criteria used for measurement of the condition? – was not applicable. Eleven of the 15 studies satisfied all 7 of the

relevant criteria. Failure to clearly define the inclusion criteria was the most common criterion not fulfilled (n=3).

**Table 2: JBI critical appraisal checklist for analytical cross-sectional studies**

Author / Date	Inclusion criteria	subjects and setting	exposure	confounding factors	strategies	outcomes	statistical analysis
Sui et al 2019	yes	yes	yes	yes	yes	yes	yes
Li et al 2021	yes	yes	yes	yes	yes	yes	yes
Fu et al 2013	yes	yes	yes	yes	yes	yes	yes
Solms et al 2019	yes	yes	yes	yes	yes	yes	yes
Yang et al 2020	yes	yes	yes	yes	yes	yes	yes
Xu et al 2020	yes	no	yes	no	no	yes	yes
Tian et al 2020	yes	yes	yes	yes	yes	yes	yes
Liu et al 2012	yes	yes	yes	yes	yes	yes	yes
Qiu 2019	yes	yes	yes	yes	yes	yes	yes
Jin 2020	no	yes	yes	no	no	yes	yes
Xu et al 2022	yes	yes	yes	yes	yes	yes	yes
Wang et al 2012	yes	yes	yes	yes	yes	yes	yes
Liu et al 2015	no	yes	yes	yes	yes	yes	yes
Zhang et al 2021	no	no	yes	yes	yes	yes	yes
Vincent et al 2022	yes	yes	yes	yes	yes	yes	yes

Inclusion criteria – 1. Were the criteria for inclusion in the sample clearly defined?  
 Subjects and setting – 2. Were the study subjects and the setting described in detail?  
 Exposure – 3. Was the exposure measured in a valid and reliable way?  
 4. Were objective, standard criteria used for measurement of the condition? (not relevant and hence not included in schematic)  
 Confounding factors – 5. Were confounding factors identified?  
 Strategies – 6. Were strategies to deal with confounding factors stated?  
 Outcomes – 7. Were the outcomes measured in a valid and reliable way?  
 Statistical analysis – 8. Was appropriate statistical analysis used?

### Characteristics of included studies

All 15 studies employed a cross-sectional study design examining the association between PsyCap and various outcomes. Of the 15 studies appraised, 13 were conducted in China with the majority from the Liaoning Province. One study was conducted in the Netherlands and another in India. The studies were conducted over the 11-year period of 2012 – 2022. All studies used validated questionnaires in the assessment of variables of interest. Thirteen studies used the PCQ-24; the Dutch and the Indian studies used the PCQ-12. For those records that stated sample size, 324 to 1400 subjects participated reflecting a response rate of 65% - 96%. Thirteen studies reported on the ‘inward facing’ work outcomes of psychological well-being including workplace violence (WPV), depressive symptoms, burnout, occupational stress, fatigue and health related

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quality of life (HRQOL); and attitudes including job satisfaction, motivation, work engagement, perceived organisational support and professional identification. Two studies reported on both ‘inward facing’ work outcomes; and ‘outward- or patient-facing’ related outcomes, specifically job performance and empathy.

**Table 3: Study characteristics**

Reference	Population	Aims	Data instruments	Outcomes
Sui et al., BMJ Open. 2019	June-July 2015. Liaoning Province, China. 255 doctors each from 8 hospitals. Response rate 77.3%	(1) Identify the prevalence of WPV (2) Examine the relationships between WPV and PsyCap with depressive symptoms and burn	1. verbal sexual harassment and sexual assault scale 2. WPV scale 3. The Center for Epidemiology Studies Depression Scale 4. The Maslach Burnout Inventory Human Services Survey (MBI-HSS) 5. PCQ-24	1. WPV correlated with depressive symptoms 2.85 (1.48 to 4.21; $p < 0.05$ ), emotional exhaustion 5.15 (3.70 to 6.61) and depersonalisation 2.72 (1.90 to 3.54). 2. PsyCap mediated these relationships is 1.61 (1.08 to 2.25), 1.29 (0.86 to 1.83) and depersonalisation 0.7 (0.45 to 1.00) respectively
Li et al., Psychol Res Behav Manag. 2021	Liaoning province, China. Random selection of 744 doctors from 6 general hospitals. Response rate 86.6%.	(1) Examine the prevalence of depressive symptoms (2) explore whether PsyCap mediates the effect of WPV on depressive symptoms	1. The Center for Epidemiologic Studies Depression Scale 2. the Chinese version of WPV scale 3. Chinese version of the PCQ-24	1. WPV was positively associated with depressive symptoms ( $\beta = 0.364$ , $P < 0.001$ ) 2. PsyCap mediated the effect of WPV on depressive symptoms ( $\beta = 0.349$ , $P < 0.001$ )
Fu et al. Public Health. 2013	Sept - Oct 2010. Liaoning Province, China. Random selection of half of the doctors from 6 general hospitals. Response rate 75.7%.	(1) Assess the level of job satisfaction (2) explore factors that enhance job satisfaction	1. Minnesota Satisfaction Questionnaire (MSQ) 2. PCQ-24 3. Survey of Perceived Organizational Support	PsyCap was positively associated with job satisfaction ( $\beta = 0.255$ , $P < 0.001$ )
Solms et al. BMJ Open 2019	Jan - Dec 2017. Doctors at 4 academic hospitals & 1 general hospital in the Netherlands	Investigate how job demands & situational & personal resources relate to work engagement & burnout among specialists & residents.	1. Quantitative Workload Inventory 2. Job Insecurity Scale 3. Work-Family Conflict Scale 4. Work Design Questionnaire 5. PCQ-12 6. Self-Compassion Scale 7. Work Acceptance and Action Questionnaire	PsyCap was associated with burnout for specialists ( $\beta = -0.58$ , $p < 0.001$ ). Psychological capital was positively related to work engagement for both residents ( $\beta = 0.37$ , $p < 0.001$ ) and specialists ( $\beta = 0.55$ , $p < 0.001$ )
Yang et al. Frontiers in public health 2020	2017. Liaoning, China. Random selection of ~200 doctors from 5 hospitals. Response rate: 83%.	To explore the role of PsyCap on the relationships between POS and work engagement	1. Utrecht Work Engagement Scale 2. Survey of Perceived Organizational Support 3. PCQ-24	PsyCap was positively associated with vigor ( $\beta = 0.442$ , $P < 0.001$ ), dedication ( $\beta = 0.413$ , $P < 0.001$ ), and absorption ( $\beta = 0.395$ , $P < 0.001$ ).

Xu et al. BMC family practice 2020	July-December 2019. Shanghai, Beijing, and Nanjing cities, China. Randomly selected family doctors. Response rate 76%.	To explore effect of interplay between psychological wellbeing, PsyCap and job involvement on motivation	1. psychological wellbeing scale 2. PCQ-24 3. Performance sustenance 4. Job Involvement Questionnaire	PsyCap correlated with psychological well-being (r=0.45), Job Involvement (r= 0.34) & performance (r=0.55); p=0.01.
Tian et al. Frontiers in public health 2020	Liaoning, China. Random selection of 1,500 physicians from 10 public tertiary hospitals	To find out the association between occupational stress, PsyCap, and fatigue among Chinese physicians.	1. Fatigue Scale 2. Siegrist's Effort-reward Imbalance questionnaire 3. PCQ-24	PsyCap was negatively associated with fatigue ( $\beta = -0.379$ , $P < 0.01$ ).
Liu et al. BMC Public Health 2012	Sept-Oct 2010. Liaoning Province, China. 50% of physicians randomly selected from 30 hospitals	(1) examine the association between occupational stress & PsyCap, (2) determine the association between PsyCap & depressive symptoms (3) investigate whether the association between occupational stress & depressive symptoms is mediated by PsyCap	1. Center for Epidemiologic Studies Depression Scale 2. Chinese version of the efforts-reward imbalance (ERI) scale 3. PCQ-24	PsyCap was negatively correlated with depressive symptoms (r= -0.325, p<0.01) and positively correlated with overcommitment r= 0.106, p<0.05). For female physicians, PsyCap mediated the association between work stress, overcommitment and depression.
Qiu et al. Psychol Res Behav Manag 2019.	Nov-Dec 2017. Liaoning province, China. 1200 doctors randomly selected from 5 hospitals. Response rate 82.9%.	Examine the mediating role of PsyCap in the relationship between WPV and professional identity	1. Occupational Identity Scale 2. WPV Scale 3. PCQ-24	PsyCap was correlated negatively with WPV (r= - 0.32) and positively with professional identity (r=0.54) p<0.01. The negative association of WPV with professional ID (a= -0.37) was mediated by PsyCap (a =-0.24, P<0.01).
Jin et al. Medical education online, 2020.	Sept 2016. Liaoning, China. 620 1 <sup>st</sup> yr residents from a university hospital	Explore the mediating effect of PsyCap on the relationship between distress and empathy	1. Jefferson scale of physician empathy 2. Satisfaction with life scale 3. Occupational distress scale 4. Self-reported distress 5. PCQ-24	Distress was negatively associated with empathy (-0.265; $P < .01$ ). This was partially mediated by PsyCap (-0.033. $P < .01$ ).
Xu et al. Psychol Res Behav Manag 2022.	Jul-Aug 2017. Jiangsu, China. A randomized sample of ER doctors. Response rate 95.8%.	Explore the association between PsyCap & depression, and the mediating role of social support	1. Symptom Checklist-90 2. PCQ-24 3. Social Support Rating Scale	Depression was negatively correlated with psychological capital (r = -0.384, p < 0.01).



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Wang et al. Journal of occupational health 2012	Sept-Oct 2010. Liaoning, China. 1300 doctors randomly selected from 6 general hospitals. Response rate: 77.8%.	To investigate the relation between work-family conflict and burnout, and the mediating role of PsyCap	1. Maslach Burnout Inventory-General Survey 2. WIF scale and FIW scale 3. PCQ-24	PsyCap partially mediated the relation between WIF & professional efficacy among male doctors & partially mediated the relations of FIW with emotional exhaustion, cynicism and professional efficacy among female doctors
Liu et al. BMC health services research, 2015	Aug 2013-April 2014. Liaoning, China. Psychiatrists from 10 psychiatric hospitals	To evaluate the condition of HRQOL of psychiatrists & explore its predictive factors, especially the effects of occupational stress & PsyCap	1. Short-Form Health Survey 2. Siegrist's effort-reward-imbalance 3. PCQ-24	PsyCap was significantly positively correlated with HRQOL ( $r=0.5$ ; $p<0.001$ ) and negatively correlated with occupational stress ( $r=-0.4$ ; $p<0.001$ ). PsyCap mediated the association between occupational stress (ERR) and HRQOL
Zhang et al. Frontiers in psychology 2021.	Beijing, China. Residents from public hospitals.	To examine the mediating effect of organizational ID on the relationship between PsyCap & job satisfaction	1. PCQ-24 2. Organizational Identification Scale 3. Job satisfaction	PsyCap had a significant positive effect on OID ( $\beta = 0.29$ , $t = 5.13$ , $p < 0.001$ ) and job satisfaction ( $\beta = 0.36$ , $t = 6.26$ , $p < 0.001$ ). After adding the mediating variable of OID, the positive effect of PsyCap on job satisfaction remained significant ( $\beta = 0.36$ , $t = 6.26$ , $p < 0.001$ ).
Vincent et al 2022. Journal of Organizational Effectiveness People and Performance	Emergency physicians in India. Response rate = 65%. n=324	To explore a moderated mediation model on the effect of doctor's family incivility and burnout on doctor's job satisfaction as a function of PsyCap	1. 6-item Family Incivility scale 2. Shirom-Melamed Burnout Measure 3. 3-item job satisfaction measure 4. PCQ12	PsyCap was negatively correlated with family incivility $r = -0.23$ and positively correlated with job satisfaction $r = 0.66$ . The relationship between family incivility and burnout; and between family incivility and job satisfaction was significantly moderated by PsyCap

**Psychological well-being**

PsyCap was negatively associated with depression and burnout and positively associated with HRQOL Two separate studies reported that PsyCap mediated the association between WPV and depressive symptoms as measured by the Center for Epidemiology Studies Depression Scale (Li & Wu, 2021; Sui et al., 2019). In a gender-stratified analysis, Liu et al showed that PsyCap mediated the association between occupational stress, overcommitment and depression, reducing symptomatology scores; however, this was true only for female physicians (Liu et al., 2012). PsyCap was negatively associated with three dimensions of burnout – emotional exhaustion, depersonalization and fatigue –

as measured by the Maslach Burnout Inventory Human Services Survey (Sui et al., 2019; Tian et al., 2020). In the lone Danish study, this association occurred only in specialists but not in residents (Solms et al., 2019). In addition, PsyCap mediated the relationship between occupational stress, as measured by the Siegrist's Effort–Reward Imbalance questionnaire and burnout (Tian et al., 2020). Whereas both family-interfering work conflict (FIW) and work-interfering family conflict (WIF) were both correlated with burnout, a gender-stratified study demonstrated that the mediating effect of PsyCap was evident only between FIW and burnout in female physicians (Wang et al., 2012).

The Short-Form Health Survey (SF-36) assesses HRQOL. It comprises six sections merged into the two components: physical component summary (PCS) and mental component summary (MCS). In a cross-section of psychiatrists, PCS scores were higher than MCS scores. Psychiatrists who worked longer hours, experienced an adverse life event in the last year or didn't exercise had lower scores across the board. Both PCS and MCS were significantly negatively correlated with workplace stress; an association that was mediated by PsyCap (Liu et al., 2015).

### **Attitudes**

PsyCap was positively associated with several job-related attitudes including job satisfaction, organisational identity (OID), job involvement, work engagement, and professional efficacy (Vincent et al., 2022; Xu et al., 2020; Zhang et al., 2021). The lone Indian study reported a moderating effect of PsyCap on the negative relationship between burnout, job incivility and job satisfaction showing that both associations were weaker when PsyCap was higher (Vincent et al., 2022).

PsyCap positively predicted work engagement as measured by the Utrecht Work Engagement Scale (Solms et al., 2019; Yang et al., 2020). Moreover, PsyCap significantly mediated both the correlation between perceived organisational support and work engagement, and the negative association between WPV and professional identity (Qiu et al., 2019). In the gender stratified study referenced previously, (which reported the effect of WIF on psychological well-being in females); FIW negatively impacted professional efficacy in male practitioners only; an association which was mediated by PsyCap (Wang et al., 2012).

### **Performance**

Performance in family physicians was positively correlated with PsyCap and a case was made for the moderating effect of PsyCap on the relationship between job involvement and performance so that when PsyCap was higher, there was a stronger positive association between job involvement and performance (Xu et al., 2020).

## DISCUSSION

PsyCap is a ubiquitous positive psychological resource that facilitates maximizing positivity in all areas of life (Avey et al., 2011). The studies in this review endorse this theoretical framework as PsyCap was associated with or predicted positive work outcomes related to psychological well-being, positive work attitudes, and performance in practising physicians.

### Work outcomes

An important aspect of these findings is the stratification of work outcomes into inward-facing outcomes, that is, psychological well-being and attitudes towards work and outward-facing outcomes, that is, performance. The studies retrieved were heavily skewed toward the inward-facing work outcomes with just 2 (14%) reporting performance or patient-directed outcomes. This is in contrast to a systematic review by Nolzen et al which included a cross-section of workers, where 50% of the articles measured performance such as in-role performance, entrepreneurship performance, academic outcome, supervisor-rated performance, and financial performance among diverse sectors such as marching bands, management and financial services, and manufacturing firms (Nolzen, 2018). One review referenced the performance of healthcare professionals amongst other white-collar employees in Turkey. Although the Nolzen review showed a greater focus on performance in comparison to the 14% performance outcome in this study which was restricted to doctors, over 90% of the studies in the Nolzen review referenced inward-facing outcomes with the majority reporting on satisfaction and work stress.

Focus on the well-being of the individual worker has grown over the past decade as there is now a legal requirement to ensure safety and well-being at work, and there is strong evidence that well-being improves performance (CIPD, 2016; EU-OSHA, 2021). This maturation of theories and policies could have influenced a publication bias towards inward-facing work outcomes at the expense of performance measures. Performance measures, in the context of medicine, are crucial as life and death literally hangs in the performance balance. There is therefore a pressing need to incorporate a double-edged approach to studies, where outward-facing measures (e.g., response times, board reviews, missed clinic days, patient complaints) are included in studies on work outcomes in health.

### Population

Importantly, this review highlights a disparity in the populations included in this research, as most studies were in one province in China, with no representation from the Western hemisphere. This is in contrast to the Nolzen

review in which just over half of the studies retrieved were carried out in the USA (Nolzen, 2018).

Compared to nursing staff, the research for doctors in this area is deficient. Of the 110 studies excluded from this review, 60 were rejected because the population was restricted to nurses or, in the minority of cases (n=9), the data for nurses and doctors were not analysed separately. The experiences of doctors and nurses are quite different in terms of job demands and resources (Kinman et al., 2020). Not stratifying the results by profession could be a missed opportunity to investigate these nuances.

Another area for future research is stratification by gender, as described in the Wang et al study. The circumstances surrounding women in medicine have evolved from women being barred from attending medical school in the 1800s to the majority of medical students being female in the 21st century (Jefferson et al., 2015). Despite this advancement towards gender equality in terms of overall numbers, there is still a 'glass ceiling' – an invisible barrier, restricting the progress of women to leadership positions (Carnes et al., 2008). In practice, more females are salaried workers, whereas males are offered partnership. Studies have shown that female doctors receive less domestic support than their male counterparts; this can influence the decision to switch to part-time employment, which interferes with career progression, making it less likely for women to reach the consultant post or drawing out the length of time to attain this goal (Taylor et al., 2009). There are additional gendered work conditions like sexism, harassment and organisational (un)responsiveness such as limited provision of job resources which was described as trying to progress on a 'sticky floor' (Bond et al., 2004). These are important circumstances to consider as they can negatively shape attitudes and psychological status and thereby work performance.

## LIMITATIONS

Whereas the required 20% of the articles were screened independently by two researchers, this is not as robust as 100% double assessment. A single author was responsible for data extraction. Restriction of relevant articles to a small geographical area limits the generalisability of the evidence.

## WHY IS THIS IMPORTANT?

This work has highlighted the dearth of research findings regarding the association between PsyCap and work outcomes in physicians worldwide but specifically within the Western hemisphere. This review has made an empirical contribution to the literature in that it is the first systematic review on this topic.

This review makes several theoretical contributions: (1) it supports the existing PsyCap theory as all articles in this review either predicted or were correlated with positive work outcomes in this population of clinicians. (2) This work seeks to extend the theory by proposing the stratification of work outcomes into inward-facing (the worker) work outcomes, which are mainly attitudes and well-being; and outward-facing (the recipient) work outcomes which are mainly performance based. In this review, the majority of the articles cited were inward-facing. This is similar to systematic reviews on work outcomes in other populations. The two categories of inward-facing and outward-facing seem divergent enough to warrant this reclassification to ensure adequate representation of each category in research outcomes.

On the practical side, this article highlights the scope for additional research in medical practitioners with an emphasis on intervention trials geared at improving PsyCap. There is also a need for studies of all designs outside of Asia, including in small island developing states and low – middle income countries where the pressures of work are unique. There is scope for studies stratified by gender, specialty, and grade (senior vs. junior doctor) as the nuances that occur at these levels may offer important insight into outcomes. There is an urgent need to ensure performance measures are included in the gamut of work outcomes assessed.

## CONCLUSION

In conclusion, the occurrence of work stressors and adverse work outcomes amongst healthcare workers is high. Despite the overwhelming evidence supporting PsyCap as a resource positively associated with wellbeing, positive attitudes, and improved performance, there is a dearth of empirical research investigating the association between PsyCap and work outcomes amongst doctors specifically, particularly those outcomes related to performance measures. There is a pressing need for intervention trials geared at improving PsyCap amongst medical practitioners as there were none available for inclusion in this review.

## FUNDING

This study received no funding.

## CONFLICTS OF INTEREST

All authors declare no conflicts of interest.

## DATA AVAILABILITY

No datasets were generated.

## ETHICAL APPROVAL STATEMENT

Ethical Approval was not required as this review utilised only previously published articles and did not involve human subjects.

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