

Supplementary Material

What factors affect the recruitment and retention of allied health professionals working in hospitals? A systematic literature review

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Supplementary Materials for: What factors affect the recruitment and retention of allied health professionals working in hospitals? A systematic literature review.

Search strategy and terms

PubMed – 548 results (searched: 1/11/23)

("Allied Health Personnel"[Mesh] OR "Allied Health Occupations"[Mesh] OR "Nutritionists"[Mesh] OR "Speech-Language Pathology"[Mesh] OR "Occupational Therapists"[Mesh] OR "Physical Therapists"[Mesh] OR "Social Workers"[Mesh] OR "Pharmacists"[Mesh] OR "Dietetics"[Mesh] OR "Occupational therapy"[Mesh] OR "Physical Therapy Specialty"[Mesh] OR "Social work"[Mesh] OR "pharmacy"[Mesh] OR "psychology"[Mesh] OR "Nuclear Medicine"[Mesh] OR "Radiography"[Mesh] OR "Ultrasonography"[Mesh] OR "allied health"[tiab] OR "dietitian"[tiab] OR "dietitians"[tiab] OR "dietician"[tiab] OR "dieticians"[tiab] OR "speech therapist"[tiab] OR "speech therapists"[tiab] OR "speech pathologist"[tiab] OR "speech pathologists"[tiab] OR "occupational therapist"[tiab] OR "occupational therapists"[tiab] OR "physiotherapist"[tiab] OR "physiotherapists"[tiab] OR "social worker"[tiab] OR "social workers"[tiab] OR "pharmacist"[tiab] OR "pharmacists"[tiab] OR "radiographer"[tiab] OR "radiographers"[tiab] OR "radiologic technologist"[tiab] OR "radiologic technologists"[tiab] OR "sonographer"[tiab] OR "sonographers"[tiab] OR "ultrasonographer"[tiab] OR "ultrasonographists"[tiab] OR "Ultrasound Technologist"[tiab] OR "Ultrasound Technologists"[tiab] OR "nuclear medicine technologist"[tiab] OR "nuclear medicine technologists"[tiab] OR "nuclear medicine technician"[tiab] OR "nuclear medicine technicians"[tiab] OR "psychologist"[tiab] OR "psychologists"[tiab] OR "allied health personnel"[tiab] OR "allied health occupation"[tiab] OR "allied health occupations"[tiab] OR "nutritionist"[tiab] OR "nutritionists"[tiab] OR "speech language pathology"[tiab] OR "speech language pathologist"[tiab] OR "speech language pathologists"[tiab] OR "speech-language pathologist"[tiab] OR "speech-language pathologists"[tiab] OR "dietetics"[tiab] OR "occupational therapy"[tiab] OR "physiotherapy"[tiab] OR "social work"[tiab] OR "pharmacy"[tiab] OR "psychology"[tiab])

AND

("Personnel Turnover"[Mesh] OR "Personnel Selection"[Mesh] OR "personnel selection"[tiab] OR "staff retention"[tiab] OR "employee retention"[tiab] OR "personnel retention"[tiab] OR "staff turnover"[tiab] OR "staff recruitment"[tiab] OR "personnel recruitment"[tiab] OR "employee recruitment"[tiab] OR "intention to leave"[tiab] OR "intention to stay"[tiab] OR "intention to quit"[tiab] OR "turnover intention"[tiab] OR "personnel turnover"[tiab] OR "retention rates"[tiab])

AND

("factor"[tiab] OR "factors"[tiab] OR "determinant"[tiab] OR "determinants"[tiab] OR "intervention"[tiab] OR "interventions"[tiab])

AND (2003:2023[pdat])

CINAHL – 428 results (searched: 1/11/23)

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“psychology” OR MH "Radiologic Technologists" OR MH "Ultrasound Technologists" OR MH "Nuclear Medicine Technicians" OR **TI**(“allied health” OR “dietitian” OR “dietitians” OR “dietician” OR “dieticians” OR “speech therapist” OR “speech therapists” OR “speech pathologist” OR “speech pathologists” OR “occupational therapist” OR “occupational therapists” OR “physiotherapist” OR “physiotherapists” OR “social worker” OR “social workers” OR “pharmacist” OR “pharmacists” OR “radiographer” OR “radiographers” OR “radiologic technologist” OR “radiologic technologists” OR “sonographer” OR “sonographers” OR “ultrasonographer” OR “ultrasonographers” OR “Ultrasound Technologist” OR “Ultrasound Technologists” OR “nuclear medicine technologist” OR “nuclear medicine technologists” OR “nuclear medicine technician” OR “nuclear medicine technicians” OR “psychologist” OR “psychologists” OR “allied health personnel” OR “allied health occupation” OR “allied health occupations” OR “nutritionist” OR “nutritionists” OR “speech language pathology” OR “speech language pathologist” OR “speech language pathologists” OR “speech-language pathologist” OR “speech-language pathologists” OR “allied health professions” OR “dietetics” OR “occupational therapy” OR “physiotherapy” OR “social work” OR “pharmacy” OR “psychology”) OR **AB**(“allied health” OR “dietitian” OR “dietitians” OR “dietician” OR “dieticians” OR “speech therapist” OR “speech therapists” OR “speech pathologist” OR “speech pathologists” OR “occupational therapist” OR “occupational therapists” OR “physiotherapist” OR “physiotherapists” OR “social worker” OR “social workers” OR “pharmacist” OR “pharmacists” OR “radiographer” OR “radiographers” OR “radiologic technologist” OR “radiologic technologists” OR “sonographer” OR “sonographers” OR “ultrasonographer” OR “ultrasonographers” OR “Ultrasound Technologist” OR “Ultrasound Technologists” OR “nuclear medicine technologist” OR “nuclear medicine technologists” OR “nuclear medicine technician” OR “nuclear medicine technicians” OR “psychologist” OR “psychologists” OR “allied health personnel” OR “allied health occupation” OR “allied health occupations” OR “nutritionist” OR “nutritionists” OR “speech language pathology” OR “speech language pathologist” OR “speech language pathologists” OR “speech-language pathologist” OR “speech-language pathologists” OR “allied health professions” OR “dietetics” OR “occupational therapy” OR “physiotherapy” OR “social work” OR “pharmacy” OR “psychology”))

AND

(MH “Personnel Turnover” OR MH “Personnel Selection” OR **TI**(“personnel selection” OR “staff retention” OR “employee retention” OR “personnel retention” OR “staff turnover” OR “staff recruitment” OR “personnel recruitment” OR “employee recruitment” OR “intention to leave” OR “intention to stay” OR “intention to quit” OR “turnover intention” OR “personnel turnover” OR “retention rates”)) OR **AB**(“personnel selection” OR “staff retention” OR “employee retention” OR “personnel retention” OR “staff turnover” OR “staff recruitment” OR “personnel recruitment” OR “employee recruitment” OR “intention to leave” OR “intention to stay” OR “intention to quit” OR “turnover intention” OR “personnel turnover” OR “retention rates”))

AND

(**TI**(“factor” OR “factors” OR “determinant” OR “determinants” OR “intervention” OR “interventions”) OR **AB**(“factor” OR “factors” OR “determinant” OR “determinants” OR “intervention” OR “interventions”))

AND (PY 2003-2023)

Embase – 918 results (searched: 01/11/23)

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AND

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AND

("factor":ti,ab OR "factors":ti,ab OR "determinant":ti,ab OR "determinants":ti,ab OR "intervention":ti,ab OR "interventions":ti,ab) AND ([article]/lim OR [article in press]/lim OR [review]/lim) AND ([2003-2023]/py)

Scopus Advanced Search (Searched: 1/11/23) – 432 results

(TITLE-ABS("Allied Health Personnel" OR "Allied Health Occupations" OR "Nutritionists" OR "Speech-Language Pathology" OR "Occupational Therapists" OR "Physical Therapists" OR "Social Workers" OR "Pharmacists" OR "Dietetics" OR "Occupational therapy" OR "Physical Therapy Specialty" OR "Social work" OR "pharmacy" OR "psychology" OR "allied health" OR "dietitian" OR "dietitians" OR "dietician" OR "dieticians" OR "speech therapist" OR "speech therapists" OR "speech pathologist" OR "speech pathologists" OR "occupational therapist" OR "occupational therapists" OR "physiotherapist" OR "physiotherapists" OR "social worker" OR "social workers" OR "pharmacist" OR "pharmacists" OR "radiographer" OR "radiographers" OR "radiologic technologist" OR "radiologic technologists" OR "sonographer" OR "sonographers" OR "ultrasonographer" OR "ultrasonographers" OR "Ultrasound Technologist" OR "Ultrasound Technologists" OR "nuclear medicine technologist" OR "nuclear medicine technologists" OR "nuclear medicine technician" OR "nuclear medicine technicians" OR "psychologist" OR

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AND

(**TITLE-ABS**(“factor” OR “factors” OR “determinant” OR “determinants” OR “intervention” OR “interventions”))

AND

(PUBYEAR > 2002)

Selected studies' main characteristics and findings

First author, year of publication	Country	Overview of study design, analytical approach, underpinning theory (if any)	Participant characteristics: n, role, gender, age	Aims	Outcomes	Relevant Findings	Interpretations and recommendations	MMAT Score
Hewko 2021	Canada	Qualitative semi structured interviews, thematic analysis, no theory	n= 10, dietitian managers, demographics not collected to preserve anonymity.	To explore characteristics of clinical dietetic jobs in Canada associated with frequent turnover.	-Themes re. avoidable turnover and sub themes -Themes re: Unavoidable turnover and sub themes	Avoidable turnover subthemes: lack of manager support (hygiene), growth opportunities (motivator), burnout/workload (hygiene), tension/conflict (hygiene) and hours of work (hygiene). Unavoidable turnover subthemes: life-stage/life-events, geography	High turnover has less to do with a particular disease or patient population and more to do with desire for expanded skills and expertise, desire for prestige and for advancement which may be accessed at larger institutions. Avoidable turnover could be addressed.	5
Hughes 2011	Australia	Qualitative semi structured interviews (phone and face-to-face), content analysis, no theory	n=28, dietitians, 25 female (89%), mean age 34.9 +/- 9.5 years <30yrs 29% 30-39yrs 43% 40+ 28%	To investigate the factors influencing the recruitment and retention of the clinical dietetics workforce in metropolitan Queensland.	- Themes relating to recruitment, retention and job satisfaction	Factors that influenced job satisfaction positively for clinicians working in Queensland Health were support and opportunities for professional development (motivator), leave provisions (hygiene), salary sacrificing benefit (hygiene), job security (hygiene) and job mobility (hygiene). Factors that influenced job satisfaction negatively were perception of inertia and bureaucracy (hygiene), lack of essential resources (hygiene). Respondents highlighted the importance of management style and leadership (hygiene) of immediate manager who had much more impact on the positive and negatives of employment within Queensland Health. Themes relating to clinical dietetic workforce retention strategies that could be used to enhance retention were elucidated from the responses and	Recruitment and retention of hospital dietitians can be enhanced through resource and organisational management strategies that address determinants of staff turnover.	5

						included; remuneration and recognition ie. enhance career progression pathways (motivator), increase remuneration (hygiene); family friendly ie. improve flexibility, increase availability of part-time positions (hygiene); management ie. Reduce bureaucratic inertia (hygiene), re-entry to work programs (motivator), mentoring schemes (motivator), more clinical educators to manage students (hygiene).		
Nightingale 2021	UK	Qualitative semi-structured interviews (literature informed topic guide), pragmatic framework methodology content analysis, no theory.	n=44 19 diagnostic radiography 10 therapeutic radiography 7 sonography 8 mammography (Of those 44, 12 radiography managers, 9 radiographers considering leaving and 23 radiographers who have left in the last 2 yrs), gender: not collected, age: not collected, but level of career reported 7 early career (first 5 yrs) 15 mid-career 10 late career (last 10 yrs)	To identify why radiographers leave the NHS early and what incentives are important in their decision to stay.	Perspectives of those who have left the NHS and those considering leaving.	Respondents overall said they enjoyed being a radiographer and the patient interactions. The negative impacts outweighed this enjoyment for many. Themes identified which impacted decisions to leave were; -Challenging work patterns and the impact on employee health and wellbeing due to extended working days and weekends, workforce deficits, and physical challenges (hygiene). -Lack of flexibility in working terms and conditions which impacted caring responsibilities and the impact on remuneration when considering inflexibility of shift systems which affected ability to earn extra (hygiene). -Lack of timely career progression and access to CPD and the need to be feel valued (motivator).	Improving retention is a rapid method of workforce expansion. Addressing concerns is required to avoid exacerbating the loss of experienced and highly trained staff from the NHS at a time when demand for services is rising.	5
Nightingale 2023	UK	Qualitative semi-structured interviews,	n=44 12 radiography managers, 9	To explore how influencing	Retention factors across the working	Reasons for leaving the NHS or the profession at different career stages aligned to generations:	Tailoring interventions may improve retention of workforce within different	5

		pragmatic framework methodology, content analysis, generation theory.	radiographers considering leaving and 23 radiographers who have left, gender: not collected, age not collected but level of career reported 9 early career roles (first 5 yrs), 15 mid career roles 10 late career roles (last 10 yrs).	factors (challenging work patterns, lack of flexibility in working patterns, lack of timely career progression and CPD) for radiographers to leave the NHS change at different stages of the career trajectory.	life of radiographers.	-Early career (Gen Z/Y) leave due to: delayed progression (skills and knowledge not exploited) (motivator), lack of additional earning potential beyond basic pay (hygiene), more transient workforce (hygiene). -Mid career (Gen X/Y) leave due to: lack of CPD and advanced practice opportunity (motivator), lack of development and earning potential in advanced consultant practice (hygiene), lack of flexible working options (childcare/elder care) (hygiene). -Late Career (BB/Gen X) leave due to: physical demands of some roles and shifts, senior staff burnout, lack of flexible working and 'wind down' roles (hygiene).	career experience levels. Generational differences should be viewed in terms of the strengths that they may bring to the workplace rather than the challenges that they may pose.	
Probst 2009	UK	Qualitative, unstructured interviews, grounded theory	n=18, therapy radiographers, basic demographic data collected only to preserve anonymity (age and gender not collected). All grades (except consultant and advanced), included specialist roles. Job tenure 8mths-20yrs included staff who had left or in process of leaving or sideways move.	To investigate factors that influence job satisfaction and turnover intentions.	Factors which influence job satisfaction and intention to leave	Factors that decrease job satisfaction and increase intention to leave include: unchallenging work (motivator); lack of opportunities to specialise, learn or progress in a career (motivator); lack of empowerment or support by management (hygiene); not being listened to and complex routes of communication (hygiene); weak leadership (hygiene); and inequality and inconsistency in the application of policies (hygiene). Worker stress and burnout decreased job satisfaction and increased intention to leave, particularly related to heavy workloads (hygiene), emotional exhaustion (hygiene), lack of team support (hygiene) and fear of making mistakes (hygiene).	Retention strategies should target improving job characteristics, leadership style and organizational governance, and reducing job stressors to prevent burnout.	5
Abdullahi 2023	Nigeria	Quantitative cross-sectional surveys	n=326, pharmacists, male (49.7%)	To examine job satisfaction	-Total satisfaction and subscales	Overall: 53.1% of pharmacists had low satisfaction. Of those pharmacists that reported high satisfaction, associated factors of high job	Overall pharmacists have low satisfaction in Nigeria. Of those with	2

		(validated), correlational analysis, no theory	female (50.3%), age: 23-29 (30.4%) 30-36 (32.5%) 37-43 (22.1%) 44-50 (0%) >50 (15%), Yrs of service: <=5 (59.5%) 6-10 (19.6%) 11-15 (7.7%) 16-20 (6.4%) >=21 (6.7%)	of pharmacists working in health facilities.	-Associated factors of high job satisfaction -Association of high job satisfaction with intention to quit	satisfaction varied. Overall satisfaction was associated with marital status, occupation type (full time vs part time vs locum), highest qualification, years of service, current level, pharmacy as main source of income, number of working hours per week, and status of residential home. Of those staff with high satisfaction, over half did not intend to leave the healthcare sector and were motivated to work in the public health sector. Of those staff with high satisfaction, majority stated they had the intention to leave Nigeria for abroad.	high job satisfaction there is still a significant intention to leave Nigeria for abroad which highlights the issue of workforce migration having an effect on retention in low-income countries.	
Benslimane 2016	Saudi Arabia	Quantitative, unvalidated surveys 1 survey to pharmacy managers and 1 survey to pharmacists The study describes that it used qualitative methods, however there was no evidence of this in the paper.	n= 90 19 pharmacy managers, 71 pharmacists, Socio-demographic collected but not reported in results.	To explore the level of job satisfaction and factors that motivate pharmacists in Saudi hospitals.	Perspectives of pharmacy managers and pharmacists on job satisfaction and factors that motivate pharmacists.	Pharmacy managers believe that pharmacists are satisfied with their general work conditions and career development. They felt salary and job promotions were the strongest motivators and job attractiveness as least motivating. In terms of satisfaction, pharmacists ranked relationship with co-workers as highest followed by having good safety measures in the hospital followed by job security. Pharmacists had low intention to stay (63.4% thinking of leaving). There was no relationship between pharmacists' satisfaction and their intention to leave work.	Managers misperceived the relative influence of different factors. Therefore, managers should seek to understand which factors influence pharmacists' intention to stay to inform retention strategies.	0
Hewko 2022	Canada	Quantitative unvalidated survey, descriptive analysis, no theory	n=20, dietitian managers, demographic data not collected. Years as a manager: <1yr: n=3 1-5yrs: n=8 6-10yrs: n=4	To identify key attributes of Canadian clinical registered dietitian jobs associated with high	Highest and lowest turnover positions of registered dietitians in the past 5 years.	High turnover positions turned over 4.0 times and lower turnover positions 0.3 times in a 5-year period. No significant differences between high and low turnover positions. Turnover in high turnover positions were maternity leave (36%) and resignation (37%). Turnover in low turnover positions were resignation (44%) and leave of absence (33%).	More research is required to understand attributes of high turnover positions. Managers may see benefit in comprehensive interviews with dietitians after each turnover to identify position attributes and distribute the	3

			11-15yrs: n=2 >15yrs: n=3	rates of turnover.		Interpersonal conflict was reported by 5 managers in high turnover versus 2 in low turnover positions.	attributes across positions to even out turnover rates.	
Lan 2019	Taiwan	Cross-sectional unvalidated survey, no theory used	n= 101 pharmacists (25 males, 76 females); 21-30yrs 58.4% 31-40yrs 21.8% 41-50yrs 9.9% >50yrs 9.9%	To explore the relationship between organisational climate, job stress, workplace burnout and retention of pharmacists.	-Demographic data -Organisational climate - Job stress - Workplace burnout -Intention to stay	Rates of retention were higher among participants who were male, unmarried and participated in further education. There was a moderate positive correlation between organisational climate (better) and intention to stay. There was a moderate to weak negative correlation between job stress and intention to stay. There was a weak negative correlation between burnout and intention to stay.	Organisational climate includes confidence and sense of support from colleagues, autonomy of decision making, recognition or rewards, sense of belonging and how conflict is managed. These are largely amenable and are worthy of addressing given they improve intention to stay.	5
Probst 2012	UK	Quantitative, surveys (validated subscales except for task load component), correlational analysis, no theory used but topics of survey were taken from main concepts which arose from Probst 2009.	n=97 (87 completed Maslach Burnout Inventory [MBI], 28% response rate, results of burnout questionnaire alone are reported in this study), therapy radiographers, demographic data collected but not reported.	To identify associations of key factors of job satisfaction and turnover intention (identified in Probst 2009) with level and domain of burnout.	MBI and other workforce related measures eg. job satisfaction, intention to leave.	Emotional exhaustion was the highest reported domain of burnout among radiation therapists and was correlated with job dissatisfaction and intention to leave. Emotional exhaustion was reduced among staff who undertook role extensions ie, the inclusion of additional responsibilities beyond traditional scope of practice). Emotional exhaustion was higher among staff who perceived a lack of leadership qualities in immediate managers in the areas of; ‘enabling others to act’ ie. fostering collaboration, actively involving others, mutual respect, strengthening others; and “encouraging the heart” ie. rewards for efforts and accomplishments celebrated. Radiation therapists who reported fewer patient interactions reported less burnout in the personal accomplishment domain.	Small sample size means a larger national survey is required to generalise findings.	3
Seston 2009	Great Britain	Cross-sectional survey, descriptive	n= 5320, hospital pharmacists (from a total of 21889 pharmacists),	To explore job satisfaction, intentions to quit the	- Job satisfaction (1-7)	Hospital pharmacists are more satisfied with their work than community pharmacists. Primary care pharmacists are more satisfied than hospital pharmacists. Hospital pharmacists derive greatest satisfaction from their colleagues (hygiene),	Insight into factors which affect satisfaction but cannot assess its impact on recruitment/retention.	5

		analysis, no theory	overall response rate 76.6%, demographic data not separated for hospital pharmacists.	profession and actual quitting.	-Intention to quit pharmacy -Intention to quit and action.	patient contact (motivator) and the responsibility they are given (motivator). Hospital pharmacists were least satisfied with remuneration (hygiene), recognition (motivator) and physical working conditions (hygiene). There were no differences between sectors of employments for intention to quit but overall pharmacists who were more satisfied with their main job were less likely to be considering leaving the profession.		
Wilson 2015	Australia	Cross sectional survey, correlational analysis, Herzberg's theory	n=56, allied health professionals (response rate 62%), demographic characteristics not reported.	To determine the aspects of the allied health professional's job that contribute most to job satisfaction and intention to leave in a metropolitan hospital	- Job satisfaction scores (1-5) - Frequency of responses to each factor - Intention to Leave (% of Y).	Overall, the frequency of rate of satisfaction was 67.9%. Factors which were more frequently scored as being satisfied or very satisfied by respondents were level of competency to do their job (motivator), level of autonomy (motivator), relationship with colleagues (hygiene), feeling of worthwhile accomplishment (motivators) and professional development opportunities (motivator). Factors which were more frequently scored as being dissatisfied or very dissatisfied were level of staffing (hygiene), opportunities for advancement (motivator), work environment in line with professional values (motivator), input into departmental decisions (hygiene) and workload (hygiene). Intention to leave was 39.3%. Correlation of job satisfaction with intention to leave was carried out but statistical analysis was not appropriate for variables.	Organisations could routinely monitor job satisfaction and implement strategies to enhance job satisfaction to maximise retention. Further research into factors which affect retention is required.	2
Yeh 2010	Taiwan	Quantitative cross-sectional mailed survey, descriptive analysis including means and std deviations for continuous	n=247 pharmacists, 61% female 36% male, age: <29: 26% 30-39: 38% 40-49: 22% >50: 8%	To describe the job stressors of hospital pharmacists and to explore their effects on hospital	Job stressors and supports affecting work outcomes: insomnia; job satisfaction; intention to reduce working hours;	Hospital pharmacists' job stress levels (stress of dispensing, work climates, consultations, pharmacy management, hospital rules) are related to stronger intention to quit employment. Job support (support from hospital high-level, leaders, peers, family/friends) provided to pharmacists negatively related to intention to quit employment. Older pharmacists had lower intentions to quit. Higher monthly incomes of	Hospital administrators could consider ways to improve the influences on hospital pharmacists.	5

		variables and frequency and percentages for categorical variables, no theory.		pharmacists' insomnia and work-related outcomes.	intention to change job content; and intention to quit employment. Demographic associations with work outcomes.	hospital pharmacists are related to lower rates of insomnia.		
Yen-Ju Lin 2007	Taiwan	Quantitative unvalidated survey, descriptive analysis, no theory.	n=298/2000 overall pharmacists, n = 133, hospital pharmacists (14.9% response rate), 53 (39.85% male, 80 (60.15% female, average age 36.05 years, working as pharmacist 10.2 years.	To examine the relationship between job characteristics and job outcomes of pharmacists in hospital, clinic and community pharmacies in Taiwan.	Job characteristics and satisfaction and intention to leave across different work settings. Overall predictor variables of job satisfaction and intentions to leave (not stratified by work setting)	Study confirms the more enriched the job the greater the pharmacist's job satisfaction and less likelihood that he or she would resign. Hospital pharmacists rated most job characteristics less enriched than community or clinic pharmacists and more likely to leave. Correlation of factors with intention to leave was not analysed separately for hospital pharmacists.	Recognition of the needs of pharmacists to redesign and enrich their work arrangements should be considered in the future.	3
Khoza 2021	South Africa	Exploratory, sequential, mixed methods design. Phase 1: Qualitative Semi-structured individual and focus group interviews, thematic	Phase 1 n=16, radiographers, 3 males, 13 females, 5 (21-33 yrs) 6 (34-49yrs) 5 (>50 yrs), 7 (1-10yrs experience) 2 (10-20 yrs) 7 (>20 yrs)	To explore job satisfaction amongst radiographers across all five disciplines – diagnostic radiographers, radiation therapists,	Phase 1 Job satisfaction Phase 2 Intention to leave and factors associated with job satisfaction.	Phase 1: extrinsic and intrinsic factors Job dissatisfaction themes: Lack of career pathing (motivator) (intrinsic) Govt policies (hygiene) (extrinsic) Remuneration (hygiene) (extrinsic) Infrastructure (hygiene) (extrinsic) Lack of support from supervisors and management (hygiene). Functioning of the human resource department (hygiene) (extrinsic) Phase 2:	Benefits main retention factor. Other factors required revision to improve retention.	4

		analysis, no theory. Phase 2: Quantitative Unvalidated survey, correlational analysis, no theory.	Phase 2 n=182/292 (response rate 62%), 60% female, 40% male, 51% employed 1-10yrs, 28% employed 10-20yrs, 20% employed >20yrs.	nuclear medicine radiographers, mammography radiographers, ultrasonographers, employed by public tertiary hospitals and formulate factors that can be used to retain radiographers across all disciplines.		The statistical methodology was unclear for phase 2 and whilst some correlations were made, most were weak. Development of the retention model based on outcome of phase 1 and 2 is somewhat unclear given the statistics in Phase 2. The following statements were found to have causal relationship between job satisfaction and organizational commitment/reduced intent to leave: CPD (motivator); fixed working hours (hygiene); employer provided benefits (hygiene). Job satisfaction decreases and intention to leave increased: Lack of physical safety (hygiene); supervisors fail to acknowledge the effort radiographers put into their work (motivator); lack of support or teamwork amongst colleagues (hygiene); heavy workloads (hygiene); no opportunity to use the skills gained from universities (motivator); no salary recognition for specialized areas (hygiene); no supervisory positions for radiographers working in sub-specialty (motivator); the PMDS ratings not fairly implemented ie. missing accelerated grade progression (hygiene); inconsistent implementation of OSD policy (hygiene).		
Phoenix 2023	England	Longitudinal comparative study Quantitative & qualitative (archived data from 10 wards within one of three NHS Mental Health Trusts in South East England).	Comparison of 2 staffing models. Mental Health Occupational Therapists (OT).	(1) To compare two different staffing models involving OT's. (2) Make recommendations for preferred	Comparison of recruitment and retention figures between the models including new starters, leavers and reason for leaving.	Experimental Staffing Model (OT's included in ward shift numbers): Less delivery of OT specific interventions, leading to poorer retention and impacting on patient and student experiences. Over 40 months, 21 new starts and 24 leavers (majority of leavers were the new starters). 22 left the NHS Trust altogether (some to become unemployed), 2 stayed in NHS Trust and 1 was for promotion. OT Led Team Staffing Model: Improved quality of OT interventions, job	OT led teams outperformed experimental staffing model in terms of recruitment and retention.	5

	Quantitative used for comparison between time periods. Qualitative (mixed sources), thematic analysis, no theory.		staffing models.		retention, student experiences, patient care and safety. Over 21 months, 4 new starters, 3 leavers all left for promotions, (no new starters left).		
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Quality Assessment Results using the Mixed Methods Appraisal Tool (MMAT) Version 2018

First Author (year)	Screening Questions ^A		MMAT Question Number ^{B,C,D}					MMAT Results	
			Q1.1	Q1.2	Q1.3	Q1.4	Q1.5	Total (max 5)	
Qualitative	QS1	QS2							
Hewko (2021)	Y	Y	Y	Y	Y	Y	Y	Y	5
Hughes (2011)	Y	Y	Y	Y	Y	Y	Y	Y	5
Nightingale (2021)	Y	Y	Y	Y	Y	Y	Y	Y	5
Nightingale (2023)	Y	Y	Y	Y	Y	Y	Y	Y	5
Probst (2009)	Y	Y	Y	Y	Y	Y	Y	Y	5
Quantitative	QS1	QS2	Q4.1	Q4.2	Q4.3	Q4.4	Q4.5		Total (max 5)
Abdullahi (2023)	Y	Y	Y	U	Y	U	N		2
Benslimane (2016)	Y	U	U	U	N	U	N		0
Hewko (2022)	Y	Y	Y	Y	Y	U	N		3
Lan (2019)	Y	Y	Y	Y	Y	Y	Y		5
Probst (2012)	Y	Y	Y	N	Y	N	Y		3
Seston (2009)	Y	Y	Y	Y	Y	Y	Y		5
Wilson (2015)	Y	Y	Y	N	Y	N	N		2
Yeh (2010)	Y	Y	Y	Y	Y	Y	Y		5
Yen-Ju Lin (2007)	Y	Y	Y	N	Y	N	Y		3
Mixed-Methods	QS1	QS2	Q5.1	Q5.2	Q5.3	Q5.4	Q5.5		Total (max 5)
Khoza (2021)	Y	Y	Y	Y	Y	Y	N		4
Phoenix (2023)	Y	Y	Y	Y	Y	Y	Y		5

Abbreviations: Y=Yes, N=No, U=Unclear, MMAT = Mixed Methods Appraisal Tool

A. Mixed Methods Appraisal Tool (MMAT) screening questions for all studies – QS1: Are the research questions clear?, QS2: Do the collected data allow to address the research questions?

B. Mixed Methods Appraisal Tool (MMAT) for qualitative studies – Q1.1: Is the qualitative approach appropriate to answer the research questions?, Q1.2: Are the qualitative data collection methods adequate to address the research question?, Q1.3: Are the findings adequately derived from the data?, Q1.4: Is the interpretation of results sufficiently substantiated by data?, Q1.5: Is there coherence between qualitative data sources, collection, analysis and interpretation?

C. Mixed Methods Appraisal Tool (MMAT) for quantitative descriptive studies – Q4.1: Is the sampling strategy relevant to address the research question?, Q4.2: Is the sample representative of the target population?, Q4.3: Are the measurements appropriate?, Q4.4: Is the risk of nonresponse bias low?, Q4.5: Is the statistical analysis appropriate to answer the research question?

D. Mixed Methods Appraisal Tool (MMAT) for mixed-method studies – Q5.1: Is there an adequate rationale for using a mixed methods design to address the research question?, Q5.2: Are the different components of the study effectively integrated to answer the research question?, Q5.3: Are the outputs of the integration of qualitative and quantitative components adequately interpreted?, Q5.4: Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?, Q5.5: Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?