

**Effectiveness of Online Educational Interventions for Diagnosing Mental
Health Disorders in Primary Care and Community Settings:
A Systematic Review**



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Abstract

This review assesses the effectiveness of online educational interventions in improving the diagnostic abilities of primary care and community-based health professionals for mental health disorders. The review followed PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) guidelines within the PICOS (Population, Intervention, Comparison/Control, Outcome and Study Design) framework. The search strategy combined controlled vocabulary and free-text terms across four concept blocks: mental health disorders, diagnosis, primary care and community settings, and online educational interventions, and the blocks were combined using the Boolean operator AND. The original searches covered Ovid MEDLINE, PsycINFO, Web of Science, and PubMed. This paper reports the review stage completed during the six-week Laidlaw Scholars research placement at UCL, London, in which the strategy was verified against the protocol and rerun in Ovid MEDLINE and PsycINFO. The records were imported into Rayyan and screened by title and abstract. The rerun searches returned 2,534 records in Ovid MEDLINE and 1,147 in PsycINFO, a combined total of 3,681 against 3,310 in the original searches of the same two databases. The reviewed literature covered general practitioners, nurse practitioners, midwives, and community health workers across five countries, and the mental health disorders reviewed were ADHD, depression, anxiety, and perinatal mental health difficulties. No outcome measure was common to all studies, with measures ranging from self-reported confidence to performance-based simulation. Search counts established the size of the retrievable literature, not its quality or direction of effect. The review informs a new case on eCREST, UCL's online diagnostic training tool for primary care.

Keywords

online educational interventions, mental health disorders, diagnosis, primary care, systematic review, community-based health professionals, general practitioners

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List of Abbreviations

PRISMA - Preferred Reporting Items for Systematic reviews and Meta-Analyses

PICOS - Population, Intervention, Comparison/Control, Outcome and Study Design

GP - General Practitioner

I. Introduction

Most people with mental health disorders are not seen by a psychiatrist. The diagnosis is made by a general practitioner, a nurse practitioner, or another primary care provider, and depends on that provider's ability to recognise the disorder. Regier et al. (1993) described primary care as the de facto mental health system on this basis, since general practice provides the only relevant clinical contact most patients with a psychiatric disorder receive.

This function of primary care has drawn the attention of researchers because recognition failures at this stage have consequences beyond the individual consultation. When a disorder is not recognised during a consultation, appropriate treatment or referral may be delayed, potentially prolonging symptoms or reducing access to further care. Recognition is an important determinant of access of mental health care.

Online educational interventions have emerged over the past two decades as one proposed way of improving recognition at this stage, on the premise that structured training delivered digitally can improve a practitioner's diagnostic ability without the cost and scheduling demands of in-person instruction. This paper reports on a systematic review examining whether that premise holds up against the accumulated evidence. The following sections set out the extent and persistence of the underlying diagnostic gap, the interventions that have been developed in response to it, the current state of the evidence on their effectiveness, and the scope of the review conducted here.

a) Recognition Failure in Primary Care

Recognition rates in primary care have been studied since at least the 1980s. Higgins (1994) reviewed a set of primary care studies and found that physicians failed to recognise mental health disorders in between roughly a third and four-fifths of cases, depending on the study and setting. The review identified structural causes for this gap. Consultation length limited the time available to assess psychiatric symptoms, and the overlap between psychiatric and physical symptoms made disorders difficult to distinguish in practice. Physician training also prioritised the recognition of physical disease over psychiatric presentation. A more recent meta-analysis of 24 studies and over 34,000 patients found that GPs' (general practitioner's) unassisted sensitivity for detecting anxiety disorders was 30.5%, with identification rates showing no significant change across more than three decades of studies examined (Olariu et al., 2015). Recognition rates in 2015 sit in the same range that Higgins reported two decades earlier.

Table 1. Studies Examining the Percentage of Psychiatric Disorders in Adult Primary Care Settings That Are Not recognised by the Primary Care Clinician*

Source, y	Setting	Psychiatric Assessment, No.			Assessment of Physician Recognition	Percentage of Disorders Not recognised
		Screened	Interviewed	Positive Diagnoses		
Kessler et al, 1985	Marshfield (Wis) Medical Clinic	GHQ: 1072	SADS-Lifetime: 166 on two occasions, 6 months apart	20 at both interviews	Chart review: recognition defined as any mention of psychiatric diagnosis, symptoms, treatment or referral during the 6 months the patient was symptomatic	70
Jones et al, 1987	Family medicine residency center, University of Alabama, Tuscaloosa	GHQ: 139	DIS: 51	42	Physician interview and chart review: assessed the physicians' specific psychiatric diagnosis	79
Von Korff et al, 1987	The Johns Hopkins Internal Medicine Associates Clinic, Baltimore, Md	GHQ: 1242	DIS: 736	184	Rating instrument: completed by the primary provider after the visit noting absence or presence of an "emotional problem"	51
Borus et al, 1988	HMO primary care center in Boston, Mass	GHQ: 140	SCID: 88	34	Rating instrument: completed by the primary provider after the visit noting absence or presence of an "emotional disorder"	65
Kirmayer et al, 1993	St Mary's Family Medicine Center, Montreal, Quebec	CES-D: 685	DIS: 212	75	Chart review:	
					Immediate diagnosis of depression or anxiety	76†
					Diagnosis of depression or anxiety within 12 months	64†
					Any psychiatric diagnosis within 12 months	45†
					Any psychiatric notation within 12 months	33†

*GHQ indicates General Health Questionnaire; SADS, Schedule for Affective Disorders and Schizophrenia; DIS, National Institute of Mental Health Diagnostic Interview Schedule; HMO, health maintenance organization; SCID, Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition; and CES-D, Center for Epidemiological Studies Depression Scale.

†Depression or anxiety disorders not recognised.

Reproduced from "A Review of Unrecognised Mental Illness in Primary Care: Prevalence, Natural History, and Efforts to Change the Course," by E. S. Higgins, 1994, Archives of Family Medicine, 3(10), p. 910.

Table 1. Presents the studies examining the percentage of psychiatric disorders in adult primary care settings that are not recognised by the primary care clinician. Non-recognition ranged from 33% to 79%, establishing the scale of the diagnostic gap this review addresses.

Table 2. Studies Examining the Percentage of Mental Illness in Children in Primary Care Settings That Is Not recognised by the Primary Care Clinician*

Source, y	Subjects	Psychiatric Assessment, No.			Assessment of Physician Recognition	Percentage of Disorders Not recognised
		Screened	Interviewed	Positive Diagnoses		
Chang et al, 1988	School-age children	0	SADS for school age children: 120	76	Physician questionnaire or chart review looking for any report of a psychiatric or behavioral problem	51
Costello et al, 1988	School-age children	Child Behavior Checklist: 789	DIS-Parent and DIS-Child: 126	52	Diagnosis-specific checklist completed by clinician after visit	83
Canning et al, 1992	School-age children		DIS-Child: 83	41	Physician completed questionnaire after visit noting the absence or presence of "a psychiatric disorder"	59
Lavigne et al, 1993	Preschool-age children	Child Behavior Checklist: 3876	Blinded evaluation by two child psychologists and DSM-III-R diagnosis by consensus: 495	251	Physician report form completed after office visit noting the absence or presence of "emotional or behavioral problems"	41

*SADS indicates *Schedule for Affective Disorders and Schizophrenia*; DIS, *National Institute of Mental Health Diagnostic Interview Schedule*; and DSM-III-R, *Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition*.

Reproduced from "A Review of Unrecognised Mental Illness in Primary Care: Prevalence, Natural History, and Efforts to Change the Course," by E. S. Higgins, 1994, Archives of Family Medicine, 3(10), p. 911.

Table 2. Studies examining the percentage of mental illness in children in primary care settings that is not recognised by the primary care clinician. Table 2 shows the same pattern in paediatric primary care, with non-recognition ranging from 41% to 83%, indicating that the diagnostic gap extends across age groups.

b) Online Educational Interventions as a Response

Online educational interventions have been developed to address this gap. These interventions deliver training through web-based modules, e-learning platforms, and interactive virtual scenarios, allowing practitioners to complete training without leaving clinical practice. Existing interventions target a range of professional groups and conditions. General practitioners in England have been trained to identify ADHD through a co-developed web-based psychoeducation program; a pilot randomised controlled trial

involving 221 GPs found that the training significantly improved knowledge, confidence, and reported clinical practice (French et al., 2020). Midwives in Japan have been trained through e-learning to recognise perinatal mental health conditions (Shinohara et al., 2022). Nurse practitioners in the United States have completed online psychiatric training programs (Kverno & Frosch, 2022). Community health workers in India have received digital training in delivering depression care, with knowledge gains comparable to those from face-to-face training delivered to the same professional group (Naslund et al., 2026).

These interventions differ in platform, duration, professional target, and condition of focus. They share an underlying assumption that online delivery can produce improvements in diagnostic ability comparable to in-person training.

c) An Unsynthesised Evidence Base

Individual evaluations of these interventions generally report favourable outcomes, but each study is confined to one intervention, one profession, or one country. The ADHD training trial establishes that GPs in England improved their knowledge and confidence in identifying ADHD; it does not establish whether the same training format would produce comparable results for a nurse practitioner assessing depression, or a community health worker in a different country. Among the studies identified during search development, no evaluation was found that tested whether findings from one intervention generalise to a different professional group or setting.

There is a need for a systematic review that brings this body of research together to assess what the evidence shows about the effectiveness of online educational interventions in improving diagnostic outcomes for mental health disorders across primary care and community settings. Individual trials exist in sufficient numbers to suggest an active and growing field, but the field needs to be mapped systematically.

d) Scope and Objective of this Review

The objective of this review was to assess the effectiveness of online educational interventions in improving the diagnostic abilities of primary care or community-based health professionals for mental health disorders. The review followed PRISMA guidelines and the PICOS framework, structured around population, intervention, comparator, outcomes, and study design. The original searches were conducted across four electronic databases: Ovid MEDLINE, PsycINFO, Web of Science, and PubMed.

This paper reports the stage of the review completed during a six-week research placement. The search strategy was verified against the protocol, and searches were rerun in Ovid MEDLINE and PsycINFO to capture literature published since the original search. Records identified through the rerun searches were imported into Rayyan and screened by title and abstract. The remaining sections set out the background to the review, the existing literature, the methodology, and the results established at this stage.

e) Background of this study

This review builds on a search strategy developed prior to this stage of the project. Database searches were completed across four electronic databases, Ovid MEDLINE, Web of Science, PsycINFO, and PubMed, using a structured strategy combining controlled vocabulary and free-text terms across four concept blocks: mental health disorders, diagnosis, primary care and community settings, and online educational interventions.

The work reported in this paper reflects the current stage of that process. Searches were rerun to capture literature published since the original search and to verify the reproducibility of the existing strategy. Records identified through these searches were screened by title and abstract using Rayyan.

III. Literature Review

The following review is background research conducted to inform and contextualise the systematic review. The studies discussed below were identified during the development of the search strategy and through narrative reading of the field; they are not necessarily records retrieved by, or included in, the systematic searches described in the methodology. They are presented to characterise the existing evidence base and to illustrate the types of interventions, populations, and outcome measures relevant to this review, rather than as findings of the review itself.

a) General Practitioner and Nurse Practitioner Training

Individual studies on general practitioners and nurse practitioners form the largest identifiable cluster of research on online mental health training in primary care. French et al. (2020) evaluated a web-based ADHD awareness training for 221 GPs in England and found significant improvements in knowledge, confidence, and self-reported clinical practice. Kverno and Frosch (2022) evaluated an online post-master's psychiatric-mental health nurse practitioner program in the United States, reporting improved graduate outcomes and expanded capacity for primary care nurse practitioners to deliver

mental health care in underserved areas. The two studies differ in how directly their outcomes relate to diagnosis. French et al. (2020) measured knowledge and confidence in identifying a specific disorder, outcomes that concern recognition. Kverno and Frosch (2022) measured program completion and service capacity, which concern the supply of practitioners trained in psychiatric assessment.

b) Community and Allied Health Worker Training

A second cluster of studies addresses mental health training for community-based and allied health workers, largely in low and middle-income country settings. Mroueh et al. (2025) evaluated a 12-module mental health e-learning platform delivered to 46 primary healthcare professionals in Mali, reporting improved knowledge, attitudes, and practices related to mental disorder identification and management. The same platform has also been used to train 322 allied and healthcare professionals in Senegal, in a program run with the Ministry of Health of Senegal and informed by the findings of the Mali pilot (Bruand et al., 2024). Jorm et al. (2010) evaluated Mental Health First Aid training delivered by e-learning in Australia, in a randomised controlled trial comparing e-learning, a printed manual, and a waitlist control, with the e-learning arm improving knowledge and first aid actions against the waitlist. This trial predates most other studies identified in this review and has since been widely replicated, including in workplace and school settings, though these later studies fall outside the population criteria for the present review.

c) Population-Specific and Allied Interventions

A smaller number of studies target specific patient populations rather than general primary care practice. Shinohara et al. (2022) conducted a randomised controlled trial of a one-day e-learning program for midwives and perinatal healthcare workers in Japan, measuring both a multiple-choice knowledge test and a video-based simulated patient assessment of empathic communication skills. This is one of the few studies identified that pairs a knowledge outcome with a performance-based assessment closer to clinical practice than self-report alone. Halliday et al. (2022) evaluated e-learning to upskill diabetes educators in Australia in supporting patients experiencing diabetes distress, a condition adjacent to but distinct from formal mental health disorder diagnosis; this study is included as a boundary case illustrating how e-learning research on psychological support extends beyond diagnosis-specific outcomes into related domains of practice.

d) Characterising the Field

These studies span five countries and six professional groups. Outcome measures range from self-reported confidence to performance-based simulation testing. Each of the six studies pairs a different outcome measure with a different comparator, and the intervention formats also differ across studies. Shinohara et al. (2022) was one of the few studies to include a performance-based simulated-patient assessment. However, the assessment measured empathic communication rather than diagnostic accuracy. The remaining five measure changes in knowledge or in self-reported confidence and attitudes. This heterogeneity is consistent with the absence of a systematic review bringing this literature together.

Table 3. Characteristics of Studies Examined in the Literature Review

Study	Country	Profession	Outcome Measures	Key Finding
French et al. 2020	England	GPs	Knowledge, confidence, attitude, practice	Significant improvement in knowledge, confidence, and reported clinical practice
Kverno & Frosch 2022	USA	Nurse practitioners	Graduate outcomes, care capacity	Programme graduates expanded capacity to deliver mental health care in primary care
Mroueh et al. 2025	Mali	Primary healthcare workers	Knowledge, attitudes, practices	Significant gains in knowledge and practices; attitude change not significant
Jorm et al. 2010	Australia	General public	Knowledge, stigma, confidence, helping behaviour	Gains in knowledge and first aid actions exceeded wait-list control
Shinohara et al. 2022	Japan	Midwives	MCQ knowledge, video-based simulation	Improvement in both knowledge and simulated clinical performance
Halliday et al. 2022	Australia	Diabetes educators	Confidence, practice	Delivery feasible; confidence in supporting diabetes distress improved

Table 3 depicts the spread of the identified evidence across countries, professional groups, and outcome measures, making the inconsistency in how effectiveness has been measured visible at a glance.

IV. Methodology

a) Study Design and Framework

This review followed PRISMA guidelines and was structured using the PICOS framework: population, intervention, comparator, outcomes, and study design. The review was conducted as part of a Laidlaw Scholars Research Placement at the UCL Department of Primary Care and Population Health, building on a protocol and search strategy developed prior to this stage of the project.

b) Eligibility Criteria

The population comprised primary care practitioners involved in diagnosing mental health disorders; general practitioners, family physicians, nurse practitioners, and community-based health professionals, as well as students training for these roles. Studies of non-health professionals were excluded.

Selected interventions were online educational interventions explicitly designed to improve diagnostic ability for mental health disorders. This covered web-based training, e-learning modules, and interactive virtual scenarios. Purely informational tools, passive screening tools, and decision-support tools without an educational component were excluded. Accepted comparators were no intervention, usual practice, or an alternative educational method such as a face-to-face workshop or paper-based learning.

Outcomes of interest were diagnostic accuracy, sensitivity or specificity, confidence in diagnosis, and diagnostic knowledge. Studies reporting only general attitudes, satisfaction, or unrelated outcomes were excluded. Accepted study designs were randomised controlled trials, quasi-experimental studies, and cohort studies. Qualitative studies were excluded.

Publications were limited to peer-reviewed journal articles and academic theses published in English from 2010 onward, a cutoff reflecting online learning technology usage in this period. Conference abstracts, editorials, letters, and non-English articles were excluded.

Table 4. Eligibility Criteria for Study Selection

Criterion	Include	Exclude
Population	Studies focused on undergraduate students and involving primary care practitioners (GPs, family physicians, nurse practitioners) or community-based health professionals involved in diagnosing mental health disorders	Non-health professionals
Intervention	Online educational interventions explicitly designed to improve diagnostic abilities for mental health disorders, including web-based training, e-learning modules, or interactive virtual scenarios.	Purely informational tools, passive screening tools, or decision-support tools without educational components.
Comparator	No intervention, usual practice, or alternative educational methods (e.g., face-to-face workshops, paper-based learning).	Comparisons of different formats of the same online intervention.
Outcomes	Diagnostic accuracy, sensitivity/specificity, confidence in diagnosis, or diagnostic knowledge.	General attitudes, satisfaction, or unrelated outcomes.
Study design	RCTs, quasi-experimental studies, and cohort studies.	Qualitative studies
Publication	Peer-reviewed journal articles and academic theses/dissertations, published from 2010 onward, in English	Conference abstracts, editorials, non-English
Time frame	Studies published from 2010 onwards (to reflect the growth of online learning technology).	Studies published prior to 2010.

Table 4 sets out the eligibility criteria across the five PICOS domains, which define the inclusion and exclusion decisions applied during title and abstract screening in Rayyan.

c) Search Strategy

The search strategy combined four concept blocks, each covering a distinct element of the research question: mental health disorders, diagnosis, primary care and community settings, and online educational interventions. Within each block, controlled vocabulary terms (MeSH or Emtree headings) and free-text keywords were combined with the Boolean operator OR. The four blocks were then combined using AND. Searches were conducted across four electronic databases: Ovid MEDLINE, PsycINFO, Web of Science, and PubMed. An original search was conducted prior to this stage of the project, returning 2,416 records in Ovid MEDLINE, 894 in PsycINFO, 573 in Web of Science, and 273 in PubMed, for a combined original total of 4,156 records. Updated searches have since been rerun in Ovid MEDLINE and PsycINFO to capture literature published since the original search and to verify the reproducibility of the search strategy.

d) Study Selection Process

All records identified through the searches were imported into Rayyan, a web-based systematic review screening tool, for title and abstract screening. Screening was conducted independently by multiple reviewers, consistent with standard systematic review practice for minimising selection bias. Before full screening began, reviewers screened a shared random subset of records independently to establish inter-rater reliability. Disagreements flagged by Rayyan were resolved through group discussion, with unresolved conflicts escalated to the supervising team.

V. Discussion and Results

a) Search Results

Database searches were rerun in Ovid MEDLINE and PsycINFO, returning 2,534 and 1,147 records respectively, a combined total of 3,681 records across these two databases. This represents an increase from the original search, which returned 2,416 records in MEDLINE and 894 in PsycINFO. The rerun retrieved 371 more records than the original searches of the same two databases. This difference may reflect newly indexed publications as well as changes in database content, indexing, or search execution.

Figure 1. Records Retrieved in the Original and Rerun Searches, by Database

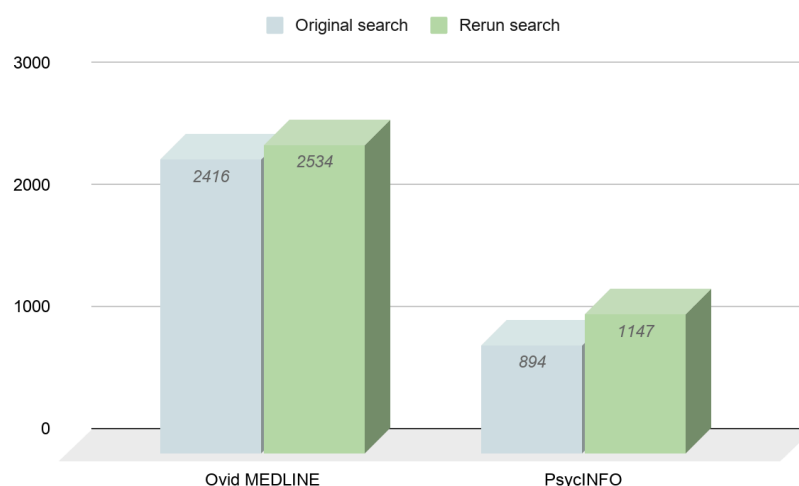
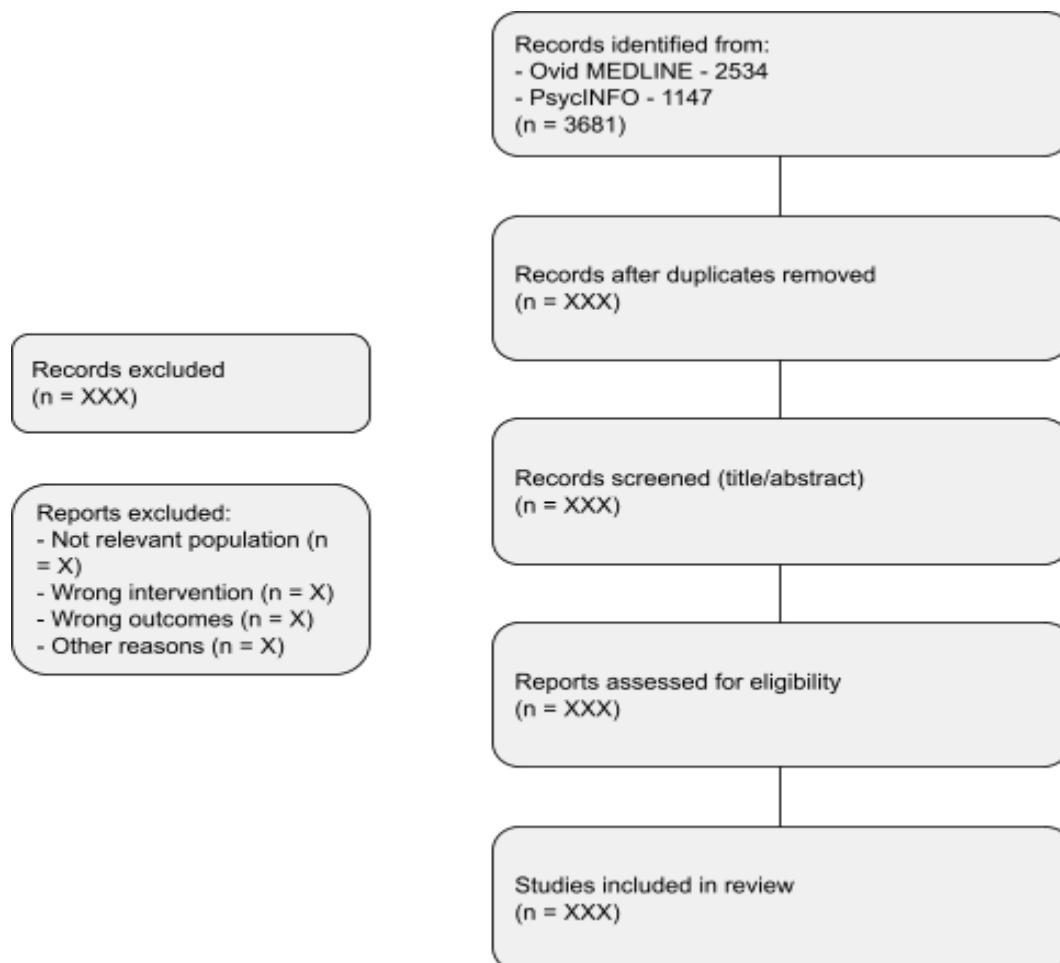


Figure 1 compares the record counts from the original and rerun searches in Ovid MEDLINE and PsycINFO. The rerun returned 118 additional records in MEDLINE and 253 in PsycINFO, reflecting literature published since the original search.

Figure 2. PRISMA 2020 Flow Diagram of Record Identification and Screening



Adapted from Page et al. (2021).

Figure 2 presents the PRISMA flow diagram for the review. The identification stage records the 3,681 records retrieved from Ovid MEDLINE and PsycINFO, with the downstream screening and eligibility stages shown unpopulated, since these steps fall outside the work completed during the placement.

b) Characteristics of the Identified Literature

The literature identified through these searches, together with the studies examined in the Literature Review section, spans multiple countries, professional groups, and mental health conditions. Interventions have been developed for general practitioners, nurse practitioners, midwives, and community health workers, targeting conditions including ADHD, depression, anxiety, and perinatal mental health difficulties. This range indicates an active field of research. It also confirms the central

premise of this review: a substantial body of evidence exists on online educational interventions in this domain, but it has not yet been brought together in a form that allows conclusions about which approaches are effective and for which professional groups.

c) Limitations

The findings reported here are confined to the identification stage. Search counts establish the size of the literature but carry no information about study quality, effect direction, or comparability. Two of the four databases in the protocol, Web of Science and PubMed, were not rerun, so the 3,681 records do not represent the full retrievable literature. The heterogeneity in outcome measures visible in Table 3 constrains what any eventual synthesis will be able to pool.

VI. Conclusion

This paper reports the search verification and record identification stage of a systematic review assessing the effectiveness of online educational interventions in improving the diagnostic abilities of primary care and community-based health professionals for mental health disorders. The work was carried out during a six-week Laidlaw Scholars research placement at the UCL Department of Primary Care and Population Health, and built on a protocol and search strategy already in place at the start of the placement.

The search strategy was verified against the protocol and rerun in Ovid MEDLINE and PsycINFO. The rerun searches returned 3,681 records against 3,310 in the original searches of the same two databases, reporting an increase of 371 records. Records were imported into Rayyan and screened by title and abstract. The identified literature covers five countries and six professional groups. Mental health disorders targeted in the study include ADHD, depression, anxiety, and perinatal mental health difficulties, and no outcome measure is common to all studies.

Search counts establish the size of the retrievable literature and carry no information about the quality of the study or the direction of effect. The scale and variation of the literature confirmed that the evidence on this topic requires systematic treatment, and no single study within it can stand for the evidence as a whole. The verified search strategy and the screening records produced during this placement form part of the audit trail required under PRISMA reporting. The review informs a new case on eCREST, UCL's online diagnostic training tool for primary care.

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