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Article

Analysis of the Current Status and Demand for Mental Health Knowledge Among Grassroots Medical Workers in Tongxiang City

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Abstract

Aims/Background: Psychiatric disorders are often accompanied by complex comorbidities. Even non-psychiatric medical professionals are increasingly encountering patients with mental disorders during routine clinical practice. This study assessed post-training mental health knowledge and additional training needs across grassroots medical workers who had recently undergone systematic training, aiming to provide empirical evidence for building the capacity of mental health professionals. **Methods**: This study surveyed 503 medical staff from various levels and types of medical institutions in Tongxiang city, China, who had undergone systematic mental health training. Data regarding baseline characteristics and mental health-related knowledge were obtained 1–2 days after training completion using two questionnaire types: the "Questionnaire on Medical Staff's Awareness of Mental Health Issues" and the "Questionnaire on Training Needs of Medical Staff". The Kruskal-Wallis (K-W) test was used to compare the demand for psychiatric services and total psychiatric knowledge scores among primary care medical staff with different job positions, specialties, professional titles, and years of service. **Results**: The mean mental health knowledge score among 503 grassroots medical workers was 53.22 $\pm$ 17.44 out of the total 70 points. Regarding mental health service training content, over 80% of the respondents reported knowledge and skills items as "urgently needed" or "needed", with some items exceeding 90%. Short-term training workshops were the preferred delivery approach, with centralized on-site lectures or distance education as the favored formats. High demand was reported for theoretical knowledge sessions, simulated case-based discussions, simulation exercises, and internship practice; the preferred training duration was half a working day per session. The leading motivations for participating in training were job requirements, personal professional development needs, and skill enhancement, whereas the main barriers to participating in training were workload or scheduling conflicts. Multiple factors were found to affect training effectiveness, including training time, format, and content. Significant differences were observed in the proportion of mental health service needs regarding primary job positions, specialties, professional titles, and years of service ($p < 0.05$). Total mental health knowledge scores also varied by primary job position, years of service, and prior participation in mental health work ($p < 0.05$). **Conclusion**: Grassroots medical workers demonstrated a foundational level of mental health knowledge following recent systematic training, with significant inter-individual variation. Demand for mental health service training was generally high, with job requirements and personal capacity enhancement as the primary drivers, while time constraints and insufficient course practicality of the modules were the main barriers. It is recommended to develop and implement corresponding strategies to address these challenges and enhance grassroots medical workers' mastery of mental health knowledge.

Keywords: health personnel; mental health; health knowledge, attitudes, practice; health surveys; needs assessment

1. Introduction

Psychiatric disorders are common, chronic health conditions associated with high disease burden and significant disability rates [1,2]. The implementation of the three-tier prevention system for mental illnesses relies on early detection, accurate diagnosis, and timely treatment to halt and reduce disease progression [3]. Because mental health awareness directly impacts early detection and effective intervention, healthcare professionals must integrate strong clinical skills with evidence-based understanding, appropriate attitudes toward mental conditions, and adequate mental health knowledge.

Recent medical evidence demonstrates that psychiatric disorders often coexist with other complex conditions and contribute to the pathogenesis of organic diseases, such as endocrine and metabolic disorders, cardiovascular pathologies, and a range of infectious and gastrointestinal diseases [4–7]. Mental health-related hospitalization increases across clinical services, and medical professionals increasingly encounter patients with mental disorders, necessitating enhanced mental health knowledge among non-psychiatric practitioners.

Current research on mental health knowledge awareness is limited and predominantly focuses on student populations. Among adolescents, Chinese youth reveal an overall awareness rate of 66%, with a higher rate reported among university students (73%) and a lower rate among secondary students (61%) [8]. Indonesian adolescents demonstrate significant cognitive deficits that hinder disease recognition and delay treatment [9]. Similarly, sec-

ondary students in northern Jordan exhibit low understanding of mental health issues [10]. Notably, among medical undergraduates in Uganda, knowledge retention regarding mental disorders reaches 77.72%, yet positive attitudes (49.29%) and sufficient mental health cognition (46.92%) remain inadequate [11].

Beyond the student cohort, population-level gaps are more prominent. Community-based surveys in Ethiopia reveal relatively poor public awareness of mental illnesses [12]. In clinical settings, only 21 out of 245 registered mental health nurses in the United Kingdom scored >80% on the knowledge of anti-psychotic drug side effects [13], and only 2.7% of Australian midwives correctly answered >11 questions in a 13-item perinatal mental health test [14]. These findings collectively underscore significant global deficits in mental health literacy across both student and non-student cohorts.

Grassroots medical personnel primarily working in community health centers and township settings, including registered physicians, nursing staff, and allied health professionals, form the cornerstone of primary care and play a crucial role in delivering mental health services. Their proficiency in mental health knowledge directly influences patients' adherence to treatment and recovery outcomes. However, systematic assessments of their current mental health knowledge remain limited. Consequently, this study investigates grassroots medical workers to assess their mental health knowledge and identify specific needs, providing empirical evidence to inform workforce development and capacity-building in primary care.

2. Methods

2.1 Study Participants

The study was performed between 1 January 2024 and 31 December 2024, and included 503 medical workers from multiple tiers and facility types in Tongxiang city, China. This survey enrolled participants from 35 institutions across six categories: 4 municipal general hospitals (11.43% of institutions; 167 participants, representing 33.20% of the sample), 3 municipal specialized hospitals (8.57%; 62, 12.33%), 4 community health centers (11.43%; 87, 17.30%), 5 township health centers (14.29%; 89, 17.69%), 16 community health stations/village clinics (45.71%; 90, 17.89%), and 3 other types of institutions (8.57%; 8, 1.59%). These 35 institutions collectively contributed to the 503 completed surveys.

The study was approved by the Medical Ethics Committee of Kangci Hospital of Jiaxing (Approval No. 2025-LUNLI-013). All procedures performed in compliance with the Declaration of Helsinki.

Inclusion criteria for selection of study participants were as follows: (1) employment in primary care institutions; (2) minimum one year of work experience; (3) voluntary participated and independent completion of the questionnaire; and (4) provision of informed consent.

The participants were excluded if (1) undertaking an internship training, (2) employed in secondary or tertiary hospitals or specialized medical institutions, (3) off duty during the survey period (e.g., advanced studies, rotations, standardized training programs) or not a formal staff member, (4) with history of major physical disorders within the past year requiring continuous treatment or significantly impacting daily activity, cognition, or mood (such as severe cardiovascular disease, advanced cancer, severe neurological disorders like dementia or Parkinson's disease), (5) with history of severe psychiatric conditions requiring hospitalization or ongoing medication, such as schizophrenia, bipolar disorder, or major depressive disorder.

2.2 Study Design

The study employed a structured questionnaire as the survey instrument comprising two major sections: a 'demographic' and a 'mental health knowledge and training' section. The demographic section recorded data regarding gender, age, specialty, highest degree, professional qualification, technical title, primary role, and participation in mental health work. The mental health knowledge-assessment section comprising the *Mental Health Awareness Questionnaire for Medical Workers* (included 35 items where a 2-point score indicate "well-informed", 1 indicates "somewhat informed", and 0 show "uninformed", with total scores obtained by summing all items) and the *Training Needs Questionnaire for Medical Workers* (evaluating content needs—8 knowledge-based items and 8 skill-based items—and format needs including training channels, methods, teaching approaches, scheduling, motivations for participation, barriers to attendance, and other factors influencing effectiveness).

2.3 Quality Control

After standardized investigators training, participants were contacted by phone and informed about the purpose of the survey, confidentiality procedures, and voluntary participation. Trained participants were then invited to complete the questionnaire within 1–2 days of training. Participants were informed that the training was part of a study that would involve a subsequent knowledge and training needs assessment. After obtaining consent, investigators distributed a quick response (QR) code linking to the Questionnaire Star survey. Investigators clarified the questionnaire structure and completion guidelines but refrained from interpreting specific items. Respondents completed and submitted questionnaires independently online.

2.4 Types of Questionnaires: Structure and Content

Two questionnaire types were used to assess mental health awareness and training requirements across health care workers.

(a) Mental Health Awareness Questionnaire: the dimension framework included the recognition of symptoms

Table 1. Baseline characteristics across 503 grassroots medical workers.

Variable	n (%)
Gender	
Male	126 (25.05)
Female	377 (74.95)
Age (years)	
20~29	72 (14.31)
30~39	269 (53.48)
40~49	125 (24.85)
≥50	37 (7.36)
Specialty	
Clinical medicine (western/Traditional Chinese)	190 (37.77)
Nursing	88 (17.50)
Others (public health, management, radiology, laboratory medicine)	225 (44.73)
Highest education	
Technical secondary school	5 (0.99)
College	47 (9.34)
Bachelor's degree	437 (86.88)
Master's degree or higher	14 (2.78)
Professional qualification	
Clinical (assistant) physician	197 (39.17)
Public health (assistant) practitioner	5 (0.99)
Registered nurse	227 (45.13)
Technician/Technologist	49 (9.74)
Others	25 (4.97)
Professional title	
No title	12 (2.39)
Junior title	197 (39.17)
Intermediate title	206 (40.95)
Senior title	88 (17.50)
Primary job position	
Clinical doctor	143 (28.43)
Nursing staff	153 (30.42)
Mental health prevention personnel	22 (4.47)
Psychiatric specialist	32 (6.36)
Psychiatric nurse	48 (9.54)
Others (public health/medical technician/TCM/rehabilitation/immunization/maternal child health, etc.)	105 (20.87)
Participation in mental health work	
Yes	102 (20.28)
No	401 (79.72)
Job tenure (years)	
≤5	113 (22.47%)
>5 to ≤10	166 (33.00%)
>10	224 (44.53%)

Note: TCM , Traditional Chinese Medicine.

in common severe mental disorders, anxiety and neurosis-related issues, mental rehabilitation, insomnia and psychological counseling, organic brain disorders, relevant laws, regulations, and ethics. This framework was primarily developed from the core modules of the World Health Organization (WHO) Mental Health Gap Action Programme (mhGAP) Intervention Guide, the National Health Commission's "Standard Operating Procedures for the Management and Treatment of Severe Mental Disorders", and the "National Basic Public Health Service Standards". Cru-

cial knowledge gaps and common misconceptions critical to primary care were identified by reviewing domestic and international mental health capacity-assessment tools for primary care, combined with focus group interviews with 15 health care professionals from 3 community health service centers in the city (8 general practitioners, 3 public health physicians, 4 nurses). Examples included identifying somatic manifestations of depression and anxiety, key elements of suicide risk assessment, and communication skills for interacting with these patients. After drafting the questionnaire instrument, cognitive interviews with 10 grassroots medical staff were used to optimize technical terminology and improve the relevance of scenario-based items, for example, changing "negative symptoms" with "manifestations such as lack of motivation and flat affect".

(b) Training Needs Questionnaire: this questionnaire was developed using a competency gap model for training needs analysis. Dimensions included: knowledge needs (e.g., identification, assessment, basic pharmacology, psychosocial interventions), skills and operational needs (e.g., risk assessment, communication skills, emergency management, follow-up care), preferences for training method and resources (e.g., online modules, offline (in-person) workshops, case discussions, preferred duration), and perceived barriers to training (e.g., time conflicts, insufficient funding, lack of high-quality resources). The design referenced national policies for primary care workforce development and research reports on mental health training needs. Priorities and practical constraints were clarified through semi-structured interviews with 8 managers of grassroots medical institutions and 12 frontline medical staff. Pre-testing emphasized the rationality and appropriateness of response options and the time required to complete the questionnaire.

2.5 Validity of Questionnaire Content and Expert Review Process

Eight experts evaluated content validity. The expert panel included 2 chief psychiatrists (1 specializing in community mental health), 1 professor of general practice, 1 official from the provincial mental health program office, 1 community health service center director (with a general practice background), 1 senior physician in community mental health prevention, 1 nursing management specialist experienced in primary care, and 1 medical education expert. The review was conducted via an online questionnaire platform. Experts received questionnaires, detailed definitions of each dimension, and review guidelines instructing them to rate item relevance and clarity on a 4-point scale and to provide specific revision suggestions. The review period lasted for three weeks.

For the Mental Health Awareness Questionnaire, item-level content validity index (I-CVI) ranged from 0.75 to 1.00. Among these, 2 items had an I-CVI of 0.75 (rated 3 or 4 by 6/8 experts), the and all remaining items were $\geq$0.88. The scale-level CVI/universal agreement (S-CVI/UA) was 0.82 (meaning 82% of items had I-CVI meeting the standard from all experts), and the scale-level CVI/average (S-CVI/Ave) was 0.92. The main recommendation was to simplify the description of 1 scenario-based item.

For the Training Needs Questionnaire, I-CVIs ranged from 0.88 to 1.00, with S-CVI/UA = 0.90 and S-CVI/Ave = 0.96. Experts suggested refinements to response options within the "training barriers" dimension.

Based on expert ratings (with particular focus on items with I-CVI $<$0.78) and qualitative feedback, the research team revised both questionnaires. Modification included rewording 2 items and adjusting the options for 1 item in the Mental Health Awareness Questionnaire and adding "lack of guidance and support from superiors" to the "barriers" dimension of the Training Needs Questionnaire. Revised versions were rechecked by 4 experts who provided core recommendations and received approval.

2.6 Internal Consistency Reliability

Reliability was evaluated using 503 valid responses from medical staff at community health service and township health centers (physicians 43%, nurses 34%, public health personnel 15%, other 8%).

For the Mental Health Awareness Questionnaire, the overall Cronbach's α coefficient was 0.987. Dimension-level Cronbach's α was 0.981 for recognition of symptoms in common severe mental disorders and anxiety symptoms, 0.971 for mental rehabilitation and insomnia, and 0.901 for organic brain disorders and relevant laws/regulations. Other sub-dimensions were excluded due to limited relevance to the study objectives.

For the Training Needs Questionnaire, the overall Cronbach's α coefficient was 0.93. The Cronbach's α for each dimension was 0.88 for knowledge area needs, 0.85 for skills and operational needs, 0.79 for training method preferences, and 0.77 for perceived training barriers. All dimensional α coefficients were greater than 0.70.

2.7 Statistical Analysis

Questionnaire data were double-entered in EpiData software (version 3.0; The EpiData Association, Odense, Denmark), and statistically analyzed using SPSS software (version 16.0; IBM Corp., Armonk, NY, USA). Continuous variables were presented as mean $\pm$ standard deviation ($\bar{x} \pm s$), and categorical variables were expressed as [n (%)]. Group comparisons were conducted using the Kruskal-Wallis (K-W) test, with $p < 0.05$ considered statistically significant.

3. Results

3.1 Baseline Characteristics Across Study Participants

The study enrolled 503 primary care providers, including 126 (25.05%) men and 377 (74.95%) women. Among 503 grassroots medical workers, the average duration of professional experience was 15.15 $\pm$ 8.35 years, and the

Table 2. Awareness of mental health issues among grassroots medical workers [n (%)].

Question	Well-informed	Somewhat informed	Uninformed
1. October 10th is "World Mental Health Day".	279 (55.47)	170 (33.80)	54 (10.74)
2. The mental health law stipulates that inpatient treatment for mental disorders follows the principle of voluntary admission.	308 (61.23)	153 (30.42)	42 (8.35)
3. The Management Measures for Reporting Onset of Severe Mental Disorders (Trial) requires mandatory reporting for six severe mental illnesses: schizophrenia, schizoaffective disorder, persistent delusional disorder (paranoid psychosis), bipolar disorder, mental disorders due to epilepsy, and intellectual disability with associated mental disorder.	312 (62.03)	145 (28.83)	46 (9.15)
4. Medical institutions and individuals shall maintain confidentiality of mentally ill patients' names, portraits, addresses, workplaces, medical records, and other identifiable information.	371 (73.76)	113 (22.47)	19 (3.78)
5. Consultation-Liaison Psychiatry refers to psychiatrists providing psychiatric care, education, and research in general hospitals, delivering medical and rehabilitation services through multidimensional biopsychosocial approaches.	297 (59.05)	179 (35.59)	27 (5.37)
6. Schizophrenia is a common severe mental illness with incompletely understood etiology. It predominantly affects young adults, often follows a relapsing-remitting course causing disability, though a minority may achieve full/partial recovery.	330 (65.61)	152 (30.22)	21 (4.17)
7. Bipolar disorder is characterized by complex alternating/irregular episodes of depression and mania/hypomania, accompanied by distractibility, recklessness, grandiosity, racing thoughts, hyperactivity, reduced sleep, and pressured speech.	321 (63.82)	158 (31.41)	24 (4.77)
8. Early schizophrenia may present subtly as neurosis-like symptoms, mild personality changes, or avolition without overt psychosis, making recognition difficult.	301 (59.84)	178 (35.39)	24 (4.77)
9. Maintenance pharmacotherapy after first-episode schizophrenia remission should last $\geq$2 years. Longer or lifelong treatment is needed after relapses.	290 (57.65)	175 (34.79)	38 (7.55)
10. Schizophrenia patients may pose risks of dangerous behaviors when acting under delusions/hallucinations.	313 (62.23)	165 (32.80)	25 (4.97)
11. Dementia syndrome is a chronic global cognitive disorder featuring progressive intellectual decline.	310 (61.63)	176 (34.99)	17 (3.38)
12. Delirium—an acute consciousness disturbance with vivid hallucinations—commonly affects medically complex elders and signals severe illness.	306 (60.83)	175 (34.79)	22 (4.37)
13. Early dementia signs include: reduced interest/efficiency, recent memory loss, slowed thinking, poor concentration, and personality changes.	317 (63.02)	170 (33.80)	16 (3.18)
14. Advanced dementia often involves behavioral/psychological symptoms like hallucinations/delusions.	302 (60.04)	183 (36.38)	18 (3.58)
15. Parkinson's medications may induce psychosis due to dopaminergic effects.	264 (52.49)	209 (41.55)	30 (5.96)
16. Depressive mood may manifest as somatic complaints (e.g., chest tightness, palpitations, fatigue, dizziness, and frequent urination).	303 (60.24)	187 (37.18)	13 (2.58)
17. Early morning awakening is the most characteristic sleep disturbance in depression.	297 (59.05)	184 (36.28)	22 (4.37)
18. Antidepressants typically take 1–2 weeks to show initial effects, with optimal efficacy at 4–8 weeks.	266 (52.88)	181 (35.98)	56 (11.13)
19. Current depression treatments include pharmacotherapy, modified electroconvulsive therapy (MECT), psychotherapy, and repetitive transcranial magnetic stimulation (rTMS).	275 (54.67)	198 (39.36)	30 (5.96)
20. Suicidal behaviors in depression may occur during severe, early, or recovery phases, often in the early morning.	293 (58.25)	183 (36.38)	27 (5.37)
21. Anti-anxiety medications include benzodiazepines, non-benzodiazepine anxiolytics, antidepressants, and β-blockers.	274 (54.47)	183 (36.38)	46 (9.15)
22. Generalized anxiety disorder features persistent worry without specific triggers, accompanied by autonomic symptoms, muscle tension, and motor restlessness.	260 (51.69)	209 (41.55)	34 (6.76)
23. Obsessive-compulsive disorder is characterized by coexisting intrusive obsessions and neutralizing compulsions.	283 (56.26)	197 (39.17)	23 (4.57)

Table 2. Continued.

Question	Well-informed	Somewhat informed	Uninformed
24. Somatic symptom disorder involves recurrent physical complaints without explanatory organic pathology, persisting despite medical reassurance.	268 (53.28)	207 (41.15)	28 (5.57)
25. Cardiac neurosis, psychogenic hyperventilation/hiccups, gastric neurosis, neurotic diarrhea, psychogenic bloating, irritable bowel syndrome, and psychogenic urinary frequency/dysuria are all somatic symptom disorders.	249 (49.50)	214 (42.54)	40 (7.95)
26. Polysomnography (PSG) is a key sleep medicine technique assessing sleep architecture, efficiency, staging, and respiratory events (e.g., hypopnea/apnea).	229 (45.53)	232 (46.12)	42 (8.35)
27. Crisis intervention following major trauma may reduce post-traumatic stress disorder (PTSD) incidence.	265 (52.68)	208 (41.35)	30 (5.96)
28. Most hypnotics are Class II psychiatric drugs. They improve insomnia but should not be routinely prescribed.	290 (57.65)	187 (37.18)	26 (5.17)
29. Psychotherapy is a professional interpersonal process wherein therapists use verbal/nonverbal methods to facilitate positive psychological/physiological changes for recovery.	288 (57.26)	194 (38.57)	21 (4.17)
30. The mental health law mandates psychotherapy exclusively within medical institutions.	281 (55.86)	191 (37.97)	31 (6.16)
31. The Law requires medical institutions to provide essential psychiatric medications for home-based severe mental disorder patients and offer technical guidance to community rehabilitation facilities.	277 (55.07)	194 (38.57)	32 (6.36)
32. Psychiatric rehabilitation restores social functioning impaired by mental disability through biological, social, and psychological approaches.	274 (54.47)	205 (40.76)	24 (4.77)
33. The three principles of psychiatric rehabilitation are: functional training, comprehensive rehabilitation, and social reintegration.	305 (60.64)	179 (35.59)	19 (3.78)
34. Psychiatric rehabilitation includes: life skills training, medication self-management training, and skills for seeking medical assistance.	289 (57.46)	186 (36.98)	28 (5.57)
35. Social skills training prepares patients for community reintegration through guided participation in social activities (e.g., family visits, group activities).	297 (59.05)	183 (36.38)	23 (4.57)

average tenure in the current job position was 11.74 $\pm$ 7.86 years. Baseline characteristics across study participants are detailed in Table 1.

3.2 Awareness of Mental Health Issues Among Grassroots Medical Workers

Responses were scored as 2 (well-informed), 1 (somewhat informed) and 0 (uninformed). The mean total score for mental health awareness among the study participants was 53.22 $\pm$ 17.44. Items with the lowest number of well-informed (well-understood) responses were Q26, Q25, Q22, Q18, Q15, Q24, Q21, Q32, and Q1, spanning specialized diagnostic knowledge, treatment principles, and policy awareness, indicating potential gaps in training and dissemination. Conversely, the highest awareness was observed for items such as Q4 and Q11, as shown in Table 2.

3.3 Training Content Needs for Mental Health Services Among Grassroots Medical Workers

As summarized in Table 3, across both knowledge and skills domains of mental health service training, over 80% of grassroots medical workers rated each time as "urgently needed" or "needed", with several items exceeding 90%.

3.4 Training Modality Needs for Mental Health Services Among Grassroots Medical Workers

Grassroots medical workers favored short-term workshops as the preferred delivery mode for mental health service training. Centralized on-site lectures or distance education were the most favored training formats. Demand was high across instructional methods, theoretical knowledge instruction, case-based discussions, simulation exercises, and practical internships. Half-day sessions on weekdays were the preferred training duration. The leading motivations for participation were job position requirements, the need to improve personal competency, and opportunities to broaden skills and perspectives. The primary barrier to non-participation was workload and schedule conflicts. Multiple factors potentially affecting training effectiveness were training timing, delivery format, and content, as presented in Table 4.

3.5 Comparison of Mental Health Service Needs Across Different Job Positions, Specialties, Professional Titles, and Job Tenures

Significant differences ($p < 0.05$) were observed in the proportion of reported mental health service needs across

Table 3. Training content needs for mental health services among grassroots medical workers [n (%)].

Training content	Urgently needed + needed	Already mastered, not needed	Not needed for work
Knowledge areas			
1. Clinical manifestations of severe mental disorders	409 (81.31)	70 (13.92)	24 (4.77)
2. Recognition and prevention of early signs of relapse	420 (83.50)	60 (11.93)	23 (4.57)
3. Common adverse reactions to psychiatric medications and management measures	429 (85.29)	47 (9.34)	27 (5.37)
4. Clinical manifestations of common psychological and behavioral issues	439 (87.28)	47 (9.34)	17 (3.38)
5. Application of screening scales for common psychological and behavioral problems	439 (87.28)	26 (5.17)	38 (7.55)
6. Health education knowledge on symptoms, treatment options, and home care	453 (90.06)	34 (6.76)	16 (3.18)
7. Mental health laws and regulations	442 (87.87)	38 (7.55)	23 (4.57)
8. Policies on assistance for patients with severe mental disorders	445 (88.47)	29 (5.77)	29 (5.77)
Skills areas			
1. Addressing psychological issues while identifying and treating physical illnesses	452 (89.86)	29 (5.77)	22 (4.37)
2. Identifying and treating physical health problems in patients with mental disorders	448 (89.07)	34 (6.76)	21 (4.17)
3. How to refer patients with mental/psychological issues	431 (85.69)	45 (8.95)	27 (5.37)
4. Specific measures for case management	445 (88.47)	23 (4.57)	35 (6.96)
5. Communication techniques with patients experiencing mental/psychological issues	461 (91.65)	26 (5.17)	16 (3.18)
6. Self-protection measures during communication and follow-up with mentally ill patients	454 (90.26)	33 (6.56)	16 (3.18)
7. Psychological counseling	449 (89.26)	33 (6.56)	21 (4.17)
8. Evidence-based psychotherapy	447 (88.87)	17 (3.38)	39 (7.75)

primary job positions, specialties, professional titles, and job tenures among grassroots medical workers (Table 5).

3.6 Comparison of Total Mental Health Knowledge Scores Across Different Job Positions, Specialties, Professional Titles, and Job Tenures

Total mental health knowledge scores across grassroots medical workers were significantly influenced by primary job position, job tenure, and current participation in mental health work ($p < 0.05$, Table 6).

4. Discussion

Among 503 grassroots medical workers, the mean mental health knowledge score was 53.22 out of 70 (76%). Although this indicates a foundational knowledge base, labeling it 'moderate-to-high' needs caution. The substantial standard deviation of 17.44 points reflects significant inter-individual variation and high scores may reflect item difficulty or specificity rather than practical competence. Over 80% of grassroots medical workers selected mental health training items as "urgently needed" or "needed", with some items exceeding 90%. This indicates a consistently high demand for mental health training among primary healthcare providers. Key contributing factors include:

First, since 2018, China's National Health Commission has required primary healthcare institutions to screen for severe mental disorders, register patients, and provide follow-up management [15]. In some regions, mental health training has been included in professional title assessments, directly driving the need for systematic training. Second, rising social stressors, changing living environments, and post-Coronavirus Disease 2019 (COVID-19) conditions have increased the incidence of mental disorders and psychologically mediated diseases [16,17], surpassing primary care capacity and necessitating enhanced skills among frontline physicians. Moreover, recovery from mental disorders is chronic and clinically characterized by high relapse rates, requiring continuous rehabilitation management [18]. Consequently, grassroots medical workers need competencies spanning the full cycle of care, driving substantial demand for comprehensive mental health training.

For training delivery, grassroots physicians favor short-term, intensive training programs, with "half-day weekday sessions" as the preferred choice. This preference reflects the requirements to manage heavy clinical workloads while timely updating mental health knowledge. Evidence on teaching formats reveals a parallel demand for centralized onsite instruction and distance

Table 4. Training modality needs for mental health services among grassroots medical workers [n (%)].

Training method	Yes	No
Training method (multiple choices)		
Advanced studies at specialty hospitals	295 (58.65)	208 (41.35)
Conducting short-term training courses	429 (85.29)	74 (14.71)
Long-term systematic training	192 (38.17)	311 (61.83)
Others	3 (0.60)	500 (99.40)
Training format (multiple choices)		
On-site centralized lectures	412 (81.91)	91 (18.09)
Distance education	354 (70.38)	149 (29.62)
Self-study followed by assessment	201 (39.96)	302 (60.04)
Others	4 (0.80)	499 (99.20)
Instructional approach		
Theoretical knowledge lectures	433 (86.08)	70 (13.92)
Case-based analysis and discussion	442 (87.87)	61 (12.13)
Simulation drills	334 (66.40)	169 (33.60)
Internship/practical training	308 (61.23)	195 (38.77)
Others	1 (0.20)	502 (99.80)
Training duration (single choice)		
Full workday sessions	117 (23.26)	-
Half workday sessions	232 (46.12)	-
Full weekend day sessions	44 (8.75)	-
Half weekend day sessions	105 (20.87)	-
Others	5 (0.99)	-
Reasons for attending training (multiple choices)		
Job position requirements	444 (88.27)	59 (11.73)
Personal competency development	373 (74.16)	130 (25.84)
Building professional networks	207 (41.15)	296 (58.85)
Promotion requirements	178 (35.39)	325 (64.61)
Broadening perspectives and enhancing skills	326 (64.81)	177 (35.19)
Others	1 (0.20)	502 (99.80)
Reasons for not attending training (multiple choices)		
High cost	120 (23.86)	383 (76.14)
Lack of leadership support	53 (10.54)	450 (89.46)
Heavy workload/schedule conflicts	443 (88.07)	60 (11.93)
Irrelevant content to job duties	42 (8.35)	461 (91.65)
Unaware of training information	48 (9.54)	455 (90.46)
Others	1 (0.20)	502 (99.80)
Factors affecting training effectiveness (multiple choices)		
Training content	317 (63.02)	186 (36.98)
Training schedule	358 (71.17)	145 (28.83)
Training format	322 (64.02)	181 (35.98)
Instructor qualification	246 (48.91)	257 (51.09)
Organizers' coordination	169 (33.60)	334 (66.40)
Others	2 (0.40)	501 (99.60)

education. Centralized onsite training—typically brief sessions—minimizes repeated absences that disrupt clinical services and suits the "multi-role staffing" nature of primary care. Conversely, distance education enables learning during fragmented time slots (e.g., between shifts or post-night duties), eliminates geographical barriers to reduce travel time and costs, and allows revisiting complex content via recordings to accommodate diverse learning paces.

Regarding teaching methodologies, there is a high demand for multiple instructional approaches, consistent with modern medical education's "theory-practice-innovation" progression. The leading motivations for participation were "job requirements" and "professional development", underscoring that updated knowledge or skills are essential for maintaining clinical quality and career advancement. In contrast, principal barriers to attendance were overwhelm-

Table 5. Kruskal-Wallis test for mental health service needs by job position, specialty, professional title, and job tenure.

Variable	n (%)	Rank mean	H	*p*-value
Primary job position			38.992	<0.001
Clinical physicians/nurses	296 (58.85%)	227.28		
Mental health prevention personnel and psychiatric physicians/nurses	102 (20.28%)	330.53		
Other (public health personnel; medical technicians; TCM/rehabilitation/physiotherapy; immunization/child/maternal healthcare)	105 (20.87%)	245.40		
Specialty			41.077	<0.001
Clinical medicine (western/TCM)	190 (37.77%)	202.53		
Nursing	88 (17.50%)	251.97		
Other (public health; management; medical imaging; laboratory medicine; others)	225 (44.73%)	293.79		
Professional title			42.671	<0.001
No title	12 (2.39%)	145.04		
Junior title	197 (39.17%)	216.22		
Intermediate title	206 (40.95%)	260.69		
Senior title	88 (17.50%)	326.34		
Job tenure (years)			6.641	0.036
≤5	113 (22.47%)	225.27		
>5 to ≤10	166 (33.00%)	246.60		
>10	224 (44.53%)	267.39		

Note: TCM, Traditional Chinese Medicine.

Table 6. Kruskal-Wallis test of total mental health knowledge scores by job position, specialty, professional title, and job tenure.

Variable	n (%)	Rank mean	H	*p*-value
Primary job position			40.849	0.000
Clinical physicians/nurses	296 (58.85%)	235.27		
Mental health prevention personnel and psychiatric physicians/nurses	102 (20.28%)	332.36		
Other (public health personnel; medical technicians; TCM/rehabilitation/physiotherapy; immunization/child/maternal healthcare)	105 (20.87%)	221.09		
Specialty			0.924	0.630
Clinical medicine (western/TCM)	190 (37.77%)	258.27		
Nursing	88 (17.50%)	240.61		
Other (public health; management; medical imaging; laboratory medicine; others)	225 (44.73%)	251.16		
Professional title			6.133	0.105
No title	12 (2.39%)	201.17		
Junior title	197 (39.17%)	244.57		
Intermediate title	206 (40.95%)	248.98		
Senior title	88 (17.50%)	282.64		
Job tenure (years)			7.149	0.028
≤5	113 (22.47%)	246.20		
>5 to ≤10	166 (33.00%)	230.20		
>10	224 (44.53%)	268.99		
Participation in mental health work			40.092	0.000
Yes	102 (20.28%)	332.36		
No	401 (79.72%)	231.56		

Note: TCM, Traditional Chinese Medicine.

ing clinical duties that complicated scheduling, concerns about service coverage during leave, and perceptions of irrelevant or lengthy course content.

Our analysis indicates that psychiatrists/psychiatric nurses, staff with senior professional titles, and those with longer years of service report a higher demand for psychiatric services. This likely reflects frequent, direct patient contact among psychiatrists/psychiatric professionals, supervisory and complex case responsibilities among senior medical staff, and greater overall exposure to cases among long-serving professionals, all of which indicate the need for continuous learning and ongoing competency development. The primary care health workers dealing with a huge number of patients need to understand the critical role of early psychiatric services in patient prognosis and also need extensive knowledge.

Furthermore, medical staff in public health, management, imaging, and laboratory professions also report greater demand for psychiatric services than clinical and nursing staff. The demand may likely be due to population-level responsibilities (public health), policy and resource planning (management) and the need to interpret laboratory findings in the context of psychiatric presentations (imaging and laboratory). In contrast, clinicians and nursing staff are more focused on acute care, which may reduce training needs. Consistent with expectations, higher psychiatric knowledge scores were observed among psychiatrists/psychiatric nurses, those with $>$10 years of service, and medical staff with prior participation in psychiatric work.

We acknowledge that this study has several limitations. First, it is a single-center, cross-sectional survey conducted in Tongxiang city, China, which limits the generalizability of the findings to regions with different healthcare systems, cultures, and economic contexts, warranting multi-center studies across diverse regions of China. Second, our statistical analysis relied on non-parametric tests and did not adjust for potential confounding factors using multivariate regression models. Thus, future studies with larger sample sizes could employ multiple linear or logistic regression to better estimate the independent effects of variables such as job position, years of service, and training participation on knowledge scores and training needs. Third, the very high Cronbach's α coefficient (0.987) for the Mental Health Awareness Questionnaire suggests a potential redundancy among some items, which may inflate the reliability estimate and indicate that the instrument could be streamlined. Additionally, certain items in our Mental Health Awareness Questionnaire (e.g., knowledge of World Mental Health Day) assessed factual recall rather than practical, applied clinical reasoning. While this reflects awareness of policy and advocacy, future instruments should emphasize scenario-based questions that more directly assess competencies relevant to daily practice. Finally, administering the questionnaire 1–2 days after training completion may have increased response rates but could introduce bias, such as social desirability (participants providing answers as per the researchers' needs) or the bandwagon or conformity effects (arising from recent group instruction). These limitations should be considered when interpreting our findings.

5. Conclusion

Primary care providers demonstrated foundational mental health knowledge, with significant inter-individual differences. Demand for mental health service training was uniformly high. Preferences for short-term, blended training formats and barriers of time constraints provide critical empirical evidence for informing the development of targeted training programs. Future research should implement and rigorously evaluate the effectiveness of such programs in improving clinical practices and patient outcomes.

To address these gaps, short-term intensive training courses that combine online and offline (in-person) approaches/components are recommended, with streamlined theoretical content and training programs or curricula tailored by position/role, professional title, and years of service. Policy guidance and incentive mechanisms should be used to enhance mastery of core mental health content. Furthermore, based on the significant disparities in mental health knowledge across job positions, a stratified training approach tailored to specific occupational roles should be implemented. For instance, psychiatric medical staff/clinicians, who had the highest scores, would benefit from advanced, case-based decision-making modules to further refine their diagnostic and intervention skills. Clinical physicians and nurses, who play a supplementary role in mental healthcare, should receive training on identification, referral, and basic psychosocial interventions. Similarly, public health workers and technicians should prioritize foundational mental health literacy and public health-oriented content.

Key Points

• Grassroots medical workers demonstrated moderate-to-high baseline awareness of mental health challenges.

• Over 80% reported high training demand in both knowledge and skills, with some items exceeding 90%.

• Short-term workshops were the most preferred approach, with centralized lectures and distance education as favored formats.

• Key factors influencing participation in training included job requirements, career development needs, and workload constraints.

• Significant differences in training needs were observed across job positions/roles, specialties, titles, and service duration.

• Mental health knowledge scores were significantly affected by job role, years of service, and prior engagement in mental health work.

Availability of Data and Materials

All data included in this study are available from the corresponding authors upon reasonable request.

Author Contributions

YYM, CDT and JZ designed the research study and wrote the first draft. YYM and CDT performed the research. YYM analyzed the data. All authors contributed to the important editorial changes in the manuscript. All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

The study was approved by the Medical Ethics Committee of Kangci Hospital of Jiaxing (Approval No. 2025-LUNLI-013). All procedures performed in compliance with the Declaration of Helsinki. All patients provided informed consent.

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Conflict of Interest

The authors declare no conflict of interest.

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