Research on the Construction of a Standard System for Youth Psychological Services on the 12355 Platform from the Perspective of Synergy in the Guangdong-Hong Kong-Macao Greater Bay Area

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Abstract. Objective: This study aims to construct a standardized system for psychological services on the 12355 youth service platform from the perspective of coordinated development in the Guangdong-Hong Kong-Macao Greater Bay Area, with the goal of enhancing the systematicness, coordination, and effectiveness of youth mental health services within the region. Methods: This research adopts a comprehensive approach, utilizing literature analysis, expert consultations, questionnaires, and structural equation modeling to screen indicators and validate the model of the standard system. Results: The study successfully established a standard system consisting of six primary indicators and sixteen secondary indicators. The primary indicators are: collaborative governance and organizational support, Service Provision and Process, professional techniques and tools, collaborative linkage and referral, data governance and security, and quality evaluation and continuous improvement. Structural equation modeling analysis showed that the second-order model achieved a good fit ($\chi^2/df = 2.974$, RMSEA = 0.086, SRMR = 0.047, GFI = 0.936, AGFI = 0.900, CFI = 0.966, PGFI = 0.566). In addition, the dimensions of "Service Provision and Process" and "professional techniques and tools" had a significant impact on the overall standard system. Conclusion: The standardized system for youth psychological services on the 12355 platform constructed in this study demonstrates good theoretical compatibility and regional coordination, providing scientific evidence and a practical framework for promoting the standardized and collaborative development of youth psychological services in the Guangdong-Hong Kong-Macao Greater Bay Area.

Keywords: Guangdong-Hong Kong-Macao Greater Bay Area; collaborative governance; youth mental health; 12355 platform; service standard system

1 Introduction

With the rapid development of society and increasing competition, adolescent mental health issues have become a focal point of attention across all sectors of society. In

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response to this challenge, the nation emphasizes the need to closely integrate current realities and trends in student mental health, comprehensively strengthening and improving student mental health work in the new era in order to achieve early monitoring and warning. Specifically, the principle of "prevention first, shifting the focus forward" should be upheld, with regular mental health assessments conducted for students and the establishment of a systematic monitoring system for student mental health status. At the same time, the selection of psychological assessment scales, the implementation of monitoring work, and the use of results should be standardized, while data analysis and case studies should be reinforced to enhance risk prediction and provide necessary safeguards [1]. Against this backdrop, seventeen departments, including the Ministry of Education, jointly issued the "Special Action Plan for Comprehensively Strengthening and Improving Student Mental Health Work in the New Era (2023–2025)," marking the entry of adolescent mental health work in China into a new stage of systematic and coordinated advancement [2]. As a key region in the country's major development strategies, the Guangdong-Hong Kong-Macao Greater Bay Area intrinsically requires social integration and coordinated development. The "Outline Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area" also clearly states the need to "strengthen the construction of the public service system and enhance the level of mental health services for youth" [3].

Against this macro background, the 12355 Youth Service Platform, advocated and established by the Central Committee of the Communist Youth League, has become a key hub linking macro-level policies with individual needs and coordinating resources from various sectors of society. However, in practical exploration, although local 12355 platforms have achieved certain results, several issues have also been revealed. Firstly, the unique institutional context of "one country, two systems, and three legal jurisdictions" in the Guangdong-Hong Kong-Macao Greater Bay Area makes cross-border, cross-city, and cross-departmental service coordination mechanisms more complex. Secondly, differences in service processes, technological applications, professional standards, and evaluation methods across regions have restricted the equalization and accessibility of services. Furthermore, the application of emerging digital tools urgently needs to be standardized to ensure service quality and data security [4]. Therefore, from the perspective of coordinated governance in the Greater Bay Area, how to construct a scientific, unified, and operational service standard system—one that aligns with national top-level design, fits regional characteristics, and can effectively guide the practice of the 12355 platform—has become a theoretical and practical task of both urgency and significance.

This study aims to respond to the practical needs mentioned above by adopting a perspective of collaborative governance to explore and construct a youth mental health service standard system for the 12355 platform in the Guangdong-Hong Kong-Macao Greater Bay Area. On the theoretical level, this research attempts to integrate relevant theories such as regional collaborative governance, public service standardization, and youth mental health interventions. On the practical level, the study seeks to provide a concrete operational framework and evaluation basis for the standardized construction, cross-domain collaboration, and efficiency enhancement of the 12355 platform in the

Greater Bay Area. The goal is to establish a service closed-loop of "prevention—monitoring—intervention—referral—evaluation," thereby truly transforming national and local policy dividends into tangible, perceptible, and accessible mental health benefits for adolescents.

2 Research Subjects and Methods

2.1 Research Subjects

This study takes Guangdong Province as an example to explore the construction of a youth mental health service standard system for the 12355 platform. To ensure that the sample represents different levels of economic development, regional cultures, and the characteristics of both the core and peripheral areas of the Guangdong-Hong Kong-Macao Greater Bay Area, a stratified random sampling method was adopted, and a questionnaire survey was conducted among youth groups in 11 prefecture-level cities in the province. The sampled cities include: core cities of the Greater Bay Area (Guangzhou, Shenzhen), other Pearl River Delta cities within the Bay Area (Foshan, Dongguan, Zhuhai, Zhongshan), as well as peripheral and eastern, western, and northern Guangdong cities (Huizhou, Jiangmen, Zhaoqing, Shantou, Zhanjiang). The numbers of valid questionnaires collected from the three types of regions were 229, 191, and 216, respectively.

In terms of sample composition, the respondents covered students from different educational stages, including 254 junior high school students, 226 high school and secondary vocational school students, and 156 upper primary school students. There were 308 male students and 328 female students. A total of 502 students attended regular public schools, 89 attended private schools, and 45 attended vocational or technical schools.

2.2 Research Methods

2.2.1 Literature Review Method.

This study systematically retrieved and collected relevant academic literature, policy regulations, industry standards, and practical cases through authoritative channels such as CNKI, Web of Science, PubMed, and official websites of governments and international organizations. Using content analysis and comparative research methods, the collected materials were coded, categorized, and deeply interpreted, with the aim of identifying the specific challenges, common patterns, and development trends faced by youth mental health services in the Guangdong-Hong Kong-Macao Greater Bay Area. This process helped to establish the core issues, value orientation, and key dimensions for the construction of the standard system.

2.2.2 Expert Survey Method.

To clarify the structural dimensions and specific indicators of the youth mental health service standard system, this study developed the "Expert Questionnaire on Indicators for the Youth Mental Health Service Standard System." Multiple rounds of consultation were conducted with 30 experts and frontline teachers in relevant fields through face-to-face interviews, telephone discussions, and email correspondence. Based on expert feedback, the preliminary framework and indicators of the standard system were examined and revised to ensure the content's scientific rigor, completeness, and practicality, ultimately resulting in a more refined set of indicators. Detailed background information on the experts is presented in Table 1.

Table 1. Statistics of Basic Information of Participants in the Expert Consultation Method

Field of Work	N	Professional Title/Position	Educational Level	Average Years of Work Experience
Clinical and Counseling Psychology Experts	4	2 Professors/Chief Physicians, 2 Associate Professors	2 PhDs, 2 Master's degrees	18.6
Public Health and Policy Research Experts	3	1 Researcher, 2 Associate Researchers	3 Master's degrees	15.3
Social Work and Service Management Experts	3	1 Senior Social Worker, 2 Youth Affairs Agency Officers	2 Master's degrees, 1 PhD	12.7
Education Experts	3	1 Professor, 2 Associate Professors	3 Master's degrees	12.5
School Mental Health Education Teachers	17	1 Senior Teacher / Psychology Research Group Leader, 12 First-level Teachers	4 Bachelor's degrees, 13 Master's degrees	8.4

The first round of the survey adopted an open-ended consultation approach. The research team sent the preliminary framework of the system (including primary and secondary indicators), developed based on the literature review, to each expert, inviting them to provide suggestions on the relevance, clarity, and possible omissions of the indicators.

The second round focused on quantitative scoring and consensus evaluation. After incorporating the feedback from the first round and revising the framework, an assessment questionnaire containing all secondary indicators was developed. Using a 5-point Likert scale, experts were invited to rate the importance and feasibility of each indicator. The screening criteria for the indicators were as follows: if the arithmetic mean of both “importance” and “feasibility” scores for an indicator was below 3.5, it was eliminated directly; if either score was below 3.5 but above 3.0, the arithmetic mean of the two scores was calculated and the indicator was eliminated if this average was below 3.5 [5]. At the same time, qualitative feedback from experts was used to revise or merge certain indicators, ultimately forming a preliminary set of standard system indicators.

2.2.3 Questionnaire Survey Method.

Based on the results of the two rounds of expert consultations and relevant literature, each secondary indicator was translated into two clear and easily understandable descriptions of specific service functions. Accordingly, the "Survey Questionnaire on the Evaluation of Youth Mental Health Services on the 12355 Platform in the Guangdong-Hong Kong-Macao Greater Bay Area" was developed. The core section of the questionnaire consists of 32 items, utilizing a 5-point Likert scale to assess respondents' evaluations of the importance of each service function. In addition, the questionnaire collects demographic information and service usage experiences from the sample. A stratified random sampling method was used, and a total of 650 questionnaires were distributed via the "Wenjuanxing" platform, with 636 valid responses recovered, yielding a valid response rate of 97.8%. The specific distribution characteristics are as described in Section 2.1 above.

2.2.4 Model Construction and Validation.

This study utilized theoretical model integration and systems engineering methods to construct both the theoretical and structural models of the youth mental health service standard system [6]. First, the 636 valid questionnaire responses were randomly divided into two groups (N1=318, N2=318). Next, SPSS 27.0 software was used to conduct exploratory factor analysis (EFA) and reliability analysis on the first group of data, in order to assess the preliminary validity of the indicator system and eliminate unsuitable items. Finally, Amos 28.0 software was employed to perform confirmatory factor analysis (CFA) on the second group of data. The goodness-of-fit of the constructed indicator model was evaluated through structural equation modeling, and the model was subsequently revised based on the results.

3 Results

3.1 Dimensional Structure of the Youth Mental Health Service Standard System on the 12355 Platform

Based on prior literature review and the results of expert consultations, this study constructed and measured the youth mental health service standard system from the following six dimensions: A. Collaborative Governance and Organizational Support Standards, B. Service Provision and Process Standards, C. Professional Techniques and Tools Standards, D. Collaborative Linkage and Referral Standards, E. Data Governance and Security Standards, and F. Quality Evaluation and Continuous Improvement Standards.

Through two rounds of expert surveys, the initially selected 27 secondary indicators—including some that were unqualified or redundant—were systematically converged and refined. Ultimately, a logically coherent, well-structured, and comprehensive indicator system was established, comprising 6 primary indicators and 16 secondary indicators. The final screening results are shown in Table 2.

Table 2. Expert Consultation Results on the Dimensional Composition of Indicators in the Adolescent Psychological Service Standards System

Dimension	Determined Indicators (16 items)
A Collaborative Governance and Organizational Support Standards	A1 Organizational Structure and Leadership Mechanism Standards
	A2 Policies, Regulations, and Financial Support Standards
	A3 Social Participation and Ecological Co-construction Standards
	A4 Evaluation, Supervision, and Accountability Standards
B Service Provision and Process Standards	B1 Multi-channel Access Standards
	B2 Hierarchical Intervention Process Standards
	B3 Offline Service Facility Standards
C. Professional Techniques and Tools Standards	C1 Intelligent Screening and Assessment Standards
	C2 Digital Intervention Tool Standards
	C3 Professional Talent and Supervision Standards
D Collaborative Linkage and Referral Standards	D1 "Family-School-Medical-Community-Organization" Collaborative Mechanism Standards
	D2 Bay Area Cross-border Referral and Service Collaboration Standards
E Data Governance and Security Standards	E1 Full Lifecycle Data Management Standards
	E2 Privacy and Ethical Security Standards
F Quality Evaluation and Continuous Improvement Standards	F1 Service Efficacy Evaluation Standards
	F2 System Health and Improvement Standards

3.2 Model Construction of the Youth Mental Health Service Standard System on the 12355 Platform

3.2.1 Exploratory Factor Analysis.

To assess the suitability of the sample data for factor analysis, SPSS 27.0 software was first used to conduct the KMO test and Bartlett's test of sphericity on the first dataset (N=318). The results showed a KMO value of 0.849 (>0.80) and a Bartlett's test chi-square value of 4127.36 (df=378, $p<0.001$), both reaching statistical significance. These findings indicate that the sample data are appropriate for exploratory factor analysis.

Subsequently, principal component analysis was conducted to extract common factors with eigenvalues greater than 1, followed by orthogonal rotation using the varimax method. Items were screened and revised according to the following criteria: (1) factor loadings less than 0.4; (2) communalities less than 0.3; (3) loadings greater than 0.3 on two or more factors [7]. Based on these criteria, four items were deleted from the questionnaire. Therefore, the final questionnaire used for subsequent analysis contained 28 items.

Ultimately, six common factors were extracted from the remaining 28 items, accounting for a cumulative variance contribution rate of 63.587%, indicating that these

factors effectively explain the majority of the information in the original variables. The eigenvalues for each factor were 7.243, 2.882, 2.367, 1.998, 1.683, and 1.631, with no single factor exhibiting an excessively high contribution rate, suggesting that common method bias was not significant. After rotation, each item's loading on its respective factor was greater than 0.6, confirming the questionnaire's good structural validity. Detailed data are presented in Table 3.

Table 3. Eigenvalues and Variance Contribution Rates of Questionnaire Factors

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.243	25.868	25.868	7.243	25.868	25.868	4.172	14.900	14.900
2	2.882	10.293	36.161	2.882	10.293	36.161	3.184	11.371	26.271
3	2.367	8.453	44.614	2.367	8.453	44.614	2.942	10.507	36.778
4	1.998	7.136	51.750	1.998	7.136	51.750	2.745	9.804	46.582
5	1.683	6.011	57.761	1.683	6.011	57.761	2.341	8.644	55.226
6	1.631	5.826	63.587	1.631	5.826	63.587	1.610	8.361	63.587

Extraction Method: Principal Component Analysis. Note: Eigenvalues less than 1 are not displayed.

According to the results of the exploratory factor analysis, the specific composition and naming of the six common factors are as follows:

Factor 1 (A): Collaborative Governance and Organizational Support Standards: This factor includes 7 items, covering four secondary indicators: A1 "Organizational Structure and Leadership Mechanism Standards," A2 "Policies, Regulations, and Financial Support Standards," A3 "Social Participation and Ecological Co-construction Standards," and A4 "Evaluation, Supervision, and Accountability Standards." It primarily measures top-level design, policy support, social mobilization, and supervision and accountability.

Factor 2 (B): Service Provision and Process Standards: This factor contains 6 items, covering three secondary indicators: B1 "Multi-channel Access Standards," B2 "Hierarchical Intervention Process Standards," and B3 "Offline Service Facility Standards." It mainly measures service entry points, procedures, forms, and accessibility.

Factor 3 (C): Professional Techniques and Tools Standards: This factor includes 5 items, covering three secondary indicators: C1 "Intelligent Screening and Assessment Standards," C2 "Digital Intervention Tool Standards," and C3 "Professional Talent and

Supervision Standards." It mainly measures assessment technology, intervention tools, and professional competence.

Factor 4 (D): Collaborative Linkage and Referral Standards: This factor contains 3 items, covering two secondary indicators: D1 ""Family-School-Medical-Community-Organization" Collaborative Mechanism Standards," and D2 "Bay Area Cross-border Referral and Service Collaboration Standards." It mainly measures multi-party collaboration mechanisms and resource integration.

Factor 5 (E): Data Governance and Security Standards: This factor includes 4 items, covering two secondary indicators: E1 "Full Lifecycle Data Management Standards," and E2 "Privacy and Ethical Security Standards." It primarily measures data security and ethical norms.

Factor 6 (F): Quality Evaluation and Continuous Improvement Standards: This factor contains 3 items, covering two secondary indicators: F1 "Service Efficacy Evaluation Standards," and F2 "System Health and Improvement Standards." It mainly measures service effectiveness evaluation and continuous system optimization.

A comparison between the factor structure obtained through exploratory factor analysis and the theoretical constructs established in previous expert consultations reveals a high degree of consistency. Therefore, the final model retains the above 28 items as the basis for subsequent confirmatory analysis.

3.2.2 Reliability Analysis.

To assess the internal consistency of the scale, this study employed Cronbach's α coefficient for reliability analysis of both the overall questionnaire and each dimension. According to general psychometric standards, an α coefficient greater than 0.7 indicates acceptable reliability, while a value exceeding 0.8 is considered good.

As shown in Table 4, the overall α coefficient of the questionnaire is 0.867, and the α coefficients for each dimension range from 0.723 to 0.832. These results demonstrate that the scale exhibits good internal consistency reliability both overall and within each dimension, indicating that the sample data are reliable and suitable for further statistical analysis.

Table 4. Reliability Analysis Results of the Questionnaire.

Overall Cronbach's α	Dimension	Number of Items	Cronbach's α
0.867	A Collaborative Governance and Organizational Support Standards	7	0.785
	B Service Provision and Process Standards	6	0.832
	C Professional Techniques and Tools Standards	5	0.816
	D Collaborative Linkage and Referral Standards	3	0.761
	E Data Governance and Security Standards	4	0.798

	F Quality Evaluation and Continuous Improvement Standards	3	0.723

3.2.3 Model Construction and Validation of the 12355 Platform Youth Mental Health Service Standards System.

This study employed CFA to examine the structural validity of the 12355 Platform Youth Mental Health Service Standards System, aiming to evaluate the model's fit and applicability within the adolescent sample. Based on the results of prior expert consultations and exploratory factor analysis, a first-order six-factor correlated model (Figure 1) and a second-order six-factor model (Figure 2) were constructed.

Using AMOS 28.0 software and the second set of sample data (N=318), confirmatory factor analysis was conducted on the above two models. The analysis adopted the Maximum Likelihood (ML) estimation method, with the covariance matrix as the input matrix. The fit indices of the models are presented in Table 5.

Table 5. Goodness-of-fit Indices of the Structural Model for Indicators of the Adolescent Psychological Service Standards System (N=318)

Indices	χ^2	df	χ^2/df	RMSEA	SRMR	GFI	AGFI	NFI	CFI	PGFI
First-order	312.47	103	3.033	0.092	0.068	0.868	0.796	0.845	0.889	0.579
Second-order	324.15	109	2.974	0.086	0.047	0.936	0.900	0.930	0.966	0.566
Criteria			1~3	<0.08	<0.05	>0.90	>0.90	>0.90	>0.90	>0.50

Fig. 1. Path Diagram of the First-order Confirmatory Factor Analysis Model of the Standards System

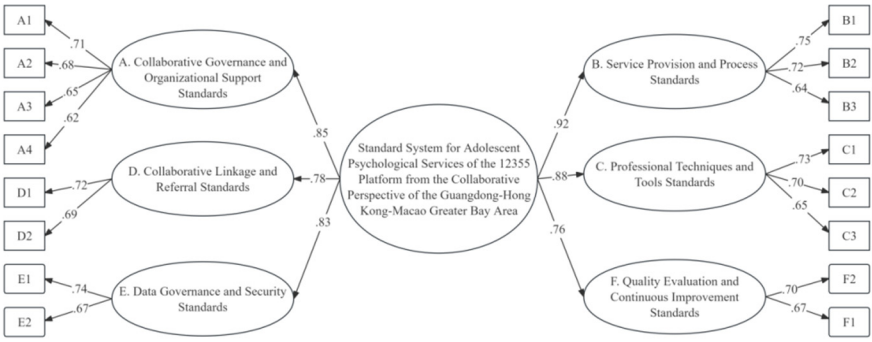

Fig. 2. Path Diagram of the Second-order Confirmatory Factor Analysis Model of the Standards System

The results of the confirmatory factor analysis indicate that both the first-order and second-order measurement models are identified. As shown in Table 5, there are differences in the fit indices between the two models. Regarding the Root Mean Square Error of Approximation (RMSEA), the first-order model is 0.092, while the second-order model is 0.086; although the latter does not reach the ideal threshold (<0.08), it presents an improvement over the first-order model and approaches the critical value for good fit. For other fit indices (such as CFI, TLI, IFI, etc.), the second-order model performs significantly better than the first-order model, achieving or exceeding ideal standards.

Considering all indices, the second-order six-factor model demonstrates superior model fit and greater theoretical explanatory power compared to the first-order model. The second-order factor loadings clearly reveal that the "Guangdong-Hong Kong-Macao Greater Bay Area 12355 Platform Youth Mental Health Service Standards System" is a theoretically well-structured and hierarchically organized construct. In this system, "Service Provision and Process" and "Professional Techniques and Tools" constitute the core driving forces; "Collaborative Governance and Organizational Support" and "Data Governance and Security" provide a solid operational foundation; while "Collaborative Linkage and Referral" and "Quality Evaluation and Continuous Improvement" are key mechanisms ensuring efficient operation and iterative optimization of the system.

Therefore, this study ultimately adopts the second-order structural model as the final measurement model for the 12355 Platform Youth Mental Health Service Standards System. This model not only demonstrates good statistical fit but also aligns more closely with theoretical expectations, allowing for a more accurate representation of the system's multi-level and systematic internal structure. Subsequent research and applications will be based on this second-order model.

4 Discussion

4.1 Overall Analysis of the 12355 Platform Youth Mental Health Service Standards System Model

The "Guangdong-Hong Kong-Macao Greater Bay Area 12355 Platform Youth Mental Health Service Standards System" constructed in this study demonstrated strong theoretical fit and structural stability in model validation. Exploratory factor analysis revealed that the six extracted common factors accounted for a cumulative variance of 63.587%, with all measurement items showing factor loadings above 0.6 on their respective factors, indicating excellent structural validity for the system. In addition, reliability analysis showed that the overall questionnaire's Cronbach's α was 0.867, and the α coefficients for each dimension ranged from 0.723 to 0.832, meeting psychometric standards and confirming the scale's high internal consistency.

In terms of model validation, results from confirmatory factor analysis showed that the fit of the second-order six-factor model (χ^2/df=2.974, CFI=0.966, RMSEA=0.086) was overall superior to the first-order model, confirming that this standards system is a multidimensional construct with a clear hierarchy and rigorous structure. Although the RMSEA value was slightly above the ideal threshold of 0.08, it remained within the acceptable range, which may be related to sample size or model complexity. Path coefficient analysis further revealed that the dimensions of "Service Provision and Process" and "Professional Techniques and Tools" contributed most significantly to the overall objective, suggesting that future efforts should prioritize resource investment in optimizing service processes and empowering professional techniques.

In summary, the standards system model constructed in this study is supported by robust theoretical rationale and empirical evidence, providing a solid scientific foundation for the promotion, application, and continual optimization of the system in the Guangdong-Hong Kong-Macao Greater Bay Area.

4.2 Regional Collaborative Mechanism of the Youth Mental Health Service Standards System in the Guangdong-Hong Kong-Macao Greater Bay Area

The 12355 Platform Youth Mental Health Service Standards System constructed in this study encompasses not only the entire process of psychological services—from entry to process to exit—but, more importantly, it directly addresses the unique demands of the Guangdong-Hong Kong-Macao Greater Bay Area in terms of cross-regional collaboration, institutional alignment, and resource integration. The system establishes "Standards for Collaborative Linkage and Referral" as an independent dimension, and specifically includes the secondary indicator of "Cross-Border Referral and Service Collaboration in the Bay Area," aiming to tackle the practical challenges of youth mental health service collaboration under the framework of "one country, two systems, three jurisdictions"[8]. For a long time, youth mental health services in the Greater Bay Area have faced structural difficulties such as fragmented resources, inconsistent standards, and the lack of cross-border referral mechanisms. The "Family-School-Medical-

Community-Organization" collaborative framework proposed by this system provides an institutional foundation for achieving effective interdepartmental and interregional cooperation. However, it must be acknowledged that the successful operation of this collaborative mechanism still faces multiple real-world obstacles, including the alignment of legal systems, mutual recognition of information, and consensus on ethical standards.

To promote the effective implementation of this collaborative mechanism, this study puts forward the following recommendations: First, at the top-level design stage, it is advisable to establish a "Guangdong-Hong Kong-Macao Youth Mental Health Service Coordination Committee," which would be responsible for overall regional coordination and policy formulation. Second, at the operational level, it is imperative to promptly develop and issue the "Guangdong-Hong Kong-Macao Greater Bay Area Youth Mental Health Service Cross-Border Referral Operational Guidelines" to provide standardized guidance for specific practices[9-10]. Third, in terms of technical support, it is recommended to explore the use of distributed technologies such as blockchain to build a regional service collaboration platform characterized by data reliability and process traceability, thereby facilitating efficient resource integration and effective institutional alignment. Finally, regarding personnel development, a regular training and exchange mechanism for professionals from the three regions should be established to enhance service providers' understanding of each other's legal systems, ethical norms, and service models, thus improving the professionalism and effectiveness of collaborative services.

It is noteworthy that this system establishes "Data Governance and Security Standards" as an independent dimension, highlighting the urgency of safeguarding the security of youth psychological data and personal privacy against the backdrop of increasingly prevalent digital mental health services. As the 12355 platform progressively integrates intelligent assessment tools and online intervention systems, vast amounts of sensitive psychological data from youth face complex ethical and legal risks during collection, storage, processing, and cross-border transfer[11]. Research indicates significant differences among Guangdong, Hong Kong, and Macao in data protection legislation, particularly regarding data export, informed consent, and special protection for minors, which pose major legal barriers to cross-border data sharing and service collaboration[12].

Although this system has proactively introduced principled requirements such as "full life-cycle data management" and "privacy and ethics standards," it is still necessary to further refine these into actionable technical specifications and management procedures in the course of implementation. In this regard, it is recommended to draw on advanced international standards such as the GDPR, and integrate them with the legal frameworks of the three regions to establish a graded and classified data security management system tailored for youth mental health services in the Greater Bay Area. Furthermore, regular data ethics training for service providers should be conducted to strengthen their risk awareness and prevention capabilities. In terms of technological application, it is advisable to actively explore the use of cutting-edge technologies such as privacy computing and federated learning, with the aim of achieving compliant and

efficient cross-border data utilization while ensuring data sovereignty and personal privacy, thereby supporting higher-level regional collaborative research and service innovation.

4.3 Localization Adaptation and Long-Term Implementation of the Youth Mental Health Service Standards System

Although the standards system developed in this study demonstrates strong reliability and validity, its promotion and application within the Guangdong-Hong Kong-Macao Greater Bay Area still face significant challenges related to localization adaptation. Research indicates that, due to differences in socio-cultural backgrounds and service systems, there are notable disparities between youth in Hong Kong and Macao and their Mainland counterparts regarding awareness of mental health services, help-seeking preferences, and cultural acceptance. These differences may directly affect the implementation effectiveness of dimensions such as "Multi-Channel Access Standards" and "Service Provision and Process Standards"[13]. In addition, the current "Standards for Quality Assessment and Continuous Improvement" lack clear specifications for key aspects such as evaluation subjects, assessment tools, and feedback mechanisms, which to some extent constrains the system's dynamic optimization and long-term development.

The implementation of mental health service standards must avoid a "one-size-fits-all" approach and instead be flexibly adapted to the unique service ecosystems of different regions. To this end, it is recommended that future work include stratified pilot programs across various city clusters in the Greater Bay Area, with particular emphasis on using qualitative research methods to collect in-depth feedback from Hong Kong and Macao youth, families, and frontline service providers, thereby enhancing the cross-cultural applicability and practical feasibility of the standards system[14].

At the same time, to ensure the system's long-term effectiveness, it is urgently necessary to establish a dynamic "monitoring–evaluation–revision" cycle. Specifically, multidimensional quantitative indicators such as service coverage, user satisfaction, and intervention outcomes should be incorporated into the monitoring framework of the "Guangdong-Hong Kong-Macao Greater Bay Area Youth Mental Health Annual Report." Utilizing digital platforms to achieve real-time data aggregation and intelligent analysis will provide empirical support for the ongoing iteration of standards and the precise optimization of services. Looking ahead, further integration of artificial intelligence and big data technologies could be explored to develop intelligent early warning and intervention support systems for youth mental health risks, thus realizing a strategic upgrade from "standards system construction" to a "smart service ecosystem."

5 Conclusion

The main conclusions of this study are as follows:

First, this study successfully established a youth mental health service standards system suitable for the 12355 platform. The system covers six primary dimensions—"Collaborative Governance and Organizational Support Standards," "Service Provision and Process Standards," "Professional Techniques and Tools Standards," "Collaborative Linkage and Referral Standards," "Data Governance and Security Standards," and "Quality Evaluation and Continuous Improvement Standards"—as well as sixteen secondary indicators. Rigorous reliability and validity testing, along with structural equation modeling, demonstrate that the system has a rational structure, clear hierarchy, and possesses a solid theoretical foundation and empirical validity.

Second, this standards system fully responds to the unique collaborative governance needs of the Guangdong-Hong Kong-Macao Greater Bay Area under the framework of "one country, two systems, three jurisdictions." The specially designated dimension of "Collaborative Linkage and Referral Standards" explicitly incorporates cross-border service coordination mechanisms, providing a systematic institutional solution to current difficulties such as insufficient resource integration and the lack of unified standards for youth mental health services in the Greater Bay Area.

Third, the practical application of this standards system still faces dual challenges of regional cultural adaptation and the establishment of long-term mechanisms. To ensure effective implementation, it is recommended to establish a dynamic optimization loop of "monitoring–evaluation–revision," and to launch stratified pilot programs in different city clusters of the Greater Bay Area. By continuously collecting feedback and iteratively improving, the system can ultimately achieve an effective transition from standardized construction to the provision of high-quality services.

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