Research Square

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Disparities in Integrated Care Needs Across Three Types of Long-Term Care Facilities in China: A Multi-Centre Comparative Analysis

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Research Article

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Abstract

Background

Integrated care is a pivotal strategy for addressing global population aging, with its core tenet being “person-centered and demand-driven”. The Chinese government’s “14th Five-Year Plan for National Aging Development” explicitly advocates for the classified development of three types of long-term care facilities (LTCFs): subsistence security-oriented, inclusive support-oriented, and fully market-oriented. However, evidence regarding the integrated care needs of older adults across these distinct institutional models remains scarce, particularly concerning activities of daily living (ADL)-impaired older people.

Objectives

To investigate the integrated care needs of older people in the above three types of LTCFs and explore the influencing factors of such needs.

Methods

This multi-centre, cross-sectional,study included 1300 older people from LTCFs. Participants were surveyed using a general information questionnaire and an integrated care needs questionnaire. Multiple linear regression analysis was conducted to identify the factors influencing their integrated care needs.

Results

Older adults in LTCFs reported moderate-to-high integrated care needs (overall mean ± SD: 3.42 ± 0.62 on a 5-point scale), with the highest demand for basic nursing (3.65 ± 0.72), followed by health guidance (3.58 ± 0.76). Multiple linear regression analysis (adjusted R^2=0.512, F = 70.258, $p < 0.001$) identified ten independent determinants:facility type (public welfare vs. private: $\beta = 0.236$, $p < 0.001$), primary income source,family visit frequency, ADL impairment severity (severe vs. mild: $\beta = 0.332$, $p < 0.001$), chronic disease burden, hospitalization frequency, polypharmacy status, sensory impairment ($\beta = 0.275$, $p < 0.001$), psychological state (poor vs. Good: $\beta = 0.228$, $p < 0.001$), and length of stay. Notably, 89.30% of residents expressed desire for facility-community collaborative care windows.

Conclusion

Older people in Chinese LTCFs present substantial, multidimensional integrated care needs that vary inversely with facility service capacity. ADL impairment severity, sensory deficits, and psychological distress emerged as the strongest determinants. These findings inform targeted resource allocation and

the development of tiered, facility-type-specific integrated care protocols to address the “high age, disability, and chronicity” challenges in institutional aging.

Introduction

With the acceleration of global population aging,the World Health Organization (WHO) Integrated Care for Older People (ICOPE) framework[1], launched in the Decade of Healthy Aging,provides evidence-based guidance for managing complex health needs in older people. Integrated care involves cross-sectoral collaboration and a continuum of services, addressing a full range of health needs,including health promotion,disease management, rehabilitation support, and palliative care[2]. WHO has emphasized that integrated care, through a coordinated and continuous service model, can reduce emergency department visits, readmission rates, and the risk of institutional care for patients[3]. Currently, the international integrated care model is well-developed and serves a wide range of populations[4], offering multidisciplinary team care for patients through needs assessment and care coordination processes. In recent years, China has been gradually promoting the localized practice of the ICOPE framework for older people, and studies have shown that it is feasible to implement this framework in LTCFs of China[5]. The professionalism and continuity of care services have greatly improved after several domestic pension institutions adopted the ICOPE process, with the abnormal referral rate, follow-up rate, and case management completion rate all increased[6]. However, numerous challenges remain in the development of exclusive multidimensional assessment tools for different types of LTCFs and the integration of institutional service resources. In China, the “14th Five-Year Plan for National Aging Development and Elderly Care Service System Planning” (2021) mandates the classified development of three distinct LTCF models to address diverse socioeconomic needs: (1)public welfare-oriented (subsistence security-oriented) facilities serving vulnerable populations with government subsidies; (2)affordable (inclusive support-oriented) facilities balancing quality and cost for middle-income older adults; (3) private (fully market-oriented) facilities offering premium services for those with substantial financial resources[7]. This tripartite structure reflects China’s strategic shift from homogeneous institutional care to differentiated, need-based service provision.

Activities of daily living (ADL) impairment, defined as the inability to perform essential tasks such as bathing, mobility, and dressing[8], is linked to adverse health outcomes, including increased healthcare utilization and lower quality of life[9]. In China, population aging is a significant social trend. According to the Fifth Sample Survey on Living Conditions of Urban and Rural Older People in China, approximately 82.5% of older people in Chinese LTCFs have varying degrees of ADL impairment, a rate much higher than that of community-dwelling older people[10]. Moreover, due to the particularity of centralized care in LTCFs, their care needs have higher requirements for professionalism and continuity[11]. ADL-impaired older people in LTCFs have multidimensional and high-level care needs due to a combination of physical dysfunction, complex medical conditions, cognitive and emotional problems, and the lack of real-time family care[12]. These older people require basic physiological support and medical interventions, as well as professional rehabilitation, psychological comfort and personalized daily living care services. Studies have shown that early identification and intervention for older people at high risk of moderate to

severe ADL impairment in LTCFs can delay functional decline, reduce the need for intensive care, and improve their quality of life[13]. However, extant research exhibits three critical limitations: (1) predominant focus on community-dwelling older adults with insufficient attention to institutionalized populations; (2) single-center designs lacking comparative analysis across the three facility types; (3) provider-centric perspectives that neglect residents' subjective care preferences[14–16]. Consequently, an evidence-based framework for tailoring integrated care to distinct institutional contexts remains elusive. Few studies explore the integrated care needs of ADL-impaired older people in LTCFs.

Based on the core principle of "need-centeredness"[17], the study focuses on ADL-impaired older people in subsistence security-oriented, inclusive support-oriented, and fully market-oriented LTCFs, aiming to analyze their integrated care needs and the factors influencing these needs. By examining the mechanisms of multidimensional factors such as medical resource allocation, family support networks, individual health status, psychological factors, and length of stay, the study provides a scientific foundation for designing targeted integrated care programs for LTCFs. These efforts are crucial for improving the quality of care services in different types of LTCFs and addressing the challenges of institutional elderly care under population aging.

Methods

Study Design

This is a cross-sectional study, with all procedures conducted in accordance with the principles of the Declaration of Helsinki.The study report is strictly written in accordance with the STROBE statement guidelines.

Study Setting and Sampling

This study was conducted from July to December 2025 in 26 different types of LTCFs (subsistence security-oriented, inclusive support-oriented, and fully market-oriented) in Nanjing, China. Sample size estimation followed the formula for cross-sectional studies: $n = Z^2 \times P(1-P)/d^2$, where $Z = 1.96(\alpha = 0.05$, two-tailed), $P = 0.80$(expected proportion of moderate-to-high care needs based on pilot data, $n = 50$), and $d = 0.04$(precision). The minimum required sample was 384; considering 20% attrition, design effect of 1.5 for cluster sampling across 26 facilities, and the need for multivariable regression (minimum 10–15 participants per predictor variable), the target sample was set at 1,400. A total of 1445 questionnaires were distributed, and 1300 valid questionnaires were returned, yielding a valid response rate of 90%.

Inclusion and Exclusion Criteria

The inclusion criteria for this study were: (1)Aged ≥ 60 years and having lived in a pension institution for ≥3months; (2)Diagnosed with partial or complete ADL impairment with a Barthel Index score < 100,

including mild impairment(60 ~ 99 points), moderate impairment (41 ~ 59 points), and severe impairment(≤ 40 points); (3)Clear consciousness and normal verbal communication function; (4)Voluntarily cooperate with the study and sign the informed consent form (legal guardians sign for those with no capacity for civil conduct); (5)Living in a subsistence security-oriented, inclusive support-oriented or fully market-oriented pension institution in Nanjing as defined in the study.Exclusion criteria included: (1)Complicated with severe mental disorders, severe cognitive impairment or severe psychological diseases; (2)Suffering from terminal diseases with a survival period < 3 months; (3)Temporarily living in a pension institution (< 3 months) or planning to transfer out within 1 month; (4)Unable to cooperate in completing the questionnaire; (5)Living in LTCFs other than the three types defined in the study.

MEASURES

General Information Questionnaire

This questionnaire collects socio-demographic characteristics, including gender, age, ethnicity, marital status, length of stay, type of pension institution, etc., and clinical health information, such as degree of ADL impairment, mobility, number of chronic diseases, hearing and visual status, etc. It also includes an assessment of the care resources related to LTCFs, with questions on: (1)whether the pension institution provides integrated care services, (2)the categories of professionals currently providing professional care services for the research subjects.

Integrated Care Needs Questionnaire

The integrated care needs questionnaire used in this study was revised based on the one compiled by Chen Hairong et al, combined with the characteristics of older people in the three types of LTCFs [18]. After expert consultation, the questionnaire includes two dimensions: functional needs and content needs. (1)Functional needs: This section assesses whether there is a need for LTCFs to collaborate with community health service centers to establish an integrated service window for information about elderly care resources and professional service docking processes, offered free of charge. Respondents are asked to specify the functions they believe such a service window should include (multiple-choice questions). (2)Content needs: This section consists of six dimensions with 77 entries. The Likert 5-point scale is used for responses: “completely unnecessary,” “not very necessary,” “indifferent,” “relatively necessary,” and “very necessary,” with corresponding scores from 1 to 5. The total score ranges from 77 to 385. In this study, the Cronbach’s alpha coefficient for the questionnaire was 0.978, and the content validity was 0.975.

Data Collection

A stratified convenience sampling method was employed, with the type of pension institution(subsistence security-oriented, inclusive support-oriented, fully market-oriented) as the

stratification criterion. Nine subsistence security-oriented LTCFs, ten inclusive support-oriented LTCFs and seven fully market-oriented LTCFs were selected in Nanjing, China, from July to December 2025. Trained and qualified personnel surveyed older people in these LTCFs who met the inclusion and exclusion criteria. For older people unable to complete the questionnaire independently, investigators filled it in based on the older people's responses.

Data Analysis

Data entry and analysis were conducted using SPSS 26.0 statistical software. Categorical variables were expressed as frequency(%), while continuous variables were presented as mean±standard deviation (M ± SD). Differences in integrated care needs scores among older people in LTCFs with different characteristics were compared using t-tests or one-way ANOVA. Multiple linear regression analyses were performed to identify the independent factors influencing the integrated care needs of older people in LTCFs. A P-value of < 0.05 was considered statistically significant.

Results

Comparison of Integrated Care Needs Scores of Older People in LTCFs with Different Characteristics

Among the 1300 older people in LTCFs, 38.00% were from subsistence security-oriented LTCFs, 35.00% from inclusive support-oriented ones, and 27.00% from fully market-oriented ones. Of the participants,41.00% were male, and 59.00% were female; 89.62% had a length of stay ≥ 1 year. The results of the univariate analysis revealed statistically significant differences in variables such as age, type of pension institution, primary source of income, frequency of family visits, degree of ADL impairment, hearing and visual status, number of chronic diseases, number of hospitalizations in the past year, polypharmacy status, psychological state, and length of stay ($P < 0.05$). Detailed results are provided in Table 1.

Table 1
Comparison of General Characteristics and Integrated Care Needs Scores of Older People in LTCFs (N = 1300)

Variables	n(%)	Score of Integrated Care Content Needs(M ± SD)	t/F	P-value
Type of pension institution	——	——	32.586	< 0.001
Subsistence security-oriented	494(38.00)	3.72 ± 0.55	——	——
Inclusive support-oriented	455(35.00)	3.35 ± 0.62	——	——
Fully market-oriented	351(27.00)	3.08 ± 0.68	——	——
Gender	——	——	4.326	< 0.001
Male	533(41.00)	3.20 ± 0.67	——	——
Female	767(59.00)	3.48 ± 0.60	——	——
Age (years)	——	——	23.658	< 0.001
60 ~ 69	195(15.00)	3.02 ± 0.61	——	——
70 ~ 79	478(36.77)	3.28 ± 0.65	——	——
≥ 80	627(48.23)	3.62 ± 0.57	——	——
Marital status	——	——	7.025	< 0.01
Married	345(26.54)	3.16 ± 0.68	——	——
Widowed/Other	955(73.46)	3.45 ± 0.61	——	——
Length of stay	——	——	6.895	< 0.001
3 months ~ 1 year	135(10.38)	3.10 ± 0.70	——	——
1 ~ 3years	390(30.00)	3.35 ± 0.65	——	——
≥ 3years	775(59.62)	3.52 ± 0.58	——	——
Primary source of income	——	——	19.586	< 0.001
Pension/Endowment insurance	685(52.69)	3.18 ± 0.64	——	——
Support by children	445(34.23)	3.65 ± 0.55	——	——
Government subsidy	130(10.00)	3.40 ± 0.59	——	——
Other	40(3.08)	3.58 ± 0.57	——	——

Variables	n(%)	Score of Integrated Care Content Needs(M ± SD)	t/F	P-value
Frequency of visits by children	——	——	48.652	< 0.001
Once every ≥ 3 months	615(47.31)	3.80 ± 0.50	——	——
Once a month	340(26.15)	3.38 ± 0.59	——	——
Once a week	275(21.15)	3.10 ± 0.63	——	——
Once a day	70(5.39)	2.88 ± 0.68	——	——
ADL-dependent Level	——	——	225.689	< 0.001
Mild impairment	375(28.85)	2.98 ± 0.58	——	——
Moderate impairment	545(41.92)	3.58 ± 0.49	——	——
Severe impairment	380(29.23)	3.92 ± 0.46	——	——
Mobility	——	——	40.586	< 0.001
Bedridden/Wheelchair-bound	485(37.31)	3.85 ± 0.48	——	——
Able to get out of bed but not go out	530(40.77)	3.38 ± 0.60	——	——
Able to go out	285(21.92)	3.00 ± 0.63	——	——
Hearing and visual status	——	——	45.268	< 0.001
Normal	315(24.23)	3.05 ± 0.61	——	——
Impaired (single/both items)	985(75.77)	3.58 ± 0.56	——	——
BMI level *	——	——	3.526	< 0.05
Underweight	225(17.31)	3.50 ± 0.59	——	——
Normal	400(30.77)	3.28 ± 0.65	——	——
Overweight	415(31.92)	3.35 ± 0.61	——	——
Obese	260(20.00)	3.18 ± 0.67	——	——
Number of chronic diseases	——	——	70.258	< 0.001
≤ 1	115(8.85)	2.88 ± 0.60	——	——
2 ~ 3	475(36.54)	3.32 ± 0.63	——	——

Variables	n(%)	Score of Integrated Care Content Needs(M ± SD)	t/F	P-value
≥ 4	710(54.61)	3.70 ± 0.52	——	——
Number of hospitalizations in the past year (times)	——	——	55.689	< 0.001
1	345(26.54)	3.18 ± 0.62	——	——
2	480(36.92)	3.45 ± 0.58	——	——
≥ 3	475(36.54)	3.78 ± 0.51	——	——
Polypharmacy status **	——	——	20.365	< 0.001
Yes	925(71.15)	3.65 ± 0.55	——	——
No	375(28.85)	3.08 ± 0.64	——	——
Psychological state	——	——	38.652	< 0.001
Good	320(24.62)	3.02 ± 0.60	——	——
General	580(44.62)	3.42 ± 0.58	——	——
Poor (loneliness/depression)	400(30.76)	3.85 ± 0.52	——	——

*Note: *BMI classification criteria - Underweight (BMI < 18.5kg/m²), Normal (18.5kg/m²≤BMI<24kg/m²), Overweight (24kg/m²≤BMI<28kg/m²), Obese (BMI≥28kg/m²); **Polypharmacy is defined as the concurrent use of ≥ 5 medications.

Current Status of Care Resources in Three Types of LTCFs: Subsistence Security-oriented, Inclusive Support-oriented and Fully Market-oriented

The study found that the care services currently provided by subsistence security-oriented, inclusive support-oriented, and fully market-oriented LTCFs primarily focus on basic daily living care and simple basic nursing[19]. Additionally, the supply of professional rehabilitation services and psychological comfort services is insufficient to varying degrees, with the supply rate of medical services and professional nursing in fully market-oriented LTCFs being significantly higher than that in inclusive support-oriented and subsistence security-oriented ones, while subsistence security-oriented LTCFs have the lowest supply rate of professional services. Detailed results are provided in Table 2.

Table 2

Current Status of Care Resources in Subsistence Security-oriented, Inclusive Support-oriented and Fully Market-oriented LTCFs (N = 1300)

Variables	Subsistence security-oriented(n = 494)n(%)	Inclusive support-oriented(n = 455)n(%)	Fully market-oriented(n = 351)n(%)	Total(N = 1300)n(%)
Provision of integrated care services	——	——	——	——
Yes	85(17.21)	155(34.07)	180(51.28)	420(32.31)
No	295(59.72)	190(41.76)	65(18.52)	550(42.31)
Only partial services provided	114(23.07)	110(24.17)	106(30.20)	330(25.38)
Provision of basic daily living care	485(98.18)	450(98.90)	350(99.71)	1285(98.85)
Provision of simple basic nursing	395(79.96)	405(88.99)	345(98.29)	1145(88.08)
Provision of professional rehabilitation services	125(25.30)	185(40.66)	285(81.20)	595(45.77)
Provision of psychological comfort services	85(17.21)	145(31.87)	255(72.65)	485(37.31)
Provision of specialized medical services	95(19.23)	195(42.86)	325(92.59)	615(47.31)
Equipped with full-time pharmacists	25(5.06)	85(18.68)	305(86.89)	415(31.92)
Equipped with full-time psychological counselors	15(3.04)	65(14.29)	285(81.20)	365(28.08)
Equipped with professional rehabilitation therapists	35(7.09)	95(20.88)	300(85.47)	430(33.08)

Integration of care needs

Functional Needs

The study showed that 89.30% of the older people in LTCFs expressed a desire for LTCFs to collaborate with community health service centers to set up an integrated service window for free access to

professional care resources and service docking processes, while only 5.23% indicated no need and 5.47% were unclear. Among them, the proportion of older people with such needs was the highest in subsistence security-oriented LTCFs (95.55%) and the lowest in fully market-oriented ones (82.05%). They emphasized the importance of extending professional nursing services, conducting dynamic health status assessment, matching care resources accurately, formulating personalized care plans, and providing family care skills training, with the respective proportions being 78.54%, 75.31%, 72.62%, 68.92%, and 62.31%. Detailed results are provided in Table 3.

Table 3
Functional Needs for Integrated Care of Older People in LTCFs (N = 1300)

Variables	n(%)
Need for an institution-community joint integrated service window (free access to care resources/processes)	——
Yes	1161(89.30)
No	68(5.23)
Unclear	71(5.47)
Required Functions of the Integrated Service Window*	——
Dynamic health status assessment	979(75.31)
Formulation of personalized care plans	896(68.92)
Accurate matching of care resources	944(72.62)
Extension of professional nursing services	1021(78.54)
Family care skills training	810(62.31)
Regular follow-up and condition tracking	775(59.62)
Other	33(2.54)
None	47(3.62)
Note: * Represents multiple choice questions.	

Scores of Each Dimension of Content Needs and Top 3 Item Scores

The total mean score of integrated care content needs of older people in LTCFs was 3.42 ± 0.62, at a moderate to high level, with the score of subsistence security-oriented LTCFs being the highest (3.72 ± 0.55), followed by inclusive support-oriented ones (3.35 ± 0.62), and fully market-oriented ones the lowest (3.08 ± 0.68). The mean scores of each dimension in descending order were: basic nursing (3.65 ± 0.72), health guidance (3.58 ± 0.76), spiritual and psychological comfort (3.42 ± 0.83), daily living care (3.28 ± 0.88), specialized medical care (3.20 ± 0.86), and social participation (2.88 ± 1.00).

Among the top 3 item scores of each dimension, the score of professional pressure ulcer care in basic nursing was the highest (4.32 ± 0.85), followed by chronic disease medication guidance (4.18 ± 0.92) and guidance on identifying changes in medical conditions (4.15 ± 0.95) in health guidance. Detailed results are shown in Table 4.

Table 4
Scores of Each Dimension and Top 3 Items of Integrated Care Content Needs of Older People in LTCFs (N = 1300)

Variables	M ± SD
Basic nursing	3.65 ± 0.72
Professional pressure ulcer care	4.32 ± 0.85
24-hour vital sign monitoring	4.15 ± 0.88
Professional care for urinary and fecal incontinence	4.02 ± 0.94
Health guidance	3.58 ± 0.76
Chronic disease medication guidance	4.18 ± 0.92
Guidance on identifying changes in medical conditions	4.15 ± 0.95
Guidance on prevention of common diseases (pneumonia/falls, etc.)	4.02 ± 0.98
Spiritual and psychological comfort	3.42 ± 0.83
One-on-one companionship and chatting	3.88 ± 1.00
Coordination and companionship guidance for family visits	3.75 ± 1.03
Psychological counseling and emotional intervention	3.70 ± 1.06
Daily living care	3.28 ± 0.88
Personalized dietary care (age-friendly)	3.78 ± 1.04
Fall prevention and mobility assistance	3.65 ± 1.07
Personal cleaning and skin care	3.60 ± 1.10
Specialized medical care	3.20 ± 0.86
Rapid docking of emergency medical services	3.85 ± 1.03
Professional rehabilitation physical therapy services	3.78 ± 1.06
Basic medical services such as oxygen inhalation/nebulization	3.70 ± 1.08
Social participation	2.88 ± 1.00
Institutional interest group activities	3.18 ± 1.13
Age-friendly outdoor leisure activities	3.05 ± 1.16
Elderly health knowledge lectures	3.00 ± 1.18
Total mean score of integrated care content needs	3.42 ± 0.62

Factors influencing demand for integrated care content

Multiple linear regression analyses were conducted using the mean Integrated Care Content Needs Score as the dependent variable, with independent variables selected based on $P < 0.05$ from the univariate analysis. The results revealed an adjusted R^2 of 0.505, accounting for 50.5% of the variance ($R = 0.716$, $R^2=0.512$, $F = 70.258$, $P < 0.001$), with a better fitting degree than relevant studies on community-dwelling older people. The explanatory variables included type of pension institution (subsistence security-oriented/inclusive support-oriented, with fully market-oriented as the reference), primary source of income (support by children/government subsidy/other, with pension/endowment insurance as the reference), frequency of family visits (once every ≥ 3 months/once a month/once a week, with once a day as the reference), degree of ADL impairment (moderate/severe, with mild as the reference), hearing and visual impairment (with normal as the reference), number of chronic diseases (2 ~ 3/≥4, with ≤ 1 as the reference), polypharmacy (with no as the reference), number of hospitalizations in the past year (2/≥3, with 1 as the reference), psychological state (general/poor, with good as the reference), and length of stay (1 ~ 3 years/≥3 years, with 3 months ~ 1 year as the reference). Among them, severe ADL impairment ($\beta = 0.332$), hearing and visual impairment ($\beta = 0.275$), and poor psychological state ($\beta = 0.228$) ranked the top three in terms of the degree of influence[20]. The results of the multiple linear regression analysis are presented in Table 5.

Table 5
Multiple Linear Regression Analysis of Influencing Factors of Integrated Care Content Needs of Older People in LTCFs (N = 1300)

Variables	B	SE	Beta	t	P-value	95.0%CI (B)	VIF
Constant	1.725	0.068	——	25.368	< 0.001	1.592 ~ 1.858	——
Type of pension institution (reference: fully market-oriented)	——	——	——	——	——	——	——
Subsistence security-oriented	0.325	0.038	0.236	8.553	< 0.001	0.251 ~ 0.399	1.225
Inclusive support-oriented	0.186	0.04	0.135	4.65	< 0.001	0.108 ~ 0.264	1.286
Age (reference: 60 ~ 69)	——	——	——	——	——	——	——
70 ~ 79	0.088	0.034	0.065	2.588	< 0.05	0.021 ~ 0.155	1.265
≥ 80	0.132	0.037	0.092	3.568	< 0.001	0.059 ~ 0.205	1.328
Primary source of income (reference: pension/endowment insurance)	——	——	——	——	——	——	——
Support by children	0.275	0.033	0.202	8.333	< 0.001	0.210 ~ 0.340	1.165
Government subsidy	0.112	0.045	0.056	2.489	< 0.05	0.024 ~ 0.200	1.138
Other	0.232	0.062	0.082	3.742	< 0.001	0.109 ~ 0.355	1.115
Frequency of visits by children(reference: once a day)	——	——	——	——	——	——	——
Once every ≥ 3 months	0.318	0.04	0.22	7.95	< 0.001	0.239 ~ 0.397	1.458
Once a month	0.192	0.043	0.13	4.465	< 0.001	0.108 ~ 0.276	1.402
Once a week	0.098	0.045	0.065	2.178	< 0.05	0.010 ~ 0.186	1.345
ADL-dependent Level(reference: mild impairment)	——	——	——	——	——	——	——
Moderate impairment	0.392	0.034	0.282	11.529	<	0.325 ~	1.198

Variables	B	SE	Beta	t	P-value	95.0%CI (B)	VIF
					0.001	0.459	
Severe impairment	0.475	0.04	0.332	11.875	< 0.001	0.396 ~ 0.554	1.326
Hearing and visual status (reference: normal)	0.382	0.038	0.275	10.053	< 0.001	0.307 ~ 0.457	1.498
Number of chronic diseases (reference: ≤1)	——	——	——	——	——	——	——
2 ~ 3	0.205	0.04	0.162	5.125	< 0.001	0.126 ~ 0.284	1.598
≥ 4	0.272	0.042	0.208	6.476	< 0.001	0.189 ~ 0.355	1.725
Polypharmacy (reference: no)	0.175	0.034	0.128	5.147	< 0.001	0.108 ~ 0.242	1.168
Number of hospitalizations in the past year (times) (reference: 1)	——	——	——	——	——	——	——
2	0.132	0.036	0.098	3.667	< 0.001	0.061 ~ 0.203	1.302
≥ 3	0.242	0.039	0.182	6.205	< 0.001	0.165 ~ 0.319	1.365
Psychological state (reference: good)	——	——	——	——	——	——	——
General	0.185	0.036	0.135	5.139	< 0.001	0.114 ~ 0.256	1.215
Poor (loneliness/depression)	0.315	0.04	0.228	7.875	< 0.001	0.236 ~ 0.394	1.352
Length of stay (reference: 3 months ~ 1 year)	——	——	——	——	——	——	——
1 ~ 3 years	0.128	0.038	0.095	3.368	< 0.001	0.053 ~ 0.203	1.186
≥ 3 years	0.215	0.041	0.158	5.244	< 0.001	0.134 ~ 0.296	1.258

Discussion

Characteristics of the Sample

According to the survey, the average age of the 1,300 elderly residents of pension facilities was 78.85 ± 7.65 years. Of these, 71.15% had ADL impairment (with 71.15% having moderate to severe impairment), and 48.23% were advanced older persons (≥ 80 years). Compared to older adults living in the community, the polypharmacy rate was 71.15%, and 54.61% had at least four chronic conditions. The key characteristics of older persons in LTCFs—“advanced age, disability, and chronic disease”—which also dictate the high quality, professionalism, and continuity of their care needs, are extremely consistent with this. The percentage of females was larger than that of males, at 59.00%, which is consistent with the traits of females having a higher frequency of osteoarticular disorders and a longer life expectancy. Moreover, female older people in LTCFs are more prone to psychological loneliness, indicating the need for gender-specific integrated care programs with a focus on the physiological nursing and psychological comfort of female older people.

According to the study’s findings, compared to older individuals who lived in the community, just 5.39% of the elderly had daily family visits, and 47.31% received them once every three months. This illustrates the severe absence of family support for elderly residents in pension facilities, as institutions take on the role of primary caregivers. As a result, there is a notable rise in the demand for and reliance on professional care services at these facilities. The care services provided by the three different types of LTCFs (totally market-oriented, inclusive support-oriented, and subsistence security-oriented) differ significantly. Fully market-oriented institutions have the most comprehensive supply of professional services, including medical care, rehabilitation, and psychology; inclusive support-oriented institutions balance basic security and professional services with a medium supply level; and subsistence security-oriented institutions concentrate on basic daily living care with the weakest professional service supply capacity. Due to inadequate service delivery, older people's unmet needs in subsistence security-oriented institutions have been transformed into greater care demands, making this a significant factor influencing their integrated care needs[21].

Furthermore, 30.76% of the older people had poor psychological states such as loneliness and depression, and 59.62% had a length of stay ≥ 3 years. The longer the length of stay and the poorer the psychological state, the higher the integrated care needs. This reflects that long-term institutional living is prone to cause psychological problems in older people, thereby increasing their demand for professional care and psychological comfort, which is also an important shortcoming of care services in LTCFs[22].

Functional Needs of Older People in LTCFs for Integrated Care

In subsistence security-oriented LTCFs, the percentage of elderly residents with such needs is as high as 95.55%, which is significantly higher than that in the other two types of institutions. Of the elderly residents in LTCFs, 89.30% expect institutions to work with community health service centers to establish an integrated service window. The extension of professional nursing services, correct matching of care resources, and dynamic health status evaluation are the fundamental needs. This outcome

accurately captures the high demand for institution-community linked integrated care among older residents of pension facilities, particularly for institutions focused on subsistence security, which have a greater need to supplement community medical resources because of their own inadequate supply of professional services.

Due to their advanced age, chronic illnesses, ADL impairment, hearing and vision impairment, and lack of real-time family care, older people in LTCFs have a significant demand for the extension of community professional medical services based on institutional care. These services include home-based rehabilitation, specialized nursing, and emergency docking. At the same time, older people require ongoing dynamic health status assessment to achieve precise management of chronic illnesses and early intervention of medical conditions. Additionally, one of the biggest issues older persons in LTCFs confront is information asymmetry of care resources, and an integrated service window is desperately needed to facilitate correct matching of care resources. It is recommended that relevant departments expedite the development of an institution-community care linkage mechanism and establish distinct integrated service windows in the three categories of LTCFs: fully market-oriented institutions maximize service coordination, inclusive support-oriented institutions enhance the effectiveness of resource docking, and subsistence security-oriented institutions concentrate on introducing community professional nursing and rehabilitation resources. In order to achieve one-stop services for care needs assessment, service docking, and resource allocation, professionals are jointly stationed by communities and institutions. At the same time, professional nursing staff in community health service centers receive more training and funding, the capacity of community home-based services is increased, and the seamless integration of institutional and community medical care is realized.

Content Needs of Older People in LTCFs for Integrated Care

The total mean score of integrated care content needs of older people in LTCFs in this study was 3.42 ± 0.62, at a moderate to high level, significantly higher than that of community-dwelling older people[23], and the score was in the order of subsistence security-oriented>inclusive support-oriented>fully market-oriented, which was negatively correlated with the professional service supply level of the institutions. The demand structure is characterized by the highest demand for basic nursing, followed by health guidance. This is very different from older people who live in the community, who consider health guidance and spiritual and psychological comfort to be their primary needs. In contrast, older people who live in LTCFs have a more pressing need for professional basic nursing because of factors like advanced age, disability, and hearing and vision impairment. The high proportion of moderate to severe ADL impairment and the 37.31% of elderly residents in pension facilities who are bedridden or wheelchair-bound are directly linked to this. While the basic nursing services of the three categories of LTCFs now have varied degrees of insufficient professionalism, particularly in subsistence security-oriented institutions, these older individuals have high-frequency and high-professionalism expectations for professional basic nursing.

Health guidance needs rank second, with chronic disease medication guidance as the core. The reasons are as follows: older people in LTCFs are of advanced age, with coexisting chronic diseases and a high

polypharmacy rate, and the risk of drug absorption and metabolic disorders is significantly higher than that of community-dwelling older people; in addition, some older people have hearing and visual impairment and cognitive decline, which have higher professional and repetitive requirements for medication guidance, and personalized and regular medication guidance is urgently needed[24]. The demand for spiritual and psychological comfort is at a high level, with one-on-one companionship and chatting, and coordination of family visits as the core needs. This is consistent with the characteristics of older people in LTCFs having insufficient family support, narrow social circles, and being prone to loneliness and depression[25], and the longer the length of stay, the more significant the demand. Different from community-dwelling older people, the spiritual and psychological comfort of older people in LTCFs not only needs the companionship of institutional staff, but also professional psychological counseling, and the coordination and guidance of family visits have also become important needs. The demand for social participation is relatively low, but there is still a certain demand, with institutional interest group activities as the core. This is related to the limited mobility, hearing and visual impairment, and difficulty in going out of older people in LTCFs, and their social participation is more dependent on the supply of age-friendly activities within the institution.

The following intervention recommendations are made in light of the aforementioned needs: (1) bolster the professionalism of basic nursing, set up professional nursing staff in accordance with the three types of institutions' differences, train nursing staff in core skills like pressure ulcer care and urinary and fecal incontinence care for LTCFs, assign community specialized nurses to provide on-site services in subsistence security-oriented institutions, and implement intelligent monitoring equipment to enable dynamic 24-hour vital sign monitoring; (2) Optimize professional health advice, create individualized chronic illness and medication management files for senior citizens residing in pension facilities, provide full-time pharmacists with the tools necessary to administer routine medication advice, implement voice and visual medication reminders for senior citizens with visual and hearing impairments, and set up a medication early warning system; (3) Enhance spiritual and psychological comfort services; provide full-time psychological counselors at various levels in the three types of institutions; subsistence security-oriented institutions work with community psychological service resources to conduct one-on-one psychological intervention while simultaneously establishing an incentive and guidance mechanism for family visits to improve the quality of family companionship; (4) Conduct age-friendly social participation activities; create a range of institutional interest groups based on the mobility, hearing, and visual status of older individuals; and work with communities to conduct small-scale, age-friendly indoor and outdoor leisure activities; (5) Create a differentiated integrated care system for the three types of institutions: community health service centers concentrate on providing home-based specialized medical services for older people in subsistence security-oriented and inclusive support-oriented institutions, while fully market-oriented LTCFs use their professional advantages to provide extended medical and rehabilitation services for nearby subsistence security-oriented and inclusive support-oriented LTCFs.

Influencing Factors of Integrated Care Content Needs of Older People in LTCFs

Institutional Type and Economic and Family Support Factors

Important affecting factors include the kind of pension institution, the main source of income, and the frequency of visits by children[26]. Elderly persons in subsistence security-oriented and inclusive support-oriented institutions have much greater care demands when compared to totally market-oriented institutions. The main cause is the stark differences in the professional service supply levels of various types of institutions; in subsistence security-oriented institutions, the lack of basic nursing, professional rehabilitation, psychological comfort, and other services causes older people's unmet needs to become higher care needs.

Elderly residents of LTCFs have more integrated care demands when family visits are less frequent[27]. Insufficient financial support for children makes it difficult for families to pay for the expensive medical care and rehabilitation. This increased financial strain causes the health of elderly residents of pension facilities to deteriorate, which raises the need for integrated services and professional care[28–29]. According to pertinent studies[30–32], older adults who receive family visits once every three months have the highest demand (β = 0.220). In addition to causing severe loneliness and depression in older adults, long-term lack of family companionship also raises their need for professional care services in institutions because they do not receive additional family care. At the same time, the interaction between psychological issues and physical health will exacerbate the illness and functional decline of older adults, creating a vicious cycle.

In order to compensate for the shortcomings of professional services, it is recommended that clinical practice incorporate loneliness screening and psychological state/social loneliness screening into the routine assessment process of older people in LTCFs; conduct professional psychological interventions, such as cognitive behavioral therapy, for older people at moderate and high risk; improve the frequency and quality of family visits through policy guidance and institutional assistance; encourage family members to participate in the care process of older people; conduct family care skills training, and create an institution-family collaborative care model.

Health Status Factors

The most significant affecting factor is the degree of ADL impairment (severe impairment β = 0.332), and the more severe the impairment, the more integrated care is required[33]. In addition to basic daily living care, older adults with moderate to severe impairment require professional rehabilitation nursing, urinary and fecal care, pressure ulcer prevention, and other services. They also require long-term professional care support after discharge, with a marked increase in multidimensional care needs[34]. It is recommended that LTCFs create a graded care system based on the ADL scores of senior citizens, create individualized care plans and goals for senior citizens with varying levels of impairment, and hire qualified rehabilitation therapists to conduct focused functional training in order to postpone the functional decline of senior citizens.

The more the number of hospitalizations in the past year and the number of chronic diseases, the higher the integrated care needs[35]: frequent hospitalizations reflect the unstable health status, poor control of chronic diseases and high incidence of complications in older people. The coexistence of multiple diseases is prone to cause conflicts in treatment goals and complex medication regimens, and the interaction of multi-system diseases will accelerate the physical function decline and cognitive and psychological disorders of older people[36–39], so intensive medical intervention and continuous care are urgently needed; however, the referral mechanism between LTCFs and hospitals is not perfect at present, and there are fragmented problems in care services, such as disconnection of medication management and interruption of rehabilitation intervention, which further aggravate the demand of older people for integrated care.

Older people with polypharmacy have higher integrated care needs[40]: 71.15% of the older people in LTCFs in this study have polypharmacy, much higher than community-dwelling older people. Moreover, due to advanced age, hearing and visual impairment, cognitive decline, and lack of family medication supervision, older people are prone to medication errors such as missed doses, overdose, and incorrect medication methods, with a significantly increased risk of drug-drug interactions. It is suggested to establish a green referral channel between LTCFs and hospitals to realize the rapid docking of emergency treatment and hospitalization for older people; build an information sharing platform between institutions and hospitals to realize the real-time intercommunication of electronic medical records, medication history and rehabilitation plans; carry out comprehensive geriatric assessment for older people, and set up an interdisciplinary team to formulate personalized treatment and care plans in a coordinated way; establish a polypharmacy management system, with full-time pharmacists regularly evaluating and simplifying medication regimens, and adopting intelligent medication reminder equipment to improve medication compliance.

Physical Function Factors

The integrated care demands of older adults living in LTCFs are considerably influenced by hearing and vision impairment ($\beta = 0.275$), and this influence is much greater than that of older adults living in the community. The reason is that up to 75.77% of elderly residents of pension facilities have hearing and vision impairments, and a lack of individualized family care increases the need for professional institutional care. In addition to impairing older people's ability to communicate and take care of themselves on a daily basis, hearing and vision impairments also limit their social participation, exacerbate psychological issues and social loneliness, and have an impact on how well older people receive health advice and medication reminders, further increasing health risks, forming a vicious circle of “abnormal physical function-deterioration of health status-increased care needs”.

It is suggested that LTCFs carry out regular hearing and visual screening for older people, equip impaired older people with hearing aids and visual aids, and provide personalized care adaptation services: such as adopting text, gesture and visual communication methods for older people with hearing impairment, optimizing the living environment and providing voice service reminders for older people with visual impairment; at the same time, carry out hearing and visual rehabilitation training, and collaborate with

community ophthalmology and otology specialists to provide home-based medical services to improve the physical function of older people.

Psychological Factors

One significant independent affecting factor is psychological state. The care needs of older individuals with general (β = 0.135) and poor (β = 0.228) psychological states are significantly higher when a good psychological state is used as the reference. The more noticeable the rise in demand, the worse the psychological state. Due to things like inadequate family support, small social circles, restricted mobility, and hearing and vision impairment, older persons in pension facilities are more likely to experience unpleasant feelings like loneliness and sadness. Negative psychological moods will worsen the symptoms of physical illnesses, further impair older people's capacity for self-care and health management, and raise the need for comprehensive care services such professional medical care, basic nursing, and psychological comfort.

It is recommended that LTCFs incorporate psychological assessment into the regular process of managing older people's health and create a dynamic monitoring mechanism of psychological state; provide psychological counselors at varying levels in accordance with the three types of institutions; subsistence security-oriented institutions work with community psychological service resources; and inclusive support-oriented and fully market-oriented institutions provide full-time psychological counselors to provide one-on-one psychological counseling, group psychological counseling, and other intervention services for older people with poor psychological states; enhance the institution's social and recreational activities, encourage participation, reduce loneliness, and improve psychological state.

Length of Stay Factor

The integrated care requirements of elderly residents of pension facilities are significantly influenced by the length of stay. The care demands of older adults with 1 to 3 years of stay (β = 0.095) and ≥ 3 years of stay (β = 0.158) gradually increase, using 3 months to 1 year of stay as the reference. Elderly people eventually adjust to institutional life as their stay lengthens, but they also endure ongoing psychological loneliness as a result of long-term isolation from family and society, dwindling social networks, and ongoing physical decline. Additionally, physiological functions like hearing and vision will continue to deteriorate, and conditions like chronic diseases and disabilities will progressively worsen. As a result, institutional care services will need to be more comprehensive and professional, which will increase the need for integrated care.

It is advised that LTCFs create an adaptation period care plan for newly admitted elderly individuals to facilitate their rapid integration into institutional life; create a dynamic long-term care management system for elderly individuals with extended stays; routinely evaluate their physical health, physiological function, and psychological state; and promptly modify care plans; concurrently, establish a long-term communication bridge between institutions, communities, and families; encourage frequent family visits;

and support community home-based interactive activities to lessen the loneliness of elderly residents of long-term care needs.

Limitations

Firstly, the research objects of this study are mainly older people from three types of LTCFs in Nanjing. The geographical scope is limited, and the sample size of fully market-oriented LTCFs is relatively small, which may lead to selection bias and affect the generalizability of the results. Furthermore, this was a cross-sectional study, and it was not possible to determine the dynamic causal relationship between the studied variables and the integrated care needs of older people in LTCFs. Future studies should focus on conducting large-sample, multi-center cohort studies, including older people from different regions and different types of LTCFs, to explore the dynamic change rules of their integrated care needs. Such research could provide a more comprehensive evidence-based foundation for improving the integrated care service system of different types of LTCFs.

Conclusion

This multi-centre comparative analysis reveals that integrated care needs among Chinese LTCF residents are substantial and inversely related to facility service capacity. Basic nursing (3.65 ± 0.72) and health guidance (3.58 ± 0.76) predominated, with public welfare-oriented facilities reporting highest demands (3.72 ± 0.55 vs. 3.08 ± 0.68 in private facilities). Multiple regression identified severe ADL impairment (β = 0.332), sensory deficits (β = 0.275), and psychological distress (β = 0.228) as primary determinants, collectively explaining 51.2% of variance. Notably, 89.3% of residents desired facility-community collaborative care windows.

These findings inform a three-tiered strategy: (1) resource reallocation and professional staffing intensification for public welfare facilities; (2) enhanced community-linkage capacity for affordable facilities; (3) structured professional outreach from private facilities. Essential components comprise ADL-stratified care protocols, embedded clinical pharmacists and psychologists, and facility-community integrated service windows. Families should increase visit frequency and quality, participate through care skills training, and strengthen emotional communication to alleviate loneliness. Policymakers must expedite the "institution-community-family" triad model, introducing differentiated support policies, increasing fiscal investments in public welfare and affordable facilities, improving care worker training and incentives, establishing service subsidies, and building information-sharing platforms to achieve seamless coordination across institutions, communities, and hospitals. Such tailored approaches offer a scalable roadmap to address the "high age, disability, and chronicity" challenge in institutional aging.

Declarations

Ethics approval and consent to participate

This study complies with the Declaration of Helsinki, which was approved by Nanjing University of Chinese Medicine Ethics Committee. Before data collection, the research team signed the “Contract for Scientific Research Entrustment of Nanjing University of Chinese Medicine” with Jiangsu Provincial Department of Civil Affairs and obtained communities’ approval (SQ2023049), we confirm that the participants themselves signed informed consent in this study.

Consent for publication

All participants consented for the information they submitted to be anonymously published in a research paper.

Competing interests

The authors declare no competing interests.

Author Contribution

LWT: Conceptualization, Methodology, Data Curation, Formal analysis, Writing-Original Draft; LYL: Methodology, Data Curation, Formal analysis, Investigation; TWJ: Conceptualization, Writing-Review & Editing, Supervision, Project administration; ZYY: Investigation, Data Curation;XGH: Writing- Review & Editing; BYM: Writing- Review & Editing.

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Data Availability

The data are not publicly available due to privacy concerns, but selected and anonymized data are available from the corresponding author upon reasonable request.

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- GeneralInformationQuestionnaire.docx
- IntegratedCareNeedsQuestionnaire.pdf