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Investigating the Determinants of Health Services Utilization Among Older Adults in the Integrated Medical and Nursing Institutions in Guangxi, China

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Abstract

Background and Aim: Guangxi, located in the less economically developed western region of China, faces an increasingly severe challenge of population aging. This study aims to explore the factors influencing the health services utilization among older adults in Guangxi's integrated medical and nursing institution (IMNI), providing empirical evidence to enhance health services utilization among older adults and improve the integrated medical and elderly care service system.

Materials and Methods: Representative IMNIs were selected from Nanning, Guilin, and Yulin, totaling 10 institutions. The study population consisted of 395 older adults aged 60 and above residing in the IMNI. The questionnaire was self-designed and underwent two rounds of expert consultation. Statistical analyses included χ^2 tests, rank-sum tests, and negative binomial regression (NB).

Results: Univariate analysis showed statistically significant differences between outpatient services utilization and hereditary diseases, familial frequently-occurring disease, pain, falls, times of health check-ups, SRH, changes in health assessments by institutional doctors, and satisfaction with institutional medical services ($p < 0.05$). Inpatient services utilization was a statistically significant difference with gender, educational level, medical insurance, hereditary diseases, chronic diseases, pain, falls, times of health check-ups, ADL, changes in health assessments by institutional doctors, and willingness to stay in the institution ($p < 0.05$). NB presented statistically significant differences between outpatient services utilization and pain, SRH, and changes in health assessments by institutional doctors. Inpatient services utilization was statistically significantly different by gender, educational level, pain, falls, and the frequency of health check-ups.

Conclusion: Older adults in the IMNI can not only receive elderly care but also conveniently access medical services, ensuring healthy aging. However, Guangxi's IMNI should further optimize internal medical resource allocation, enhance the quality of medical services, and explore broader collaboration with external medical resources to establish a more efficient health services network that better meets the health needs of older adults.

Keywords: Health Services Utilization; Older Adults; Integrated Medical and Nursing Institutions

Introduction

Guangxi, located in the less economically developed western region of China, faces an increasingly severe challenge of population aging. According to statistics, by the end of 2022, the number of older adults aged 60 and above in Guangxi had reached 8.81 million, accounting for 17.5% of the total population, while those aged 65 and above numbered 6.63 million, making up 13.1% of the total population(Bureau of Statistics, 2023). With the continuous rise in the proportion of older adults, the demand for both medical and elderly care services is steadily increasing. Effectively integrating medical and elderly care services has become an urgent issue. In recent years, Guangxi has actively promoted the development of the IMNI. The IMNI is a medical care institution or elderly care institution that possesses both medical and elderly care service qualifications and capabilities(GOSC, 2015). The IMNI aims to integrate medical care and elderly care resources to provide more convenient, efficient, and continuous medical services for older adults. However, the development of these institutions remains in an exploratory phase, and the integration of "medical care" and "elderly care" remains a challenge. The integration of medical and elderly care in China still faces many problems that need to be addressed(Cao et al, 2024). This study aims to explore the

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factors influencing the health services utilization among older adults in Guangxi's IMNI, providing empirical evidence to enhance health services utilization among older adults and improve the integrated medical and elderly care service system.

Objectives

The objective was to investigate the factors influencing the health services in the IMNI for older adults in this study. ①This study provided scientific evidence to support the government and society in promoting integrated medical and elderly care initiatives. ②It was to better meet the healthcare needs of older adults in these institutions and encourage their willingness to reside in such facilities, thus addressing the issue of the separation between medical and elderly care for the aging population.

Literature review

The domestic research analyzes the current situation and problems of the medical and elderly care integration in China from different perspectives. In particular, elderly care institutions or medical institutions to carry out the medical and elderly care integration faced with difficulties. Scholars put forward a variety of optimization paths according to the actual problems encountered, including: innovating the mode of medical and elderly care integration, summarizing typical cases, policy innovation, and other schemes(Gao et al., 2022; Wu & Zhang, 2021; Ye & Bao, 2019; Zhao, 2024). At present, existing studies rarely analyze and discuss the health services utilization for older adults living in IMNI, which still needs to be improved. Whether it is the analysis and study of the health status and satisfaction of older adults in the IMNI(Zhu & Li, 2018), or the evaluation of the content and quality of the service of the medical and elderly care integration(Si et al., 2021), or the choice of older adults to the medical and elderly care integration(Wu et al., 2016). All these need to take the health services utilization for older adults as a starting point to analyze the demand and expectation of health services for older adults and the supply capacity of health services in IMNI. The health services utilization for older adults in IMNI will be different due to the characteristics of demographic sociology, income level, health status, health services supply level, and other factors. So the health services utilization for older adults in IMNI is different. In this case, it is necessary to analyze the factors and paths affecting the health services in older adults. At present, there are few studies on this aspect domestically, and it needs to be strengthened urgently.

Conceptual Framework

This study divided health services utilization into two dependent variables: outpatient service utilization and inpatient service utilization. It explored the factors influencing these two types of health service utilization from three perspectives: sociodemographic characteristics, medical needs, and institutional evaluation. Ultimately, this study provided recommendations and strategies for the government and society. See Figure 1.

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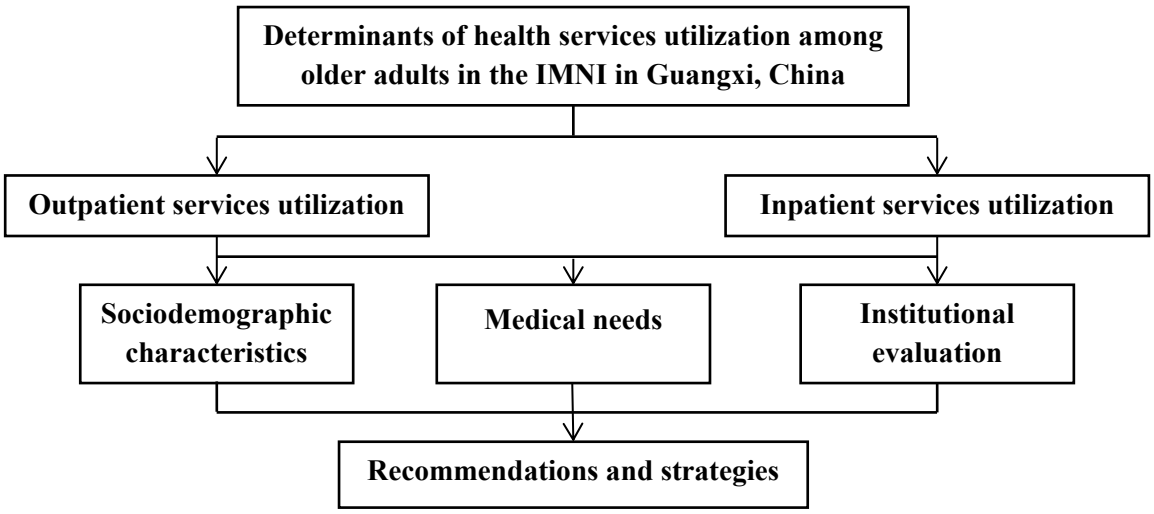

Figure 1 Research conceptual framework
Note: Constructed by the researcher

Methodology

1. Data source

The study population consisted of older adults aged 60 and above residing in the IMNI. Inclusion criteria: Age ⩾ 60 years; Institutional residency for ⩾ 12 months; Sufficient cognitive and responsive ability to comprehend the questionnaire content; Informed consent and willingness to participate in the survey. Exclusion criteria: Individuals with severe physiological or psychological disorders, significant language or hearing impairments, or extremely poor comprehension ability that prevents completion of the survey; Those unwilling to cooperate.

The study areas were determined based on the per capita GDP of 14 prefecture-level cities in Guangxi in 2022, categorizing them into regions with high, medium, and low economic development levels. One prefecture-level city was selected from each category, resulting in a total of three cities. Taking into account geographical regional divisions, Nanning, Guilin, and Yulin were chosen as the study areas. Representative IMNIs were selected from these three cities, totaling 10 institutions. The survey was conducted from September to December 2024.

The questionnaire utilized in this study was a self-designed "Questionnaire on the Health Services Utilization of Older Adults in Guangxi Integrated Medical and Nursing Institution." It underwent two rounds of expert consultation and a preliminary survey to ensure its quality. A total of 400 questionnaires were distributed, and after excluding those with logical inconsistencies in responses, 395 valid questionnaires were obtained, yielding an effective response rate of 98.8%. This study has been approved by the Medical Ethics Committee of Guangxi Medical University (Ethical Approval Number: 2024 KY0301).

2. Variable

2.1 Dependent variable

The dependent variable in this study was health services utilization, which included two separate variables: outpatient services utilization and inpatient services utilization. These corresponded to the questions: “In the past month, how many times have you visited a medical institution for outpatient services?” and “In the past year, how many times have you been hospitalized?” Both dependent variables were count data.

2.2 Independent variable

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The independent variables in this study were categorized into three modules: sociodemographic characteristics, medical needs, and institutional evaluation. Sociodemographic characteristics referred to the basic information of older adults, including gender, age, marital status, education level, place of residence, income, medical insurance, and pension insurance. Medical needs encompass disease conditions and lifestyle habits, including smoking, drinking, hereditary diseases, familial frequently-occurring disease, chronic diseases, pain, falls, times of health check-ups, activities of daily living (ADL), and self-rated health (SRH, ranging from 1 = very poor to 5 = very good). The institutional evaluation focuses on elderly individuals' assessment of their living experience in the IMNI, covering aspects such as changes in health assessments by institutional doctors, satisfaction with institutional medical services, overall institutional satisfaction, satisfaction with current living conditions (ranging from 1 = very dissatisfied to 5 = very satisfied), and willingness to stay in the institution (ranging from 1 = very unwilling to 5 = very willing).

3. Statistical analysis

Categorical independent variables were expressed as composition ratios, and group comparisons were conducted using the χ^2 test. Continuous variables were presented as medians and analyzed using the rank-sum test. Since both dependent variables were count data, they typically deviate from a normal distribution and exhibit overdispersion (mean > variance). An NB was used for multivariate analysis to identify influencing factors. Model evaluation included overdispersion test, zero-inflation test, and goodness-of-fit test to ensure the appropriateness of model selection. Data processing and analysis were conducted using Stata 18.0, with a significance level of $\alpha = 0.05$.

Results

1. Sociodemographic characteristics of participants

Among the 395 elderly participants in Guangxi, 116 were male (29.37%) and 279 were female (70.63%). The median age was 85 years. In terms of marital status, 137 participants had a spouse (or partner) (34.68%), while 258 did not (65.32%). Regarding educational level, 117 participants had primary school education or below (29.62%), 101 had junior high school education (25.57%), 80 had senior high school or vocational secondary education (20.25%), and 97 had college education or above (24.56%). In terms of residence, 332 participants lived in urban areas (84.05%), and 63 lived in rural areas (15.95%). After the logarithmic transformation, the median income was 8.29. Regarding medical insurance, 85 participants were uninsured (21.52%), while 310 were insured (78.48%). For pension insurance, 116 participants were uninsured (29.37%), and 279 were insured (70.63%). 168 elderly participants (42.53%) have visited outpatient clinics in the past month, and 128 elderly participants (32.41%) have been hospitalized in the past year. See Table 1.

Univariate analysis of health services utilization:

Univariate analysis results presented that hereditary diseases, familial frequently-occurring disease, pain, falls, times of health check-ups, SRH, changes in health assessments by institutional doctors, and satisfaction with institutional medical services were statistically significant with the outpatient services ($P < 0.05$). Additionally, gender, educational level, medical insurance, hereditary diseases, chronic diseases, pain, falls, times of health check-ups, ADL, changes in health assessments by institutional doctors, and willingness to stay in the institution were statistically significant with the inpatient services utilization ($P < 0.05$). See Table 1.

Table 1 Descriptive statistics of participant characteristics (n=395).

Independent variable	Total	Outpatient			Inpatient		
		Num	rate/%	χ^2/Z	Num	rate/%	χ^2/Z
Sociodemographic characteristics							
Sex (Male=0)	116	50	43.10	0.02	48	41.38	6.04*
Female=1	279	118	42.29		80	28.67	
Age	395	168	85	-0.04	128	85	0.88

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Independent variable	Total	Outpatient			Inpatient		
		Num	rate/%	χ^2/Z	Num	rate/%	χ^2/Z
Marital status (No=0)	258	110	42.64	0.00	49	35.77	1.08
Yes=1	137	58	42.34		79	30.62	
Educational level (Primary school education or below)	117	45	38.46	7.34	29	24.79	11.46**
Junior high school education	101	37	36.63		26	25.74	
High school or vocational secondary education	80	44	55.00		33	41.25	
College education or above=3	97	42	43.30		40	41.24	
Residence (Urban=0)	332	139	41.87	0.38	114	34.34	3.55
Rural area=1	63	29	46.03		14	22.22	
Income (ln)	395	168	8.26	0.20	128	8.30	-1.26
Medical insurance (No=0)	85	29	34.12	3.14	20	23.53	3.90*
Yes=1	310	139	44.84		108	34.84	
Pension insurance (No=0)	116	42	36.21	2.69	31	26.72	2.42
Yes=1	279	126	45.16		97	34.77	
Medical needs							
Smoking (No quit=0)	7	1	14.29	2.38	1	14.29	2.51
Quit=1	47	21	44.68		19	40.43	
Never=2	341	146	42.82		108	31.67	
Drinking (Not frequent=0)	373	158	42.36	0.58	120	32.17	0.20
Once a week =1	6	2	33.33		2	33.33	
Everyday=2	16	8	50.00		6	37.50	
Hereditary diseases (No=0)	268	104	38.81	4.73*	77	28.73	5.14*
Yes=1	127	64	50.39		51	40.16	
Familial frequently-occurring disease (No=0)	357	146	40.90	4.06*	114	31.93	0.38
Yes=1	38	22	57.89		14	36.84	
Chronic diseases (No=0)	101	35	34.65	3.45	22	21.78	6.99**
Yes=1	294	133	45.24		106	36.05	
Pain (No=0)	147	40	27.21	22.48***	36	24.49	6.70**
Yes=1	248	128	51.61		92	37.10	
Falls (No=0)	297	117	39.39	4.82*	78	26.26	20.62***
Yes=1	98	51	52.04		50	51.02	
Health check-ups	395	168	1	-3.44***	128	1	-3.51***
ADL	395	168	90	-0.27	128	90	-2.38*
SRH	395	168	3	3.00**	128	3	1.36
Institutional evaluation							
Changes in health assessments by institutional doctors (Deterioration=0)	23	17	73.91	19.37***	8	34.78	11.06*
Unchanged=1	119	39	32.77		29	24.37	
Improved=2	183	89	48.63		74	40.44	
Uncertain=3	70	23	32.86		17	24.29	
Satisfaction with institutional medical services	395	168	4	-2.09*	128	4	-1.17
Overall institutional satisfaction	395	168	4.5	-1.48	128	4.5	-1.70
Satisfaction with current living conditions	395	168	5	-1.78	128	4.5	-1.73
Willingness to stay in the institution	395	168	4	-0.79	128	4	-2.03*

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Note: *p<0.05, **p<0.01, ***p<0.001; this also applies to all tables.

2. Multivariate analysis of health services utilization

Outpatient services utilization:

All independent variables that showed statistical significance in the univariate analysis of outpatient services utilization were incorporated in the NB. The results presented that older adults experiencing pain, those with lower SRH scores, and those whose health status had deteriorated had statistically significantly higher outpatient service utilization (P < 0.05). See Table 2.

Table 2 NB analysis of factors influencing outpatient services utilization among older adults in Guangxi's IMNI.

Independent variable	IRR（95%CI）	S.E.	z
Medical needs			
Hereditary diseases (ref: No)			
Yes=1	1.468(0.970~2.220)	0.211	1.82
Familial frequently-occurring disease (ref: No)			
Yes=1	1.269(0.683~2.356)	0.316	0.75
Pain (ref: No)			
Yes=1	2.781(1.800~4.296)	0.222	4.61***
Falls (ref: No)			
Yes=1	1.157(0.743~1.801)	0.226	0.64
Health check-ups	1.060(0.904~1.243)	0.081	0.71
SRH	0.794(0.658~0.958)	0.096	-2.40*
Institutional evaluation			
Changes in health assessments by institutional doctors (ref: Deterioration)			
Unchanged=1	0.229(0.106~0.494)	0.392	-3.76***
Improved=2	0.367(0.177~0.764)	0.374	-2.68**
Uncertain=3	0.346(0.152~0.784)	0.418	-2.54*
Satisfaction with institutional medical services	1.144(0.914~1.432)	0.115	1.17

Inpatient services utilization:

All independent variables with statistical significance from the univariate analysis of inpatient services utilization were incorporated into an NB. The results presented that older adults who were male, those with a higher level of education, experienced pain, had a history of falls, and had a higher frequency of health check-ups were statistically significant with higher inpatient services utilization (P<0.05). See Table 3.

Table 3 NB analysis of factors influencing inpatient services utilization among older adults in Guangxi's IMNI

Independent variable	IRR（95%CI）	S.E.	z
Sociodemographic characteristics			
Sex (ref: Male)			
Female=1	0.369(0.228~0.597)	0.246	-4.06***
Educational level (ref: Primary school education or below)			
Junior high school education	1.995(1.019~3.907)	0.343	2.01*
High school or vocational secondary education	1.793(0.895~3.591)	0.354	1.65
College education or above=3	1.980(1.038~3.777)	0.330	2.07*
Medical insurance (ref: No)			
Yes=1	0.908(0.496~1.662)	0.308	-0.31
Medical needs			
Chronic diseases (ref: No)			

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Yes=1	1.410(0.796~2.499)	0.292	1.18
Pain (ref: No)			
Yes=1	2.415(1.431~4.076)	0.267	3.30***
Falls (ref: No)			
Yes=1	3.224(1.935~5.370)	0.260	4.50***
Health check-ups	1.226(1.010~1.489)	0.099	2.06*
ADL	1.009(0.999~1.020)	0.005	1.77
Institutional evaluation			
Changes in health assessments by institutional doctors (ref: Deterioration)			
Unchanged=1	0.696(0.230~2.105)	0.565	-0.64
Improved=2	1.333(0.456~3.893)	0.547	0.53
Uncertain=3	0.736(0.233~2.329)	0.587	-0.52
Willingness to stay in the institution	1.087(0.844~1.400)	0.129	0.64

Model evaluation:

The zero-inflated negative binomial regression model (ZINB) was used to test for overdispersion. The lnalpha values for outpatient and inpatient services utilization were 0.707 and 0.966, respectively, with P-values both less than 0.05, indicating the presence of overdispersion. This presented that the data were appropriate for either an NB or a ZINB. In the zero-inflation test, the Voung test yielded z-values of -0.02 and -0.41, with P-values greater than 0.05, indicating that zero-inflation is not statistically significant. Therefore, the data were appropriate for either an NB or a Poisson regression. For model selection, the goodness-of-fit test was calculated with the Akaike Information Criterion (AIC) for Poisson regression, NB, zero-inflated Poisson regression (ZIP), and ZINB. The NB had the lowest AIC value, indicating it as the optimal model (Lin & Dayton, 1997). In conclusion, the NB was the appropriate choice for this analysis. See Table 4.

Table 4 Model evaluation.

Dependent variable	Overdispersion test (lnalpha)	Zero-inflation test (Voung)	Goodness-of-fit test (AIC)			
			Poisson	NB	ZIP	ZINB
Outpatient services utilization	0.707*	-0.02	1563.377	1060.054	1423.763	1062.054
Inpatient services utilization	0.966*	-0.41	1525.005	848.848	1245.396	850.848

Discussion

1. Impact of gender and educational level on inpatient services utilization among older adults

In the multivariate analysis, gender had a significant impact on the utilization of inpatient services. Compared to males, females had a significantly lower rate of inpatient services utilization (IRR = 0.369, P = 0.000), indicating that the time of hospitalizations among elderly females in the IMNI in Guangxi was only 36.9% of that among males. This finding is consistent with previous studies(Qian et al., 2017; Read & Smith, 2018; Zhang et al., 2018). Females tended to prefer self-care or self-treatment during the early stages of illness (Pham et al., 2019; Zhang et al., 2020), whereas males may seek hospitalization only when their conditions become severe. According to China's basic medical insurance policies, the reimbursement rate for inpatient services was higher than that for outpatient services. However, many IMNIs in Guangxi were not designated medical insurance institutions. They had limited medical capabilities, requiring elderly patients to transfer to other hospitals for hospitalization in cases of serious illness. Moreover, some females, due to a lack of medical insurance coverage, may reduce their inpatient services utilization due to financial burdens (Zhou et al., 2021). Additionally, in traditional Chinese societal culture, males often held a higher social status than females, which may result in females being in a passive position in medical decision-making, thereby affecting their inpatient services utilization(Yang et al., 2023).

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Compared to elderly individuals with primary school education or below, those with higher educational levels had a significantly higher frequency of inpatient service utilization (all IRR > 1, with the effect of high school or vocational secondary education being significant at the 0.1 level). This finding contradicted multiple previous studies, which generally revealed a positive correlation between education level and health status and a negative correlation between education level and health services utilization (Bibiano et al., 2019; Li, 2024; Nouraei Motlagh et al., 2015; Pan et al., 2021). A possible explanation lies in the unique characteristics of the study population. All participants resided in the IMNIs, where, similar to other nursing homes in China, overall health status tended to be relatively poor(Wang et al., 2020; Yang et al., 2022). Consequently, their medical need may be higher than those of older adults in previous research. Furthermore, a higher educational level was often associated with better financial capacity and higher coverage of medical insurance enrollment, which could enhance the ability to afford hospitalization. This economic advantage may partly explain the increase in inpatient services among older adults with higher education levels.

2. Impact of medical needs on health services utilization among older adults

The results of the multivariate analysis indicate that pain, falls, times of health check-ups, and SRH significantly influence health services utilization among older adults. In previous studies, there have been both supportive and opposing views, with the specific details as follows:

First, pain had a significant positive correlation with both outpatient and inpatient service utilization. As one of the most prevalent health issues among older adults, particularly chronic pain, it has been shown to increase the health services (Mohamed Zaki & Hairi, 2014; Torres et al., 2018). This study found that experiencing pain increased the likelihood of outpatient services utilization by 278.1% (IRR = 2.781, P = 0.000) and inpatient services utilization by 241.5% (IRR = 2.415, P = 0.001). These results exceed the findings of Dellaroza (2013), who reported that suffering intense pain increases the likelihood of using health care services by 55.0%(Dellaroza et al., 2013). Furthermore, Cao (2024) presented that physical pain among older adults in rural China led to increased medical visits. However, older adults who experience frequent pain were also more likely to live separately from their children, which further exacerbated difficulties in accessing health services utilization(Cao & Su, 2024). Given these findings, the IMNI in Guangxi should strengthen pain management and intervention strategies for elderly residents to reduce unnecessary health services utilization. For older adults in poor health and without co-residing children, admission to such institutions can provide proactive health management, alleviating the impact of pain on their daily lives.

Secondly, falls had a significant positive impact on inpatient services utilization, substantially increasing the likelihood of hospitalization among older adults (IRR = 3.224, P = 0.000). Previous studies consistently indicated that falls were a critical factor influencing inpatient services utilization among older adults (Zhang et al., 2019; M. Zhang et al., 2019). Research by Canuto (2020), Tang (2022), and Deng (2024) presented that older adults with diseases characterized by symptoms such as dyspnea, such as chronic obstructive pulmonary disease, or those suffering from multiple chronic diseases, may face an elevated risk of falls (Canuto et al., 2020; Deng et al., 2024; Tang et al., 2022). Therefore, the IMNI in Guangxi should enhance fall risk assessment and intervention strategies for specific older adults. Additionally, improving intelligent elderly care systems by using big data to provide early warnings for falls could help mitigate risks associated with inadequate caregiving. Moreover, these IMNIs should implement age-friendly infrastructure modifications to minimize the occurrence of fatal fall-related incidents.

Third, the times of health check-ups had a significant positive impact on older adults' inpatient services utilization (IRR=1.226, P=0.040), indicating that older adults who underwent more health check-ups were also more likely to be hospitalized. This finding was consistent with previous studies (Gan-Yadam et al., 2013; Li et al., 2024). Health check-ups serve as an essential tool for health monitoring, enabling early detection of potential health issues, which in turn increases the likelihood of hospitalization while reducing overall hospitalization costs(Li et al., 2024). However, some studies presented that after

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retirement, older adults tended to undergo fewer check-ups, increasing their risk of chronic diseases and subsequently leading to higher outpatient and inpatient services utilization (Li & He, 2022). Regardless of the conclusion, these findings highlighted the role of health check-ups in promoting early disease diagnosis and treatment. For older adults, the IMNI should bring out their medical advantages by conducting comprehensive health check-ups at least once every six months. This would enhance older adults' health monitoring, raise health awareness, facilitate early detection, reduce health services utilization, and alleviate healthcare costs.

Lastly, SRH had a significant negative impact on outpatient services utilization. Older adults with poorer SRH were more inclined to utilize outpatient services (IRR=0.794, P=0.016). This finding was consistent with previous studies (Hajek et al., 2021; Hao et al., 2021; Hita et al., 2021). However, in prior studies, not only did older adults with poorer SRH utilize outpatient services more frequently, but their inpatient services utilization also significantly increased (Hao et al., 2021). These studies presented that SRH, as a subjective judgment of one's health status, is an important psychosocial factor influencing health services utilization among older adults. The non-significant inpatient services utilization among older adults in Guangxi's IMNI may be due to professional assessments by institutional doctors of those with poorer SRH, thereby reducing the instances of hospitalization. It indicates that the IMNI should pay attention to the mental health of older adults, enhance their SRH, and thereby reduce unnecessary needs for medical services.

3. Impact of institutional evaluation on outpatient services utilization among older adults

The results of the multivariate analysis showed that changes in health assessments by institutional doctors had a significant negative impact on outpatient services utilization. The study found that, compared to older adults whose health assessments had worsened, those whose assessments remained unchanged, improved, or were uncertain had significantly lower outpatient service utilization (IRR = 0.229, 0.367, and 0.346, respectively, $P < 0.05$). It was found that older adults with deteriorating health assessments were more likely to seek outpatient services. This finding complements the previous results on SRH. SRH was a subjective assessment, whereas a doctor's health evaluation is an objective judgment. Regardless of whether older adults perceived their health as deteriorating or doctors professionally diagnosed a decline in health status, both factors contributed to increased outpatient services. This helps prevent the misconception of "ignoring minor illnesses while only addressing major ones"(He & Shen, 2018; Shi et al., 2022), enabling early intervention and timely treatment of diseases. This result shows that the IMNIs in Guangxi are effectively leveraging their medical resources to regularly monitor the health status of older adults. When their health deteriorates, they can proactively seek outpatient services, thereby potentially reducing the need for hospitalization.

Conclusion

In conclusion, our study found that older adults residing in Guangxi's IMNI can effectively access health services utilization when they have healthcare needs. Moreover, due to regular health monitoring by doctors, older adults tend to utilize outpatient services more frequently than inpatient services, thereby reducing financial burdens. This enables them to access medical services conveniently while receiving elder care, ensuring their health and promoting healthy aging. However, given that Guangxi's overall medical level was lower than the national average, the IMNI should further optimize internal medical resource allocation and enhance the quality of medical services, particularly through improved pain management and fall prevention. Furthermore, the IMNI should pay attention to the psychological well-being of older adults, enhance their SRH, and reduce unnecessary medical needs. Additionally, Guangxi's IMNI should explore broader collaborations with external medical resources to establish a more efficient health services network, better meeting the health needs of older adults.

Suggestions

1. Suggestions for putting study results to good use

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Based on the research findings, the following suggestions are proposed to maximize the utilization of the study results:

First, regarding outpatient services utilization, greater attention should be given to pain management among older adults, particularly those with poorer SRH status and declining health conditions, by providing more timely and effective medical services.

Second, for inpatient services utilization, it is recommended to enhance health interventions for elderly men, individuals with higher education levels, those with a history of falls, and those who undergo frequent health check-ups. Early identification and intervention should be prioritized to reduce hospitalization needs and improve the efficiency of medical services.

Additionally, regular health check-ups should be encouraged to facilitate early detection and management of health issues, thereby reducing hospitalization rates. These measures will help optimize the allocation of medical resources and improve the accessibility and quality of medical services for older adults.

2. Suggestions for future research

This study employs a cross-sectional design, which limits the ability to establish stable causal relationships and does not encompass all potential influencing factors. Future research should expand the sample scope, adopt a longitudinal design, explore additional influencing factors in greater depth, conduct intervention studies, and assess the impact of policy and technological applications.

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