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ORIGINAL RESEARCH

The Impact of Social Support on Sleep Quality in Elderly Care Institutions in Northeast China: the Chain-Mediating Effect of Psychological Adjustment and Coping Style

Wen Jing Sun[1,2], Yu Jin Liu[1]

[1]Department of Nursing Welfare, Changchun Humanities and Sciences College, Changchun, Jilin, 130117, People's Republic of China; [2]Department of Counseling Psychology, Dongshin University, Naju-si, Jeollanam, Republic of Korea

Correspondence: Wen Jing Sun, Department of Nursing Welfare, Changchun Humanities and Sciences College, No. 1488, Boshuo Road, Jingyue National High-Tech Industrial Development Zone, Changchun City, Jilin, 130117, People's Republic of China, Tel +8615904405614, Email 179403066@qq.com

Purpose: The aim of this study was to investigate the sleep quality as well as the influence of social support on the sleep quality of elderly people in nursing homes in northeast China, and analyze the chain-mediating role of psychological adjustment and coping styles in social support and sleep quality, thereby to provide a scientific basis for the development of effective intervention measures in this direction.

Patients and Methods: This study was conducted during January–March 2023 and adopted a cluster sampling method to select 5 elderly care institutions from across the Jilin, Liaoning, and Heilongjiang provinces in Northeast China. A questionnaire survey was conducted using the Self-mate General Situation Questionnaire, Pittsburgh Sleep Quality Index, Nursing Home Adjustment Scale for the Elderly, Social Support Rating Scale, and Medical Coping Modes Questionnaire. Statistical analysis methods, including ANOVA, logistic multi-factor regression, and Pearson's correlation were employed in SPSS 26.0, while Amos 26.0 was used to build a structural equation model to analyze the interaction path and the mediating role between the variables.

Results: The sleep quality of elderly individuals in elderly care institutions was relatively low 8.43(3.456). Social support of elderly individuals in elderly care institutions affected their sleep quality through i) both psychological adjustment and face-to-face coping style ($B = 0.493$, $P < 0.001$, 95% CI = 0.050–0.122) and ii) both psychological adjustment and avoidance coping style ($B = -0.302$, $P < 0.001$, 95% CI = −0.119 to −0.048). Psychological adjustment, confrontation coping, and avoidance coping played a mediating role in the sequential relationship between social support and the sleep quality of elderly individuals in elderly care institutions.

Conclusion: Psychological adjustment and coping styles have a chain-mediating effect between social support and sleep quality of the elderly in northeast China's elderly care institutions.

Keywords: elderly care institutions, elderly people, sleep quality, psychological adjustment, social support, nursing

Introduction

Currently, there were approximately 260 million people aged ≥60 years in China, accounting for 18.70% of the total population. Among them, there were approximately 200 million individuals aged ≥65 years, accounting for 13.50% of the total population; this indicates a further increase in the aging population.[1] The situation of aging households in three northeastern provinces, namely, Jilin, Liaoning, and Heilongjiang provinces, is more prominent. The percentage of elderly individuals aged ≥60 years in Jilin, Liaoning, and Heilongjiang provinces is 23.06%, 25.72%, and 23.22% of the total population in the region, respectively. Furthermore, the proportion of elderly individuals aged ≥65 years is 15.61%, 17.42%, and 15.62%, respectively, all of which were >14%.[2–4] Based on the standards of the World Health Organization, China has become an aging society, with the absolute number of elderly individuals ranking first worldwide. In particular, the aging problem in the abovementioned three northeastern provinces is prominent.[5]

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The advent of the silver wave has led to a rapid increase in the elderly population; this has resulted in enormous pressure on elderly care. Owing to the weakening of family care functions and the unsound community care service system, the number of elderly people opting for nursing care institutions to seek professional and comprehensive care is gradually increasing. According to the epidemiological studies conducted at home and abroad, sleep disorders are quite common among the general elderly population. The British scholar Morgan et al found that approximately 60% of elderly people in nursing homes experience night-time sleep disorders.[6] One-third of the elderly in South Korea and Japan also have sleep disorders, and their sleep problems are worsening. In order to improve the sleep quality of elderly people in nursing homes, personalized and appropriate care plans and measures need to be established.[7–10] When compared with the elderly living in families and communities, those living in long-term care institutions have a higher incidence of sleep disorders, ranging from 49% to 64.9%, which has a serious negative impact on their health.[11–13] Research has shown that long-term sleep disturbance induces and aggravates the symptoms of chronic diseases in the elderly, such as cardiovascular diseases, stroke, hypertension, and diabetes.[14–17] In fact, there are reports of suicidal deaths triggered by emotional distress and psychological problems resulting from sleep disorders.[18–20] In addition, the incidence of sleep disorders is relatively high among elderly individuals living in elderly care institutions, necessitating extensive attention from the medical nursing and psychological circles.

To some extent, the level of social support among the elderly can affect their sleep quality, and the lack of social support among the elderly is the primary reason for insufficient sleep.[21,22] Psychological adjustment affects the sleep quality of elderly individuals in elderly care institutions.[23,24] Furthermore, social support for elderly individuals in elderly care institutions can have a positive effect on sleep quality. Elderly individuals in elderly care institutions can receive emotional support from social networks, thereby improving their psychological adjustment level and sleep quality. In elderly individuals in elderly care institutions, psychological adjustment plays a mediating role between social support and sleep quality.[25] This indicates that coping styles affect the sleep quality of elderly individuals in elderly care institutions. If the elderly can adopt an optimistic attitude and find a way to deal with negative life events, the incidence of sleep disorders can decrease. Coping style plays a mediating role between the social support and sleep quality of elderly individuals in elderly care institutions.[26] Elderly individuals living in elderly care institutions respond to stressful events by utilizing higher psychological adjustment abilities and positive coping styles, better regulating their emotions and psychological states, and decreasing the occurrence of sleep problems.[27]

Taken together, the abovementioned information suggests that social support, psychological adjustment, and coping styles have some effect on elderly individuals living in elderly care institutions and that psychological adjustment and coping styles play mediating roles between the social support and sleep quality of these elderly individuals. However, most of the research objects focus on the elderly in the community and on family care, and there is a substantial lack of research on elderlies in nursing institutions. In addition, the aging of the population in northeast China is increasingly becoming prevalent, for which institutional nursing care is the preferred old-age care approach. Therefore, there is a need to strengthen the research scenario on the sleep quality of the elderly in old-age care institutions in Northeast China. In the present study, we investigated the elderly individuals living in elderly care institutions in three provinces (Jilin, Liaoning, and Heilongjiang provinces) in Northeast China, explored the relevant factors affecting the sleep quality of elderly individuals in elderly care institutions, elucidated the correlation among their social support, psychological adjustment, coping styles, and sleep quality as well as the effect of social support on the sleep quality of elderly individuals in elderly care institutions, and the chain-mediating effect between psychological adjustment and coping styles.

Materials and Methods

Study Subjects

The present study was approved by the Ethics Review Committee of Dongshin University, Korea (No. 1,040,708–202,212-SB-047). It was a cross-sectional questionnaire survey study.

Sample estimation formula: $n = \left(\frac{Z_1 - \partial/2}{\delta}\right)^2 \times \rho \times (1 - \rho)$

n: Estimated sample size, =1.96, tolerance error =0.04, =0.626.[28] We calculated 562 people considering that the study premises may have been affected by non-collaborators, drop-outs, and invalid responses, as such, the sample size of this study is estimated to be >675 people considering the non-response rate of 20%. This study therefore adopted the survey method of cluster sampling.

In the present study, the cluster sampling survey method was adopted and 1206 elderly individuals from five elderly care institutions across the Jilin, Liaoning, and Heilongjiang provinces of China were selected as the study subjects. The inclusion criteria for the elderly care institutions were as follows: stable operation for ≥1 year; no less than 30 open beds available; and willingness to participate in the study. The inclusion criteria for the elderly participants were as follows: individuals aged ≥60 years; continuously living in a nursing home for at least 3 months; and individuals who provided informed consent and were willing to participate in this study without any communication barriers. The exclusion criteria for the elderly participants were as follows: individuals not living in a nursing home during the survey period; those with severe cognitive impairment; those with speech dysfunction; those in a comatose state; and those suffering from major illnesses or at the final stages of their life.

Pittsburgh Sleep Quality Index (PSQI)

PSQI was developed in 1989 by Dr. Buysse, a sleep expert from the Sleep and Biological Rhythm Research Center of the Psychiatry Department of the University of Pittsburgh Medical Center, and others.[29] Liu Xianchen et al[30] translated the PSQI scale into Chinese and tested its reliability and validity. The reliability (based on Cronbach's α coefficient) of the Chinese version of the PSQI scale is 0.84. The PSQI comprises 18 items, including 7 components of subjective sleep quality, falling asleep time, sleep time, sleep efficiency, sleep disorders, hypnotics, and daytime dysfunction. Each factor is scored using a four-level scoring method of 0–3, with a total score of 0–21 points. A total score of >5 points indicates that the individual has poor sleep quality, while a total score of <5 points indicates better sleep quality. Thus, the higher the total score, the worse the sleep quality.

Nursing Home Adjustment Scale (NHAS)

NHAS was developed by the Korean scholar Professor Lee Ga-eon et al in 2007 to measure the psychological adjustment of elderly individuals in elderly care institutions.[31] Xiao Huimin et al[32] conducted a sinicization study on this scale and found that the internal consistency (based on Cronbach's α coefficient) of the scale was 0.87. The NHAS comprises 23 items, including 5 dimensions: emotional distress (2 items), interpersonal relationships (7 items), accommodation acceptance (6 items), emotional repression (6 items), and feeling at home (6 items). This scale adopts the Likert five-level scoring method, with scores ranging from "strongly disagree to strongly agree" to "1–5 points". The higher the score, the better the psychological adjustment of elderly individuals in elderly care institutions.

Social Support Rating Scale (SSRS)

SSRS was developed by Xiao Shuiyuan[33] and Cronbach's α coefficient of this scale is 0.92, with good reliability and validity.[34] The scale comprises 10 items, including three dimensions: objective support (3 items), subjective support (4 items), and use of social support (3 items). This scale was employed to measure individual social support. Questions 1–4 and 8–10 of the scale, each with 4 options (A, B, C, and D), were assigned a score of 1–4 points. Question 5 comprised five sub-questions, each of which employed the Likert four-level scoring method. "No to Full Support" was scored as "1–4 points", whereas questions 6 and 7 were multiple-choice questions. If an individual selected "No Source", it was scored as 0 points. If an individual selected "The Following Sources", a few options were counted as several points. The total score of each dimension was obtained by adding the scores obtained from each of the three dimensions, and the total score of the 10 items indicated the total score of social support. The score ranges 12–66 points, with higher scores implying a greater level of social support.

Medical Coping Modes Questionnaire (MCMQ)

MCMQ was developed by Feifel et al[35] in 1987. It is a limited coping style scale applicable to participants. Shen Xiaohong et al[36] conducted a sinicization study on the MCMQ scale and reported that the Cronbach's α internal

consistency coefficients of the three subscales (facing, avoiding, and yielding) were 0.69, 0.60, 0.76 and retest reliability was 0.64, 0.85, and 0.67, respectively. The scale comprises 20 items, including three dimensions: facing (8 items), avoiding (7 items), and yielding (5 items). Using a four-level scoring system. Using a four-level scoring system, items 2, 3, 5, 6, 7, 8, 14, 15, 16, 17, and 20 were scored positively, with the score of 1–4 points. On the other hand, items 1, 4, 9, 10, 11, 12, 13, 18, and 19 were scored in reverse, with a score of 4–1.

Materials Collection and Sorting

With the aid of 6 members of our project team, we conducted this study during January–March 2023. In order to facilitate the investigation process and statistical analysis of the survey results, electronic questionnaire survey was conducted, with a 100% recovery rate.

Statistical Analysis

SPSS 26.0 software was used to analyze the statistical data. The countable data were expressed as frequency, percentage, and constituent ratio, whereas normally distributed measurement data were expressed as the mean ±standard deviation (M ±SD). When analyzing the relationship between the demographic characteristics of the elderly in elderly care institutions and sleep quality, single-factor analysis of variance (ANOVA) was employed for multi-group comparison. If the F-value obtained via ANOVA reached the display as a whole, the least significant difference method was employed for multiple comparisons. Furthermore, multivariate logistic regression analysis using Pearson's correlation coefficient (r) was performed to represent the linear correlation between the two variables, with a test level of <0.05.

A structural equation model was established using Amos 26.0 statistical software to analyze the effects of social support, psychological adjustment, and coping styles on the sleep quality of individuals in elderly care institutions. The maximum likelihood (ML) method was applied to test the path coefficients of the model. To determine the presence of moderating effects by testing the significance of interaction terms, the goodness-of-fit (GF) test of the model, $\chi 2$ statistics, normalized $\chi 2$ (CMIN/DF), comparative fit index (CFI), GF index (GFI), adjusted GFI (AGFI), normalized fit index (NFI), and root mean square error approximation (RMSEA) were evaluated to determine the credibility of the model.[37]

Results

Harman Analysis

We used the Haman single-factor method for conducting CMB analysis and conducted an exploratory factor analysis of all questions in the scale. There were 13 factors with eigenvalues of >1. The first factor explained 18.64% of the total variance, which is considerably less than the 40% judgment standard.[38] Therefore, this study does not have a serious CMB and further research is warranted.

Sociodemographic Characteristics and Analysis of the Factors Affecting Sleep Quality

In total, 574 (47.59%) men and 632 (52.41%) women; the average age was 76.79 (8.562) years. (Table 1). Univariate analysis of the sleep quality of elderly individuals in elderly care institutions revealed that education level (F = 3.144, P = 0.016), economic status (F = 9.698, P = 0.000), presence of chronic diseases (F = 5.061, P = 0.007), reason for check-in (F = 9.774, P = 0.007), frequency of communication and exchange with other elderly individuals in elderly care institutions (F = 12.843, P = 0.000), frequency of visits or phone greetings with children or other relatives (F = 3.804, P = 0.011), and participation in elderly care institution activities (F = 9.114, P = 0.011) were the factors resulting in differences in sleep quality among elderly individuals; the differences were statistically significant (P < 0.05; Table 1).

Logistic regression analysis revealed that educational level (odds ratio [OR] = 1.390, P = 0.045, 95% confidence interval [CI]: 1.008–1.917), economic status (OR = 0.431, P = 0.002, 95% CI: 1.345–3.833), number of chronic diseases (OR = 1.166, P = 0.009, 95% CI: 0.706–1.924), and frequency of communication and exchange with other elderly individuals in elderly care institutions (OR = 2.631, P = 0.002, 95% CI: 1.434–4.827) were the factors affecting the sleep quality of elderly individuals in elderly care institutions (Table 2).

Table 1 Sociodemographic Characteristics and ANOVA Analysis of Elderly People in Elderly Care Institutions (n = 1206)

Variables	Items	N (%)	M (SD)	T/F	*P*
Gender	Male	574(47.59%)	8.16(3.483)	1.199	0.232
	Female	632(52.41%)	8.73(3.418)		
Age (years)	60–69	297(25.62%)	7.74(3.758)	1.524	0.220
	70–79	486(40.29%)	8.58(3.250)		
	80–89	397(32.91%)	8.79(3.430)		
	≥90	26(1.18%)	9.02(3.628)		
Educational Level	Never attended school	47(3.89%)	10.50(3.586)	3.144*	0.016
	Primary school	151(12.52%)	9.38(3.522)		
	Middle school	287(23.79%)	9.15(3.543)		
	High school or technical secondary school	439(36.40%)	8.27(3.408)		
	College or above	282(23.40%)	7.53(3.198)		
Ethnicity	Han	1165 (96.60%)	8.34(3.462)	−2.015	0.055
	Minority	41(3.40%)	11.00(2.160)		
Career	Civil servants, employees of enterprises or institutions	258(21.39%)	8.16(3.595)	0.840	0.473
	Worker	673(55.80%)	8.64(3.406)		
	Individual business	157(13.02%)	7.63(3.733)		
	Unemployed personnel	118(9.79%)	8.90(3.059)		
Marital attainment	Unmarried	18(1.49%)	10.00(0.001)	0.475	0.754
	Married (with a surviving spouse)	539(44.69%)	8.33(3.641)		
	Remarriage (with a surviving spouse)	25(2.08%)	10.00(2.944)		
	Divorce	69(5.72%)	7.83(3.271)		
	Bereft of one's spouse	555(46.02%)	8.49(3.383)		
Number of children	Childlessness	53(4.39%)	8.56(4.613)	0.381	0.767
	1	574(47.59%)	8.16(3.059)		
	2	340(28.19%)	8.66(3.507)		
	≥3	239(19.83%)	8.73(4.050)		
Residence before moving into a nursing home	Living Alone	287(23.79%)	9.00(3.657)	1.097	0.351
	Living with a spouse (separate from children or Childlessness)	386(32.01%)	7.86(3.477)		
	Living with spouse and children	217(17.99%)	8.41(3.685)		
	Living with children (separated from spouse or widowed)	316(26.21%)	8.63(3.049)		
Economic situation	Poor	63(5.22%)	10.66(2.668)	9.698*	0.000
	Average	685(56.79%)	9.45(2.685)		
	Good	287(23.79%)	8.55(3.142)		
	Very good	171(14.20%)	7.44(3.568)		
Number of chronic diseases	1	111(9.21%)	6.11(3.125)	5.061*	0.007
	2	293(24.29%)	8.46(3.345)		
	≥3	802(66.50%)	8.74(3.439)		
Time spent in a nursing home, years	<1	198(16.41%)	8.71(3.369)	0.907	0.405
	1–3	691(57.29%)	8.09(3.630)		
	>3	317(26.30%)	8.04(3.539)		
Room type	Single	104(8.62%)	8.17(2.065)	1.049	0.372
	Double	268(22.22%)	8.51(3.474)		
	>3 people/room	720(59.70%)	8.83(3.779)		
	Co-marital housing or suite	114(9.46%)	7.21(3.521)		

(*Continued*)

Table 1 (Continued).

Variables	Items	N (%)	M (SD)	T/F	P
Reason for check-in	No one to take care of at home	479(39.71%)	7.52(3.255)	9.774*	0.000
	Enjoy life in a nursing home	71(5.90%)	6.25(4.731)		
	Poor health requires professional care	656(54.39%)	9.33(3.189)		
Frequency of communication and exchange with other elderly people in elderly care institutions	Never	432(35.82%)	9.36(2.646)	12.843*	0.000
	Occasionally	335(27.78%)	9.23(3.601)		
	Often	439(36.40%)	6.91(3.557)		
Frequency of visits/phone greetings from children or other relatives	Weekly	685(56.79%)	7.91(3.168)	3.804*	0.011
	2–3 weeks	287(23.79%)	8.41(3.594)		
	≥1 month	198(16.41%)	9.83(4.309)		
	Basic or none at all	36(3.01%)	10.03(3.656)		
Participation in elderly care institution activities	Never	385(31.92%)	9.49(3.383)	9.114*	0.000
	Occasionally	383(31.76%)	8.82(2.436)		
	Often	438(36.32%)	7.17(3.456)		

Notes: The calculated values for gender and ethnicity are t-values *$P < 0.05$.

Table 2 Logistic Regression Analysis of Influencing Factors on the Sleep Quality of Elderly People in Elderly Care Institutions

Variables	B	S.E	Wals	P	OR (95% CI)
Intercept	−0.921	1.349	6.465	0.005	
Educational level	0.329	0.164	4.026	0.045	1.390*(1.008~1.917)
Economic situation	−0.841	0.266	10.006	0.002	0.431*(0.256~0.726)
Number of chronic diseases	0.153	0.256	0.359	0.009	1.166*(0.706~1.924)
Reason for check-in	−0.249	0.177	1.980	0.159	0.780(0.551~1.103)
Frequency of communication and exchange with other elderly people in elderly care institutions	0.967	0.310	9.751	0.002	2.631*(1.434~4.827)
Frequency of visits/phone greetings from children or other relatives	−0.048	0.201	0.057	0.811	0.953(0.643~1.412)
Participation in elderly care institution activities	0.062	0.301	0.042	0.837	1.064(0.589~1.921)

Note: *$P < 0.05$.

Correlation Among the Variables

The total average score for the social support of elderly individuals at the elderly care institutions was 27.78 (8.067). Social support was positively correlated with psychological adjustment (r = 0.264, $P < 0.05$) and facing coping styles (r = 0.165, $P < 0.05$), but negatively correlated with avoiding coping styles (r = −0.316, $P < 0.01$), submission (r = −0.485, $P < 0.01$), and sleep quality (r = −0.353, $P < 0$ 0.01).

The total average score for the psychological adjustment of elderlies in elderly care institutions was 70.65 (8.008). Psychological adjustment was positively correlated with facing coping styles (r = 0.176, $P < 0.05$), but negatively correlated with avoidance coping styles (r = −0.213, $P < 0.01$), submission (r = −0.340, $P < 0.01$), and sleep quality (r = −0.300, $P < 0.01$).

The average scores for diverse dimensions of the coping styles of elderly individuals in elderly care institutions were as follows: 18.92 (2.471) for face-to-face, 16.60 (2.686) for avoidance, and 11.58 (1.903) for submission. Face-to-face coping was found to be negatively correlated with sleep quality (r = −0.623, $P <0$ 0.05); on the other hand, both avoidance and submission were positively correlated with sleep quality (r =0 0.577, $P < 0.01$ and r = 0.605, $P < 0.01$, respectively).

The overall average score for the sleep quality of elderlies in elderly care institutions was 8.43 (3.456), with a score >5 indicating poor sleep quality. In the present study, most elderlies in elderly care institutions suffered from poor sleep quality (score >5 points) (127, 61.7%) with an average sleep quality score of 10.72 (1.893) (Table 3).

Table 3 Correlational Analysis of Variables

Items	M (SD)	Social Support	Psychological Adjustment	Confrontation	Avoidance	Acceptance-Resignation	Sleep quality
Social Support	27.78 (8.067)	1.000					
Psychological Adjustment	70.65 (8.008)	0.264*	1.000				
Confrontation	18.92 (2.471)	0.165*	0.176*	1.000			
Avoidance	16.60 (2.686)	−0.316**	−0.213**	0.565**	1.000		
Acceptance-Resignation	11.58 (1.903)	−0.485**	−0.340**	0.461**	0.640*	1.000	
Sleep quality	8.43 (3.456)	−0.353**	−0.300**	−0.623*	0.577**	0.605**	1.000

Note:**P < 0.01, *P < 0.05.

Construction and Revision of the Mesomeric Effect Model for the Variables

The structural equation model was established using Amos 26.0 software and six latent and observable variables of social support; psychological adjustment; facing, avoiding, and yielding coping styles; and sleep quality of elderly individuals in elderly care institutions. The mesomeric effect test revealed that the fit of the model was poor. Using the modification indicators (MI) provided by Amos software as a reference to improve the model, the fixed parameters with the maximum MI values were released and two parameters were modified two times in combination with the expected parameter change to obtain the final model (Figure 1). The fit indicators of the modified model were as follows: CMIN/DF = 2.793 < 3, CFI =0. 941 > 0.9, GFI = 0.936 > 0.9, AGFI = 0.958 > 0.9, NFI = 0.927 > 0.9, and RMSEA = 0.068 < 0.08. The fitting degree of the modified structural equation model was noted to be good.

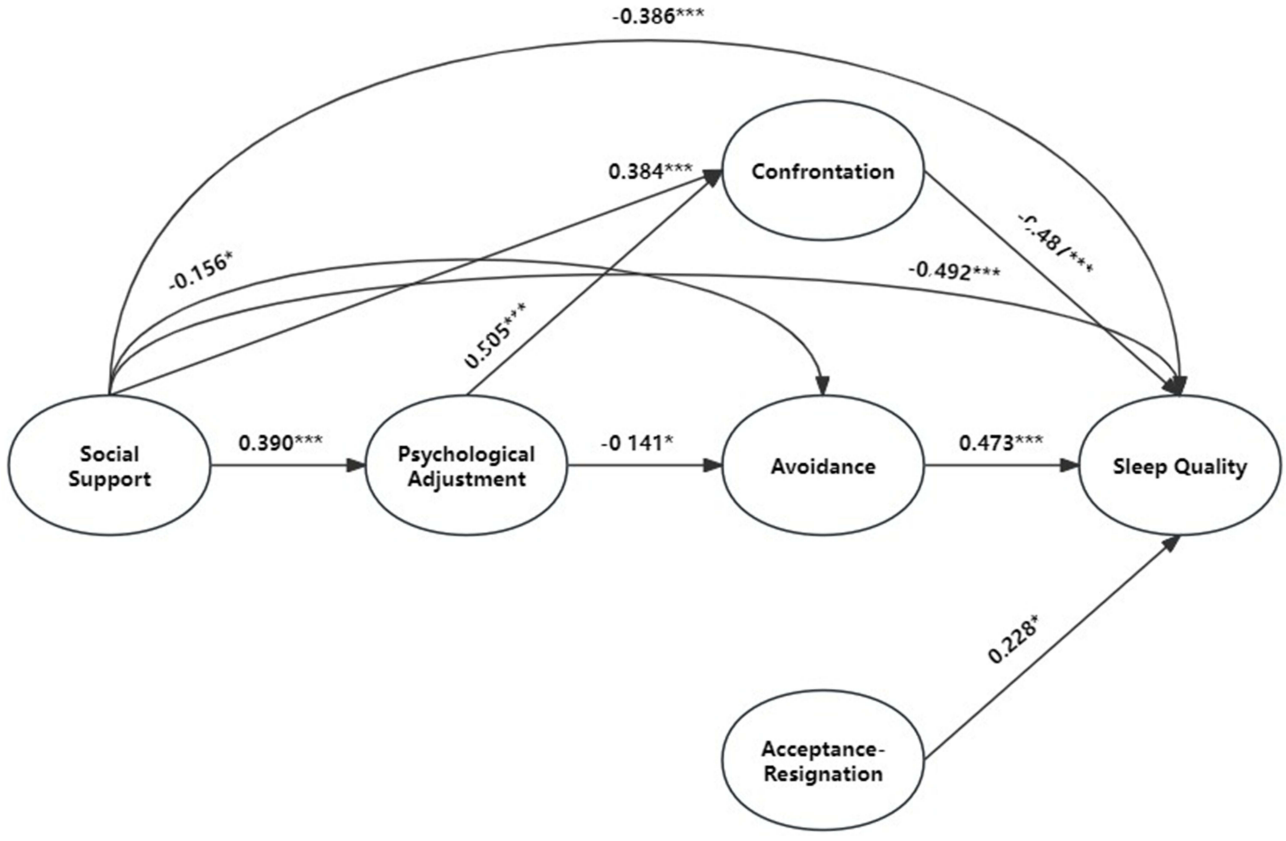

Figure 1 The correlation among social support, psychological adjustment, coping styles, and sleep quality among elderly people in elderly care institutions. (R-square value was 0.18 for the outcome).
Note: *P < 0.05, ***P < 0.001.

Analysis of the Mesomeric Effect Between Social Support and Sleep Quality

Analysis revealed that the social support of elderly individuals in elderly care institutions affected sleep quality via psychological adjustment (B = 1.904, $P < 0.001$, 95% CI = 0.135–0.249) and face-to-face coping styles (B = −0.567, $P < 0.001$, 95% CI = −0.652 to −0.504). Furthermore, the social support of elderly individuals in elderly care institutions affected sleep quality via both psychological adjustment and face-to-face coping style (B = 0.493, $P < 0.001$, 95% CI = 0.050–0.122).

The social support of elderly individuals in elderly care institutions affected sleep quality via psychological adjustment (B = 1.904, $P < 0.001$, 95% CI = 0.135–0.249) and avoidance coping styles (B = 0.458, $P < 0.001$, 95% CI = 0.557–0.730). Furthermore, the social support of elderly individuals in elderly care institutions affected sleep quality via both psychological adjustment and avoidance coping style (B = −0.302, $P < 0.001$, 95% CI = −0.119 to −0.048) (Table 4).

Discussion

Differences in the Sleep Quality of Elderlies with Different Demographic Characteristics in Elderly Care Institutions

We observed that the sleep quality of elderly individuals in elderly care institutions was relatively poor; this finding is consistent with those of other studies.[39–41] However, the higher level of poor sleep quality recorded in our study when compared with the literature may be attributed to the difference in the study areas, cultural habits with respect to sleep, and cognitive levels. We found that the age and education level affected the sleep quality of elderly individuals in elderly care institutions, which is consistent with past reports.[42,43] The results of this study also demonstrated that economic status, chronic diseases, and the reasons for stay can affect the sleep quality of elderly people in elderly care institutions.

If the elderly individual has a low education level, it makes it challenging for them to gain knowledge on sleep via the conventional forms of media such as books and newspapers as well as to undertake effective measures to resolve their life and health problems.[39] Good economic support is an important protective factor for the sleep quality of elderly individuals and exerts a positive promoting effect on sleep.[44] Patients with chronic diseases need to take long-term medication; using various therapeutic drugs can lead to various adverse reactions that can affect the sleep quality of such patients.[45] Furthermore, long-term drug use can increase the economic burden of the elderly, resulting in psychological stress to the elderly and indirectly affecting their sleep quality.[46] Drugs taken for some chronic diseases such as cardiovascular diseases exert diuretic effects, increasing the number of nocturnal urinations of the elderly and easily decreasing their sleep quality.[47] Elderly individuals who actively choose to live in elderly care institutions do not have negative emotions and irrational perceptions such as “being abandoned or unwanted by their children”. Therefore, they can gradually cultivate their interests and hobbies in institutional life and have a high level of psychological adjustment.[48,49] The number of friends and interpersonal relationships with other elderly individuals and the frequency of communication can affect the mood of elderly individuals in elderly care institutions, thereby affecting their sleep quality.[50] Moreover, spiritual relationships, care, and material assistance from families and children can increase the positive emotions of elderly individuals, allowing them to experience a sense of belonging and security, thereby improving their sleep quality.[51–53] Elderly individuals who participate in leisure and physical exercise activities have better sleep quality than those who do not participate in activities.[54]

Table 4 The Chain-Mediating Effect Among Social Support, Psychological Adjustment, Coping Styles, and Sleep Quality of Elderly People in Elderly Care Institutions

Route	B	SE	95% CI Confidence interval
Social Support→Psychological Adjustment→Sleep Quality	1.904	0.038***	0.135~0.249
Social Support→Confrontation→Sleep Quality	−0.567	0.083***	−0.652~-0.504
Social Support→Avoidance→Sleep Quality	0.458	0.079***	0.557~0.730
Social Support→Psychological Adjustment→Confrontation→Sleep Quality	0.493	0.046***	0.050~0.122
Social Support→Psychological Adjustment→Avoidance→Sleep Quality	−0.302	0.035***	−0.119~-0.048

Note: ***$P < 0.001$.

Chain-Mediating Effect of Psychological Adjustment and Coping Styles between the Social Support and Sleep Quality of Individuals in Elderly Care Institutions

This research on psychological adjustment and coping styles showed a chain-mediating effect on the social support and sleep quality of elderly individuals in elderly care institutions, which concurs with other past reports.[55,56] Therefore, the social support and psychological adjustment levels of elderly individuals in elderly care institutions can be improved, thereby increasing their ability to respond positively, decreasing negative avoidance, and ultimately improving their sleep quality.[57,58]

Moreover, psychological adjustment and coping styles play a mediating role between the social support and sleep quality of elderly individuals in elderly care institutions, as also reported previously.[59–61] When developing strategies to improve the sleep quality of elderly individuals in elderly care institutions or implementing specific measures, psychological adjustment, and coping styles should be considered as important influencing factors.

The sleep quality of elderly individuals can be improved by increasing entertainment activities, enriching their daily lives, satisfying their spiritual lives,[62] decreasing their sense of loneliness, and stimulating them to develop positive coping styles. Positive coping styles and psychological adjustment levels play mediating roles in the social support and sleep quality of elderly individuals. By improving the social support level of elderly individuals and helping them adopt positive coping styles to face life difficulties,[63] better psychological health can be achieved and they can enjoy their lives and improve their sleep quality. Studies on psychological and behavioral interventions for elderly patients with insomnia have reported that psychological adjustment and coping styles have a sequential mediating effect on the impact of social support on the sleep quality of individuals in elderly care institutions.[64] Strengthening the social support system for elderly individuals, improving their anxiety and depression, and decreasing their negative coping styles and dependency on hypnotic drugs play important driving roles in improving their sleep quality. Ma et al[65] investigated the prevalence of insomnia among elderly individuals and reported that social support can enrich the information sources of elderly individuals and provide a buffer to decrease the negative effects of psychological stress on their sleep quality, thereby increasing the availability of information on health-related behaviors (including healthy sleep habits).

Limitations and Future Research Ideas

The present research findings have a limited scope of inference, as it is confounded by potential selective bias and hence does not entirely represent all elderly populations at elderly care institutions. In subsequent studies, we plan to include more numbers of regions and institutions, expand the current sample size and scope, and minimize the effects of regional and population differences on the study results. Moreover, data collection of sleep indicators was conducted by evaluating a combination of scales, human observation, and self-reporting. Owing to the limitations of study conditions, objective sleep indicators such as sleep polysomnography and activity recording equipment were not selected. In future studies, we plan to use a combination of subjective and objective sleep indicators to obtain more accurate sleep data.

Conclusion

Our results indicate that psychological adjustment and coping styles have a chain-mediating effect between social support and sleep quality of elderlies in northeast China's elderly care institutions. The present findings can facilitate the development of an improvement plan for the sleep quality of elderly individuals in elderly care institutions that can be easily implemented by medical staff and psychotherapists at the institution with a targeted approach. Adopting this approach is critical to improving the sleep quality of elderly individuals and their quality of life in later years.

Abbreviations

SGSQ, Self-made General Situation Questionnaire; PSQI, Pittsburgh sleep quality index; NHAS, The Nursing Home Adjustment Scale; SSRS, Social Support Revalued Scale; MCMQ, Medical Coping Modes Questionnaire; CFI, Comparative Fit Index; GFI, Goodness of Fit Index; AGFI, Adjusted Goodness of Fit Index; NFI, Normed Fit Index; RMSEA, Root Mean Square Error Approximation; CMB, Common Method Bias.

Data Sharing Statement

All data generated or analyzed during this study are included in this published article.

Ethics Approval and Informed Consent

The present cross-sectional questionnaire survey study was approved by the Ethics Review Committee of DongShin University, Korea (No. 1040708-202212-SB-047) and has been performed in accordance with the ethical standards laid down in an appropriate version of the Declaration of Helsinki.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare that there is no conflict of interest in this work.

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