Journal of Multidisciplinary Healthcare

Dovepress
Taylor & Francis Group

Open Access Full Text Article

ORIGINAL RESEARCH

Knowledge, Attitude, and Practice Toward Spinal Cord Tumors Among Patients and Their Families in Beijing: A Cross-Sectional Study

Longqi Liu, Yibing Su, Liang Shi

Beijing Jishuitan Hospital, Capital Medical University, Beijing, 100035, People's Republic of China

Correspondence: Yibing Su, Beijing Jishuitan Hospital, Capital Medical University, Beijing, 100035, People's Republic of China, Tel +8615011001024, Email jstshiliang@126.com

Background: This study aimed to investigate the knowledge, attitude, and practice (KAP) regarding spinal cord tumors among both patients and their family members.

Methods: A cross-sectional survey was conducted at the Department of Neurosurgery, Beijing Jishuitan Hospital, between August 1, 2023, and January 31, 2024 using a self-designed questionnaire.

Results: A total of 489 valid questionnaires were analyzed, including 219 (44.79%) from patients. The mean knowledge, attitude, and practice scores were 11.09 ± 6.64 (possible range: 0–28), 18.61 ± 1.92 (possible range: 6–30), and 33.58 ± 4.34 (possible range: 8–40), respectively. Multivariate logistic regression analysis revealed that urban residency (OR = 1.904, 95% CI: 1.113–3.314, P = 0.020) and higher monthly per capita income (OR = 3.779, 95% CI: 1.697–8.599, P = 0.001) were independent predictors of proactive practice. Path analysis demonstrated that knowledge (β = 0.11, P < 0.001), monthly per capita income (β = 1.15, P < 0.001), and marital status (β = −0.93, P = 0.039) directly influenced practice behaviors.

Conclusion: Patients and their families demonstrated suboptimal knowledge, negative attitude and proactive practice towards spinal cord tumors. Efforts should be made to enhance education and awareness programs targeting both patients and their families for improving knowledge and fostering positive attitudes.

Keywords: knowledge, attitude and practice, spinal cord tumor, patient, family member, cross-sectional study

Introduction

Spinal tumors originate within the spinal cord or its adjacent tissues, presenting considerable challenges for neurosurgical treatment due to their intricate nature.[1] These tumors are anatomically classified based on their location relative to the dura mater, the protective membrane enveloping the spinal cord. They are categorized as epidural spinal cord tumors (located outside the dura mater), intradural extramedullary tumors (situated inside the dura mater but outside the spinal cord), and intramedullary spinal cord tumors (found within the spinal cord itself).[2] The proliferation of these tumors compresses nearby nerve tissues, leading to sensory disruptions, pain, and movement disorders. Within the broader context of the central nervous system, primary spinal cord tumors represent a relatively rare yet significant subset, comprising 4–8% of all central nervous system (CNS) tumors.[3] Among these, ependymomas are the most frequently occurring primary spinal cord tumors in adults, with astrocytoma's following in prevalence.[4] Malignant forms of these tumors account for about 22% of primary spinal cord tumors.[5] However, spinal cord tumors generally show limited responsiveness to chemotherapy or radiation therapy, often necessitating surgical removal as the primary treatment strategy.[6]

Studies have shown that patient education and family involvement contribute significantly to surgical outcomes. Adequately informed patients demonstrate improved adherence to treatment plans,[7] while family engagement has been associated with enhanced recovery outcomes. Additionally, comprehensive preoperative education has been linked to reduced anxiety levels and improved postoperative compliance.[8] Due to the complexity and risks associated with surgical treatment of spinal cord tumors, it

Received: 5 November 2024
Accepted: 13 February 2025
Published: 25 February 2025

is crucial for patients and their family members to have an in-depth understanding of these procedures. This includes awareness of the specific steps involved in the surgery, the potential intraoperative risks such as spinal cord injury or bleeding, and the realistic expectations regarding recovery time and potential outcomes. This includes awareness of intraoperative risks, such as spinal cord injury or bleeding, and an understanding of recovery steps to foster realistic expectations.[9]

The "Knowledge-Attitude-Belief Practice (KABP)" framework is an influential behavioral theory that delineates the transformation of human health behavior through three interconnected stages: the acquisition of knowledge, the formation of beliefs, and the establishment of behaviors. Knowledge refers to the understanding of spinal tumor symptoms, diagnostic methods, and treatment strategies. For example, patients who are familiar with the potential symptoms such as back pain or sensory disruptions may seek medical attention more promptly. Attitudes encompass feelings or beliefs about surgical intervention, which can vary from positive (eg, hopeful, trusting in treatment efficacy) to negative (eg, anxious or fearful of complications). Practices represent health-related actions, such as seeking timely medical care, adhering to treatment plans, engaging in postoperative rehabilitation, and regularly attending follow-up appointments.[10,11]

The complexity of spinal cord tumors, characterized by their diverse types, symptoms, and treatment options, imposes significant decision-making and adaptive challenges on patients and their families. Despite the critical importance of addressing the unique needs of this population, there has been a noticeable lack of research focusing on the Knowledge, Attitude, and Practice (KAP) specific to spinal cord tumors. Thus, this study aimed to address this gap by investigating the KAP regarding spinal cord tumors among both patients and their family members.

Methods

Study Design and Participants

This cross-sectional study was conducted between August 1, 2023, and January 31, 2024, at the Department of Neurosurgery, Beijing Jishuitan Hospital, Capital Medical University. The inclusion criteria for patients were: 1) aged 18 to 80 years; 2) diagnosed with spinal cord tumors through imaging examinations and postoperative pathological analysis; 3) scheduled to undergo or underwent surgery for spinal cord tumors; 4) hospitalized patients. Those did not agree to participate or were unable to comprehend the questionnaire were excluded. Regarding family member selection, the attending physician communicated directly with the family members, explaining the purpose of the study and obtaining informed consent before the family member participated in the survey. The selection of family members followed a hierarchical order: first prioritizing spouses, then children or parents, and finally other relatives or friends. Each patient was asked to designate one primary family member to participate in the study, ensuring that only one family member per patient was included to avoid duplicate or conflicting data. Family members who were unable to understand the questionnaire or unwilling to participate were excluded. The study enrolled patients diagnosed with spinal cord tumors along with their respective family members. Ethical approval for the study was obtained from the Ethics Committee of Beijing Jishuitan Hospital, Capital Medical University, and informed consent was obtained from all participants.

Questionnaire Introduction

The development of the questionnaire drew upon existing literature.[12,13] Initial questionnaire drafting was followed by soliciting feedback from three experienced chief neurosurgeons specializing in spinal cord and spinal nerve surgery, which led to subsequent modifications. To further enhance the questionnaire's validity and content relevance, it was reviewed by six experts: three neurosurgeons (one chief physician with 30 years of experience and two associate chief physicians with 15 years of experience), two neurologists (both associate chief physicians with 12 years of experience), and one rehabilitation physician (an attending physician with 10 years of experience). These experts provided valuable insights, assessing the content relevance and appropriateness of the questions for the study's goals. A preliminary pilot test, involving the distribution of 32 copies on a small scale, was then conducted to assess reliability, resulting in a reliability coefficient of 0.907. The final questionnaire, administered in Chinese, comprised data collection across four dimensions. The first dimension encompassed basic demographic information, including gender, age, education level, and employment status, among others. The knowledge dimension consisted of 14 items, while the attitude dimension included 6 items, and the practice dimension comprised 8 items. Scores were assigned for statistical analysis based on response options for each item. In the knowledge dimension, responses of "very familiar", "heard of", and

"unclear" were assigned values of 2, 1, and 0, respectively, resulting in scores ranging from 0 to 28 points. The attitude dimension primarily employed a five-point Likert scale, ranging from "very positive" (5 points) to "very negative" (1 point), yielding scores ranging from 6 to 30 points. Similarly, the practice dimension utilized a five-point Likert scale, with scores ranging from 8 to 40. Adequate knowledge, positive attitude, and proactive practice were indicated by scores exceeding 70% of the maximum in each section.[14]

Questionnaire Distribution and Quality Control

The included spinal cord tumors patients were systematically approached to complete the questionnaire prior to discharge. Each patient was asked to complete the questionnaire independently to ensure data quality.

Statistical Analysis

Data analysis was carried out using Stata 14.0 (Stata Corporation, College Station, TX, USA). Continuous variables are presented as means and standard deviations (SD), while categorical variables are expressed as n (%). Normality tests were conducted for continuous variables, and the *t*-test or Wilcoxon Mann–Whitney test was applied for comparisons between two groups, depending on the distribution of the data. For comparisons involving three or more groups with normally distributed continuous variables and uniform variance, ANOVA was used, whereas the Kruskal–Wallis test was utilized for skewed data. Univariate and multivariate logistic regression analyses were performed to explore the risk factors associated with knowledge, attitude, and practice, using 70% of the total score as the cut-off value. Path analysis was employed to investigate the relationships between baseline characteristics with statistical differences and KAP. A significance level of $p < 0.05$ (two-sided) was considered statistically significant in this study.

Results

Initially, 500 questionnaires were collected, and 11 questionnaires with respondents under the age of 18 were excluded, resulting in 489 valid questionnaires, achieving a validity rate of 97.8%. Among these, 219 (44.79%) respondents were patients themselves, while 266 (54.40%) were females, with a mean age of 45.27 ± 13.09 years. Additionally, 340 (69.53%) respondents resided in urban areas, and 277 (56.65%) were employed full-time. The most prevalent types of tumors reported were neurinoma (179 cases, 36.61%) and meningioma (120 cases, 24.54%). The mean knowledge, attitude, and practice scores were 11.09 ± 6.64 (possible range: 0–28), 18.61 ± 1.92 (possible range: 6–30), and 33.58 ± 4.34 (possible range: 8–40), respectively. Differences in knowledge scores were associated with varying monthly per capita incomes ($P = 0.046$), while differences in attitude scores were linked to different types of illness ($P = 0.023$). Moreover, disparities in practice scores were observed among participants based on their residence ($P = 0.002$), education ($P < 0.001$), occupation type ($P < 0.001$), employment status ($P = 0.002$), monthly per capita income ($P < 0.001$), marital status ($P = 0.002$), and type of illness ($P = 0.005$). Furthermore, significant differences were found between patients and their families, with patients exhibiting higher attitude scores ($P < 0.001$) and families demonstrating higher practice scores ($P < 0.001$) (Table 1).

Responses on the knowledge dimension showed that around 10% of participants choose option "Very familiar", indicating that only a small proportion of the participants were proficient in the relevant knowledge. Apart from this, the question with the highest number of participants choosing the option "Heard of" were

> Spinal tumors, also known as intraspinal tumors, encompass primary or secondary tumors that occur within the spinal cord itself or in various adjacent tissues within the spinal canal (such as nerve roots, meninges, etc.). (K1)

With 63.19%. While the question with the highest number of participants choosing the option "Unclear" were

> Laminectomy utilizes the gap between the vertebral bodies to remove the lower edge of the upper vertebral body and the upper edge of the lower vertebral body, creating a small "window" for surgery. Compared to traditional surgery, it preserves the ligamentous structure of the spine, retains the small joint structure between the vertebral bodies, and maximally preserves the integrity of the posterior vertebral structure, ensuring postoperative spinal stability. (K12)

With 49.08% (Supplementary Table 1).

https://doi.org/10.2147/JMDH.S504886

Table 1 Baseline Characteristics of Survey Participants and KAP Scores

Variables	N (%)	Knowledge		Attitude		Practice	
		Score	P	Score	P	Score	P
Total	489 (100)	11.09 ± 6.64		18.61 ± 1.92		33.58 ± 4.34	
Gender			0.401		0.862		0.840
Male	223 (45.60)	10.67 ± 6.22		18.58 ± 1.97		33.84 ± 3.86	
Female	266 (54.40)	11.44 ± 6.96		18.62 ± 1.87		33.36 ± 4.70	
Age, years	45.27 ± 13.09						
Residence			0.125		0.816		**0.002**
Rural	120 (24.54)	10.42 ± 6.88		18.73 ± 2.07		32.43 ± 4.89	
Urban	340 (69.53)	11.32 ± 6.57		18.58 ± 1.87		34.08 ± 3.98	
Suburban	29 (5.93)	11.17 ± 6.48		18.38 ± 1.82		32.52 ± 5.00	
Education			0.272		0.686		**<0.001**
Junior high school and below	101 (20.65)	11.23 ± 8.18		18.90 ± 2.44		31.67 ± 5.27	
High school/technical school	86 (17.59)	11.14 ± 5.83		18.56 ± 1.50		33.05 ± 4.01	
College	93 (19.02)	11.26 ± 5.58		18.57 ± 1.75		33.75 ± 4.46	
Bachelor's degree	148 (30.27)	11.55 ± 5.94		18.58 ± 1.98		34.39 ± 3.36	
Master's degree and above	61 (12.47)	9.41 ± 7.80		18.30 ± 1.49		35.26 ± 3.89	
Occupation type			0.744		0.131		**<0.001**
Professional and technical personnel (teachers, doctors, engineers, writers)	110 (22.49)	11.25 ± 6.90		18.85 ± 2.13		33.96 ± 4.04	
General staff and related personnel	148 (30.27)	10.84 ± 5.80		18.31 ± 1.60		34.62 ± 3.76	
Business and service personnel	39 (7.98)	12.10 ± 6.85		18.13 ± 1.45		34.23 ± 3.54	
Agricultural, forestry, animal husbandry, fishery, and water conservancy production personnel	59 (12.07)	11.19 ± 6.50		18.76 ± 2.45		32.68 ± 3.95	
Others	133 (27.20)	10.89 ± 7.31		18.80 ± 1.87		32.31 ± 5.15	
Employment status			0.119		0.646		**0.002**
Full-time	277 (56.65)	11.12 ± 6.55		18.57 ± 1.76		34.26 ± 3.96	
Part-time/Self-employed/Freelancer	79 (16.16)	12.15 ± 6.87		18.72 ± 2.65		32.61 ± 4.98	
Retired	82 (16.77)	9.707 ± 5.34		18.78 ± 1.99		32.87 ± 4.12	
Other	51 (10.43)	11.53 ± 8.245		18.33 ± 1.16		32.55 ± 5.04	
Monthly Per Capita Income, RMB			**0.046**		0.603		**<0.001**
2000–5000	126 (25.77)	11.01 ± 7.64		18.87 ± 2.24		31.29 ± 5.50	
5000–10,000	147 (30.06)	11.41 ± 5.98		18.61 ± 1.98		33.44 ± 3.57	
10,000–20,000	154 (31.49)	10.15 ± 6.51		18.46 ± 1.79		34.79 ± 3.23	
>20,000	62 (12.68)	12.84 ± 5.92		18.42 ± 1.21		35.56 ± 3.68	
Marital Status			0.425		0.454		**0.002**
Single	63 (12.88)	12.02 ± 6.07		18.44 ± 2.01		35.17 ± 3.95	
Married	397 (81.19)	10.85 ± 6.56		18.64 ± 1.94		33.40 ± 4.34	
Divorced/Widowed	29 (5.93)	12.34 ± 8.52		18.52 ± 1.33		32.55 ± 4.48	

Basic Diseases							
Diabetes			0.100		0.516		0.226
No	410 (83.84)	11.30 ± 6.86		18.65 ± 1.95		33.62 ± 4.56	
Yes	79 (16.16)	10.03 ± 5.25		18.37 ± 1.74		33.35 ± 2.95	
Hypertension			0.077		0.059		0.383
No	350 (71.57)	11.43 ± 6.89		18.75 ± 2.07		33.59 ± 4.68	
Yes	139 (28.43)	10.24 ± 5.89		18.25 ± 1.42		33.56 ± 3.38	
Kidney disease			0.347		0.233		0.421
No	482 (98.57)	11.11 ± 6.61		18.62 ± 1.92		33.61 ± 4.32	
Yes	7 (1.43)	10.00 ± 8.64		17.86 ± 1.35		31.57 ± 5.68	
Medical insurance type			0.576		0.562		0.542
No	5 (1.02)	10.20 ± 11.45		18.20 ± 1.10		31.80 ± 6.42	
Yes	484 (98.98)	11.10 ± 6.59		18.61 ± 1.92		33.60 ± 4.32	
Identity			0.067		**<0.001**		**<0.001**
Patient	219 (44.79)	11.79 ± 6.63		18.96 ± 2.10		32.90 ± 4.32	
Family member	270 (55.21)	10.53 ± 6.60		18.31 ± 1.70		34.13 ± 4.29	
Type of Affliction			0.108		**0.023**		**0.005**
Neurinoma	179 (36.61)	11.22 ± 6.60		18.45 ± 1.67		33.57 ± 4.21	
Meningioma	120 (24.54)	10.89 ± 6.23		18.49 ± 1.60		34.23 ± 3.56	
Ependymoma	34 (6.95)	9.118 ± 7.15		18.74 ± 2.27		33.68 ± 3.25	
Astrocytoma	12 (2.45)	7.417 ± 4.94		18.08 ± 1.08		36.42 ± 3.68	
Teratoma (or congenital tumor)	42 (8.59)	13.67 ± 6.87		18.98 ± 2.36		32.88 ± 4.97	
Hemangioma	17 (3.48)	9.941 ± 8.72		17.65 ± 1.27		36.12 ± 3.89	
Others	85 (17.38)	11.36 ± 6.37		19.12 ± 2.45		32.08 ± 5.25	

Notes: The bolded values represent P-values less than 0.05, indicating statistically significant differences.

https://doi.org/10.2147/JMDH.S504886

Responses to the attitude dimension showed that 62.99% agreed that knowing the preoperative qualitative and localization diagnosis of the spinal cord tumor had given them more confidence in the success of the operation (A4), and 59.51% had great trust in the doctor and were very willing to cooperate actively with the examinations and treatments (A6). However, 60.12% said that although they believed the treatment could help them get through the difficult time, they were still very worried (A1) (Supplementary Table 2).

When it comes to related practices, 50.10% always pay close attention to symptomatic changes and seek medical help (P8), and 48.88% always follow the doctor's advice to carefully cooperate with the treatment plan and rehabilitation process (P2). Moreover, 45.40% often sought support and understanding from friends, family or professionals to remain hopeful and optimistic (P6), as well as 42.94% often sought information about spinal cord tumors to better understand the disease and treatment options (P1) (Supplementary Table 3).

Multivariate logistic regression showed that lived in urban (OR = 1.904, 95% CI: [1.113–3.314], P = 0.020) was independently associated with good knowledge (Table 2). Additionally, univariate analysis showed that as a family member of a patient (OR = 0.550, 95% CI: [0.381–0.791], P = 0.001) was independently associated with negative attitude (Table 3). Meanwhile, with monthly per capita income of more than 20000 Yuan (OR = 3.779, 95% CI: [1.697–8.599], P = 0.001) was independently associated with proactive practice (Table 4).

Table 2 Analysis of Factors Influencing Good Knowledge

Variables	Univariate Analysis			Multivariate Analysis		
	OR	95% CI	P	OR	95% CI	P
Gender						
Male	Ref.					
Female	1.203	0.834–1.739	0.324	0.989	0.970–1.008	0.257
Age	0.980	0.965–0.994	0.005			
Residence						
Rural	Ref.			Ref.		
Urban	1.721	1.106–2.720	0.018	1.904	1.113–3.314	0.020
Suburban	1.484	0.622–3.431	0.361	1.795	0.731–4.299	0.192
Education						
Junior high school and below	Ref.					
High school/technical school	0.759	0.411–1.389	0.373			
College	1.197	0.673–2.134	0.540			
Bachelor's degree	1.099	0.655–1.855	0.722			
Master's degree and above	1.075	0.557–2.063	0.827			
Occupation type						
Professional and technical personnel (teachers, doctors, engineers, writers)	Ref.					
General staff and related personnel	1.043	0.629–1.736	0.870			
Business and service personnel	1.388	0.660–2.906	0.384			
Agricultural, forestry, animal husbandry, fishery, and water conservancy production personnel	0.830	0.424–1.600	0.582			
Other	0.944	0.560–1.594	0.830			
Employment status						
Full-time	Ref.			Ref.		
Part-time/Self-employed/Freelancer	1.011	0.605–1.674	0.968	1.490	0.840–2.649	0.172
Retired	0.485	0.275–0.829	0.010	0.742	0.360–1.510	0.414
Other	0.768	0.406–1.417	0.406	0.947	0.465–1.896	0.878
Monthly Per Capita Income						
2000–5000	Ref.			Ref.		
5000–10,000	0.928	0.563–1.531	0.769	0.886	0.505–1.552	0.671
10,000–20,000	1.118	0.687–1.826	0.655	0.862	0.478–1.556	0.622
>20,000	2.048	1.107–3.820	0.023	1.535	0.753–3.145	0.239

(*Continued*)

Table 2 (Continued).

Variables	Univariate Analysis			Multivariate Analysis		
	OR	95% CI	P	OR	95% CI	P
Marital Status						
Single	Ref.					
Married	0.751	0.440–1.292	0.296			
Divorced/Widowed	0.658	0.257–1.617	0.369			
Basic Diseases						
Diabetes						
No	Ref.			Ref.		
Yes	0.493	0.280–0.837	0.011	0.690	0.372–1.246	0.227
Hypertension						
No	Ref.					
Yes	0.670	0.439–1.012	0.060			
Kidney disease						
No	Ref.					
Yes	0.265	0.014–1.569	0.221			
Medical insurance type						
No	Ref.					
Yes	0.928	0.152–7.095	0.935			
Identity						
Patient	Ref.					
Family member	0.776	0.538–1.120	0.175			

Table 3 Analysis of Factors Influencing Positive Attitude

Variables	Univariate Analysis		
	OR	95% CI	P
Knowledge	0.992	0.965–1.019	0.570
Gender			
Male	Ref.		
Female	1.078	0.751–1.550	0.684
Age	1.004	0.990–1.018	0.608
Residence			
Rural	Ref.		
Urban	0.936	0.615–1.430	0.757
Suburban	0.712	0.296–1.633	0.432
Education			
Junior high school and below	Ref.		
High school/technical school	0.889	0.495–1.592	0.692
College	0.895	0.505–1.584	0.703
Bachelor's degree	0.960	0.576–1.603	0.876
Master's degree and above	0.632	0.322–1.218	0.175
Occupation type			
Professional and technical personnel (teachers, doctors, engineers, writers)	Ref.		
General staff and related personnel	0.825	0.500–1.361	0.451
Business and service personnel	0.622	0.283–1.319	0.224
Agricultural, forestry, animal husbandry, fishery, and water conservancy production personnel	0.740	0.384–1.408	0.363
Other	0.934	0.561–1.555	0.792

(*Continued*)

https://doi.org/10.2147/JMDH.S504886

Table 3 (Continued).

Variables	Univariate Analysis		
	OR	95% CI	P
Employment status			
Full-time	Ref.		
Part-time/Self-employed/Freelancer	1.057	0.633–1.751	0.831
Retired	1.473	0.897–2.421	0.125
Other	0.557	0.280–1.057	0.083
Monthly Per Capita Income			
2000–5000	Ref.		
5000–10,000	1.239	0.765–2.011	0.385
10,000–20,000	1.081	0.669–1.749	0.751
>20,000	0.724	0.376–1.363	0.323
Marital Status			
Single	Ref.		
Married	1.482	0.856–2.638	0.168
Divorced/Widowed	1.053	0.407–2.637	0.914
Basic Diseases			
Diabetes			
No	Ref.		
Yes	1.419	0.873–2.303	0.156
Hypertension			
No	Ref.		
Yes	0.749	0.497–1.121	0.163
Kidney disease			
No	Ref.		
Yes	0.574	0.082–2.691	0.509
Medical insurance type			
No	Ref.		
Yes	2.793	0.409–54.856	0.360
Identity			
Patient	Ref.		
Family member	0.550	0.381–0.791	0.001

Table 4 Analysis of Factors Influencing Proactive Practice

Variables	Univariate Analysis			Multivariate Analysis		
	OR	95% CI	P	OR	95% CI	P
Knowledge	1.023	0.994–1.052	0.117			
Attitude	1.015	0.920–1.118	0.762			
Gender						
Male	Ref.					
Female	1.137	0.782–1.656	0.502			
Age	0.973	0.958–0.987	<0.001	0.985	0.959–1.010	0.239
Residence						
Rural	Ref.			Ref.		
Urban	1.702	1.084–2.726	0.023	1.133	0.581–2.222	0.715
Suburban	1.048	0.402–2.529	0.920	0.946	0.332–2.518	0.914

(*Continued*)

Table 4 (Continued).

Variables	Univariate Analysis			Multivariate Analysis		
	OR	95% CI	P	OR	95% CI	P
Education						
Junior high school and below	Ref.			Ref.		
High school/technical school	1.177	0.611–2.265	0.625	0.892	0.418–1.894	0.766
College	1.834	0.994–3.425	0.054	1.009	0.438–2.327	0.983
Bachelor's degree	1.798	1.033–3.188	0.041	0.698	0.281–1.739	0.439
Master's degree and above	3.141	1.609–6.234	0.001	0.698	0.230–2.106	0.524
Occupation type						
Professional and technical personnel (teachers, doctors, engineers, writers)	Ref.			Ref.		
General staff and related personnel	1.123	0.680–1.863	0.651	1.027	0.592–1.786	0.924
Business and service personnel	0.974	0.453–2.048	0.945	1.237	0.522–2.895	0.625
Agricultural, forestry, animal husbandry, fishery, and water conservancy production personnel	0.440	0.207–0.891	0.027	0.791	0.302–2.010	0.627
Other	0.601	0.349–1.028	0.064	0.752	0.357–1.568	0.450
Employment status						
Full-time	Ref.			Ref.		
Part-time/Self-employed/Freelancer	0.653	0.376–1.105	0.119	1.017	0.523–1.961	0.960
Retired	0.451	0.250–0.782	0.006	0.955	0.419–2.146	0.912
Other	0.684	0.353–1.276	0.243	1.120	0.472–2.626	0.795
Monthly Per Capita Income						
2000–5000	Ref.			Ref.		
5000–10,000	0.881	0.508–1.529	0.650	0.855	0.446–1.645	0.638
10,000–20,000	2.058	1.243–3.453	0.006	1.808	0.929–3.573	0.084
>20,000	4.171	2.208–8.038	<0.001	3.779	1.697–8.599	0.001
Marital Status						
Single	Ref.			Ref.		
Married	0.503	0.293–0.861	0.012	0.582	0.289–1.168	0.128
Divorced/Widowed	0.465	0.177–1.152	0.106	0.766	0.239–2.374	0.648
Basic Diseases						
Diabetes						
No	Ref.			Ref.		
Yes	0.543	0.305–0.929	0.031	0.881	0.458–1.652	0.698
Hypertension						
No	Ref.					
Yes	0.684	0.443–1.041	0.081			
Kidney disease						
No	Ref.					
Yes	0.748	0.106–3.509	0.730			
Medical insurance type						
No	Ref.					
Yes	0.797	0.131–6.098	0.805			
Identity						
Patient	Ref.			Ref.		
Family member	1.754	1.199–2.580	0.004	1.398	0.914–2.144	0.123

https://doi.org/10.2147/JMDH.S504886

Table 5 Path Analysis

Model Paths		Total effects		Direct Effect		Indirect Effect	
		β (95% CI)	P	β (95% CI)	P	β (95% CI)	P
Asum <-							
	Ksum	0.016(−0.00,0.04)	0.196	0.01(−0.008,0.04)	0.196	—	—
	Disease Type	0.07(0.005,0.15)	0.035	0.07(0.005,0.15)	**0.035**	—	—
	Monthly Per Capita Income	0.002(−0.00,0.01)	0.604	—	—	0.002(−0.00,0.01)	0.604
	Relationship with Patient	−0.61(−0.94, −0.27)	<0.001	−0.61(−0.94, −0.27)	**<0.001**	—	—
Psum <-							
	Asum	0.02(−0.15,0.21)	0.773	0.02(−0.15,0.21)	0.773		
	Ksum	0.11(0.06,0.16)	<0.001	0.11(0.062,0.16)	**<0.001**	0.0004(−0.0002,0.001)	0.196
	Disease Type	−0.11(−0.26,0.04)	0.168	−0.11(−0.27,0.04)	0.161	0.002(−0.01,0.01)	0.775
	Education	0.28(−0.11,0.69)	0.164	0.28(−0.1,0.69)	0.164	—	—
	Residence	−0.22(−0.98,0.53)	0.559	−0.22(−0.98,0.53)	0.559	—	—
	Job	−0.05(−0.36,0.24)	0.702	−0.05(−0.36,0.24)	0.702	—	—
	Work_status	0.07(−0.33,0.48)	0.712	0.07(−0.33,0.48)	0.712	—	—
	Monthly Per Capita Income	1.17(0.721,1.62)	<0.001	1.15(0.70,1.60)	**<0.001**	0.019(−0.04,0.08)	0.574
	Relationship with Patient	0.67(−0.05,1.41)	0.069	0.69(−0.04,1.43)	0.065	−0.01(−0.13,0.09)	0.774
	Marital	−0.93(−1.81, −0.04)	0.039	−0.93(−1.81, −0.04)	**0.039**		
Ksum <-							
	Monthly Per Capita Income	0.17(−0.42,0.76)	0.571	0.171(−0.42,0.76)	0.571	—	—

Notes: The bolded values represent P-values less than 0.05, indicating statistically significant differences.

Path analysis results showed that the type of disease (β = 0.07, P = 0.035) and relationship with the patient (β = −0.61, P < 0.001) directly affected attitude. Knowledge (β = 0.11, P < 0.001), monthly per capita income (β = 1.15, P < 0.001) and marital status (β = −0.93, P = 0.039) directly affected practice (Table 5 and Figure 1).

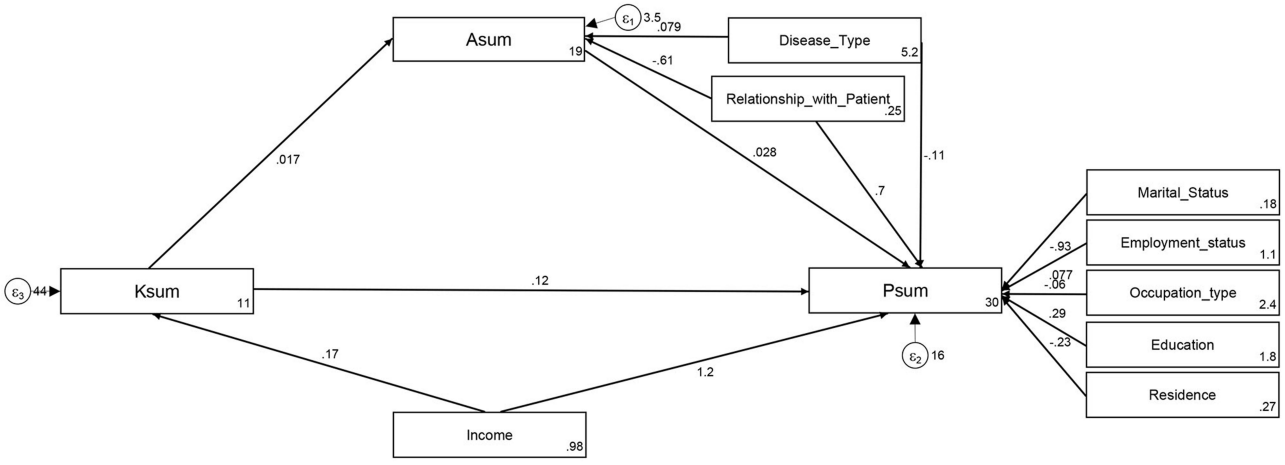

Figure 1 Path Analysis.

Discussion

Main Finding of This Study

The findings of the study indicated that both patients and their family members showed suboptimal knowledge, negative attitude, and proactive practice concerning spinal cord tumors. In light of these results, it is advised that healthcare professionals prioritize educational interventions to improve comprehension and cultivate positive attitudes among patients and their families regarding spinal cord tumors.

What is Already Known on This Topic

The findings of this study underscore a concerning trend regarding the KAP related to spinal cord tumors among both patients and their family members. Previous research has indicated that patients lacking awareness of their conditions are more likely to disregard medical advice, potentially leading to adverse clinical outcomes.[15] Despite the proactive nature of observed practices in this study, the persistence of inadequate knowledge and attitudes underscores the critical importance for healthcare professionals to address these aspects attentively.

What This Study Adds

The examination of demographic and socio-economic factors revealed noteworthy associations with knowledge, attitudes, and practices among participants. Notably, individuals with higher monthly per capita incomes demonstrated significantly better knowledge scores, aligning with existing literature suggesting a positive correlation between socio-economic status and health literacy.[16] Similarly, the influence of urban residence on superior health practices is consistent with previous studies indicating better access to healthcare services and health education in urban settings.[17] Furthermore, the impact of higher education levels on proactive health practices echoes findings from numerous studies highlighting the role of education in promoting health-conscious behaviors.[18] The significantly higher practice scores among full-time employees suggest the potential influence of stable employment on facilitating consistent healthcare access and adherence to medical recommendations. Additionally, the differential impact of marital status on health practices underscores the need for tailored interventions addressing the unique challenges and support systems available to individuals based on their marital status.

The absence of significant disparities in knowledge scores between patients and their family members may suggest a shared informational milieu within affected households, wherein both parties partake in the diagnostic and treatment processes, thus facilitating mutual knowledge exchange. This dynamic could stem from their joint involvement in disease management discussions and interactions with healthcare providers, ensuring a collective understanding of the ailment's nature, treatment options, and prognosis. However, discordances emerge in attitudes and practices, with patients exhibiting a more proactive stance, potentially attributed to their direct confrontation with the disease's impact and consequent inclination towards active information-seeking, treatment adherence, and coping strategies. Conversely, family members demonstrate more proactive practices, indicative of their caregiving responsibilities necessitating practical assistance provision and emotional support provision.[19] These divergences likely emanate from the distinct roles and obligations assumed by patients and family members in navigating the illness trajectory.

The multivariate logistic regression and path analysis provide further insights into the determinants of KAP scores. Urban residency and higher income levels independently predict good knowledge and proactive practices, emphasizing the role of socio-economic factors in shaping improved health outcomes and better access to healthcare services.[20] The path analysis highlights the direct influence of knowledge, income, and marital status on health practices, which acknowledges the intricate interplay between individual characteristics, interpersonal relationships, and societal factors in shaping health behaviors. Furthermore, the direct influence of disease type and relationship with the patient on attitudes underscores the importance of personalized approaches in healthcare delivery. Previous research has highlighted the significant impact of illness perceptions and social support networks on individuals' treatment adherence.[21]

The findings underscore a varied level of familiarity among participants regarding different aspects of spinal cord tumors. While certain concepts such as tumor classification and typical symptoms garnered relatively higher levels of familiarity, surgical techniques received less recognition. These findings resonate with similar studies indicating that

patients and their families often possess limited understanding of complex medical procedures and interventions.[22] Based on these findings, it is recommended that healthcare professionals prioritize patient education initiatives focused on clarifying misconceptions and enhancing understanding of surgical interventions for spinal cord tumors. Utilizing multimedia resources, such as informational videos and illustrated guides, may facilitate comprehension and alleviate anxieties associated with unfamiliar procedures.[23] Additionally, establishing clear communication channels between patients, families, and healthcare providers can foster open dialogue and address any concerns or uncertainties regarding treatment options.

Participants exhibited a generally positive attitude towards spinal cord tumor diagnosis and treatment, emphasizing the perceived necessity and efficacy of surgical intervention. However, concerns regarding potential adverse effects on spinal stability and neurological function were evident, reflecting the nuanced considerations individuals navigate when weighing the benefits and risks of surgical treatment. Patients and their families often face anxiety and stress when considering cancer treatment.[24] In light of these findings, healthcare professionals should prioritize patient-centered communication strategies aimed at fostering trust and transparency throughout the treatment process.[25,26] Providing detailed explanations of treatment options, including their anticipated outcomes and potential complications, can empower patients and their families to make informed decisions aligned with their values and preferences.[27,28] Additionally, offering psychological support services, such as counseling and peer support groups, may help individuals cope with anxiety and uncertainty surrounding surgical treatment for spinal cord tumors.[29,30]

Participants demonstrated a proactive approach to healthcare practices, including information-seeking and treatment adherence. High levels of engagement with healthcare providers and adherence to treatment plans were observed, indicating a strong sense of self-efficacy and motivation among participants in managing their health and well-being. Building upon these findings, healthcare providers should continue to emphasize the importance of patient education and self-management support in optimizing outcomes for individuals with spinal cord tumors. Integrating technology-enabled solutions, such as mobile health applications and telehealth services, may further empower patients to actively participate in their care and access support resources conveniently.[31]

This study has several limitations that warrant consideration. Firstly, the reliance on self-reported data may introduce recall bias or social desirability bias, potentially influencing the accuracy of responses. Secondly, the study was conducted at a single medical center, which may limit the generalizability of the findings to other populations or settings. Additionally, the cross-sectional design of the study only permits the observation of associations rather than establishing causality, emphasizing the need for cautious interpretation of the results.

Conclusion

In conclusion, this study reveals that both patients and their family members exhibit suboptimal knowledge, negative attitude, and proactive practice towards spinal cord tumors. Healthcare providers should focus on implementing targeted educational interventions aimed at improving knowledge and fostering positive attitudes among patients and their families regarding spinal cord tumors, thereby promoting more proactive healthcare practices and enhancing overall patient outcomes.

Data Sharing Statement

All data generated or analysed during this study are included in this published article and its supplementary information files.

Ethics Approval and Consent to Participate

This work has been carried out in accordance with the Declaration of Helsinki (2000) of the World Medical Association. Ethical approval for the study was obtained from the Ethics Committee of Beijing Jishuitan Hospital, Capital Medical University, and informed consent was obtained from all participants.

Author Contributions

Longqi Liu and Liang Shi carried out the studies, participated in collecting data, and drafted the manuscript. Longqi Liu and Yibing Su performed the statistical analysis and participated in its design. Longqi Liu and Yibing Su participated in acquisition, analysis, or interpretation of data and draft the manuscript. 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.

Funding

There is no funding to report.

Disclosure

The authors declare that they have no competing interests.

References

1. Engelhard HH, Villano JL, Porter KR, et al. Clinical presentation, histology, and treatment in 430 patients with primary tumors of the spinal cord, spinal meninges, or cauda equina. *J Neurosurg Spine*. 2010;13(1):67–77. doi:10.3171/2010.3.Spine09430
2. Zadnik PL, Gokaslan ZL, Burger PC, Bettegowda C. Spinal cord tumours: advances in genetics and their implications for treatment. *Nat Rev Neurol*. 2013;9(5):257–266. doi:10.1038/nrneurol.2013.48
3. Schellinger KA, Propp JM, Villano JL, McCarthy BJ. Descriptive epidemiology of primary spinal cord tumors. *J Neurooncol*. 2008;87(2):173–179. doi:10.1007/s11060-007-9507-z
4. Abul-Kasim K, Thurnher MM, McKeever P, Sundgren PC. Intradural spinal tumors: current classification and MRI features. *Neuroradiology*. 2008;50(4):301–314. doi:10.1007/s00234-007-0345-7
5. Duong LM, McCarthy BJ, McLendon RE, et al. Descriptive epidemiology of malignant and nonmalignant primary spinal cord, spinal meninges, and cauda equina tumors, United States, 2004-2007. *Cancer*. 2012;118(17):4220–4227. doi:10.1002/cncr.27390
6. Abd-El-Barr MM, Huang KT, Moses ZB, Iorgulescu JB, Chi JH. Recent advances in intradural spinal tumors. *Neuro Oncol*. 2018;20(6):729–742. doi:10.1093/neuonc/nox230
7. Nakarai H, Kato S, Yamato Y, et al. Quality of life and postoperative satisfaction in patients with benign extramedullary spinal tumors: a multicenter study. *Spine*. 2023;48(18):E308–e316. doi:10.1097/brs.0000000000004771
8. Molenaar CJ, van Rooijen SJ, Fokkenrood HJ, Roumen RM, Janssen L, Slooter GD. Prehabilitation versus no prehabilitation to improve functional capacity, reduce postoperative complications and improve quality of life in colorectal cancer surgery. *Cochrane Database Syst Rev*. 2022;5(5):Cd013259. doi:10.1002/14651858.CD013259.pub2
9. Konovalov NA, Shishkina LV, Asyutin DS, et al. Extradural spinal cord hemangioblastoma (a case report and literature review) [Ekstradural'naya gemangioblastoma spinnogo mozga (sluchai iz praktiki i obzor literatury)]. *Zh Vopr Neirokhir Im N N Burdenko*. 2016;80(6):88–92. doi:10.17116/neiro201680688-92
10. Gao L, Su S, Du N, et al. Medical and non-medical students' knowledge, attitude and willingness towards the COVID-19 vaccine in China: a cross-sectional online survey. *Hum Vaccin Immunother*. 2022;18(5):2073757. doi:10.1080/21645515.2022.2073757
11. Tan J, Luo L, Zhang M, et al. A Chinese and Western medication adherence scale in patients with chronic kidney disease. *Patient Prefer Adherence*. 2019;13:1487–1495. doi:10.2147/ppa.S207693
12. Furlan JC, Wilson JR, Massicotte EM, Sahgal A, Fehlings MG. Recent advances and new discoveries in the pipeline of the treatment of primary spinal tumors and spinal metastases: a scoping review of registered clinical studies from 2000 to 2020. *Neuro Oncol*. 2022;24(1):1–13. doi:10.1093/neuonc/noab214
13. Horbinski C, Nabors LB, Portnow J, et al. NCCN guidelines® insights: central nervous system cancers, version 2.2022. *J Natl Compr Canc Netw*. 2023;21(1):12–20. doi:10.6004/jnccn.2023.0002
14. Lee F, Suryohusodo AA. Knowledge, attitude, and practice assessment toward COVID-19 among communities in East Nusa Tenggara, Indonesia: a cross-sectional study. *Front Public Health*. 2022;10:957630. doi:10.3389/fpubh.2022.957630
15. Kimura M, Nakashima K, Usami E, et al. Adherence and awareness of the therapeutic intent of oral anticancer agents in an outpatient setting. *Oncol Lett*. 2015;9(5):2341–2346. doi:10.3892/ol.2015.3027
16. Neter E, Brainin E. eHealth literacy: extending the digital divide to the realm of health information. *J Med Internet Res*. 2012;14(1):e19. doi:10.2196/jmir.1619
17. Zhang QN, Lu HX. Knowledge, attitude, practice and factors that influence the awareness of college students with regards to breast cancer. *World J Clin Cases*. 2022;10(2):538–546. doi:10.12998/wjcc.v10.i2.538
18. Mosli HH, Kutbi HA, Alhasan AH, Mosli RH. Understanding the interrelationship between education, income, and obesity among adults in Saudi Arabia. *Obes Facts*. 2020;13(1):77–85. doi:10.1159/000505246
19. Sjolander C, Ahlstrom G. The meaning and validation of social support networks for close family of persons with advanced cancer. *BMC Nurs*. 2012;11(1):17. doi:10.1186/1472-6955-11-17
20. Zheng X, Xue Y, Dong F, et al. The association between health-promoting-lifestyles, and socioeconomic, family relationships, social support, health-related quality of life among older adults in China: a cross sectional study. *Health Qual Life Outcomes*. 2022;20(1):64. doi:10.1186/s12955-022-01968-0

21. Guo A, Jin H, Mao J, et al. Impact of health literacy and social support on medication adherence in patients with hypertension: a cross-sectional community-based study. *BMC Cardiovasc Disord*. 2023;23(1):93. doi:10.1186/s12872-023-03117-x
22. Clarke J, Momeyer MA, Rosselet R, Sinnott L, Overcash J. Serious illness conversation training for inpatient medical oncology advanced practice providers: a quality improvement project. *J Adv Pract Oncol*. 2023;14(1):37–48. doi:10.6004/jadpro.2023.14.1.3
23. Malale K, Fu J, Nelson W, Gemuhay HM, Gan X, Mei Z. Potential benefits of multimedia-based home catheter management education in patients with peripherally inserted central catheters: systematic review. *J Med Internet Res*. 2020;22(12):e17899. doi:10.2196/17899
24. Bridge E, Conn LG, Dhanju S, Singh S, Moody L. The patient experience of ambulatory cancer treatment: a descriptive study. *Curr Oncol*. 2019;26 (4):e482–e493. doi:10.3747/co.26.4191
25. Gorman JR, Standridge D, Lyons KS, et al. Patient-centered communication between adolescent and young adult cancer survivors and their healthcare providers: identifying research gaps with a scoping review. *Patient Educ Couns*. 2018;101(2):185–194. doi:10.1016/j.pec.2017.08.020
26. Rosen DB, Benjamin CD, Yang JC, et al. Early palliative radiation versus observation for high-risk asymptomatic or minimally symptomatic bone metastases: study protocol for a randomized controlled trial. *BMC Cancer*. 2020;20(1):1115. doi:10.1186/s12885-020-07591-w
27. Gritsch S, Batchelor TT, Gonzalez Castro LN. Diagnostic, therapeutic, and prognostic implications of the 2021 World health organization classification of tumors of the central nervous system. *Cancer*. 2022;128(1):47–58. doi:10.1002/cncr.33918
28. Ottenhausen M, Ntoulias G, Bodhinayake I, et al. Intradural spinal tumors in adults-update on management and outcome. *Neurosurg Rev*. 2019;42 (2):371–388. doi:10.1007/s10143-018-0957-x
29. Barańska B, Bazaliński D, Guzik G, Kózka M, Ślusarz R, Więch P. Quality of life and its selected determinants in the group of patients with surgically treated spinal tumors. *Front Oncol*. 2023;13:1213258. doi:10.3389/fonc.2023.1213258
30. Pour-Rashidi A, Namvar M, Iranmehr A, Carpaneto A, Hanaei S, Rezaei N. Psychological and psychiatric aspects of brain and spinal cord tumors. *Adv Exp Med Biol*. 2023;1405:673–687. doi:10.1007/978-3-031-23705-8_26
31. Debono B, Braticevic C, Sabatier P, Dutertre G, Latorzeff I, Hamel O. The "Friday peak" in surgical referrals for spinal metastases: lessons not learned. A retrospective analysis of 201 consecutive cases at a tertiary center. *Acta Neurochir*. 2019;161(6):1069–1076. doi:10.1007/s00701-019-03919-z