BMC Public Health

RESEARCH

Open Access

Knowledge, attitude, and practice toward cervical spondylosis among the healthy general population

Shuyang Li[1†], Tongyu Liu[2†], Qian Yang[2†], Yanbin Zhao[1], Xin Chen[1], Shengfa Pan[1], Yu Sun[1] and Feifei Zhou[1*]

Abstract

Background This study aimed to investigate the knowledge, attitude and practice (KAP) of the healthy general population toward cervical spondylosis.

Methods A cross-sectional study was conducted among healthy individuals at Peking University Third Hospital between May and December 2023, utilizing a self-designed questionnaire.

Results A total of 506 valid questionnaires were collected, of which 276 (64.94%) were completed by females. The mean scores for knowledge, attitudes, and practices were 4.07 ± 1.24 (range: 0–8), 35.69 ± 3.67 (range: 9–45), and 27.01 ± 4.38 (range: 9–36), respectively. Structural equation modeling (SEM) revealed that knowledge had a direct influence on both attitudes (β = 0.589, $P = 0.002$) and practices (β = 0.353, $P = 0.020$). Furthermore, attitudes had a direct effect on practices (β = 0.442, $P < 0.001$).

Conclusion The healthy general population demonstrated inadequate knowledge, a positive attitude, and suboptimal practices regarding cervical spondylosis. These findings highlight the need for targeted educational interventions to improve public awareness and foster healthier practices in managing cervical spondylosis.

Keywords Knowledge, Attitude, Practice, General population, Cervical spondylosis, Cross-sectional study

Background

Cervical spondylosis, characterized by stiffness and pain in the neck and upper back, is a common age-related degenerative condition [1]. Its incidence has been steadily increasing with technological advancements and lifestyle changes [2]. The disorder manifests as a progressive degeneration of the cervical vertebral bodies, intervertebral discs, and the surrounding musculo-ligamentous complex, leading to various clinical neurological symptoms [3]. Previous studies have demonstrated that individuals with higher levels of health knowledge and positive attitudes are more likely to adhere to recommended preventive measures and treatments, resulting in improved outcomes in managing cervical spondylosis [4, 5]. Research further indicates that patients with greater health literacy and a deeper understanding of their condition exhibit better adherence to treatment protocols and achieve superior clinical outcomes [6]. Moreover, positive attitudes toward preventive measures have been associated with improved long-term prognosis and reduced symptom severity.

†Shuyang Li, Tongyu Liu and Qian Yang contributed equally to this work.

*Correspondence:
Feifei Zhou
orthozhou@163.com
[1]Department of Orthopedics, Peking University Third Hospital, Beijing 100191, China
[2]Peking University Health Science Center, Beijing 100191, China

The Knowledge-Attitude-Practice (KAP) theory, widely recognized in public health, plays a crucial role in shaping health-related behaviors [7]. This theoretical framework, often paired with the KAP questionnaire, is a valuable tool for assessing the knowledge, attitudes, and practices of populations within the healthcare domain [8]. The KAP model is founded on the principle that knowledge positively influences attitudes, which subsequently shape individual behaviors [9]. Understanding the awareness, attitudes, and behaviors of the healthy general population regarding cervical spondylosis is essential for developing effective preventive strategies and early intervention measures. Attitudes, particularly in healthy individuals, are pivotal in shaping preventive behaviors before the onset of disease symptoms. Positive attitudes toward cervical spine health can motivate individuals to adopt healthier lifestyles, seek relevant knowledge, and engage in proactive practices, potentially delaying or preventing the progression of cervical spondylosis. By identifying knowledge gaps and areas for improvement in attitudes and practices, this research aims to inform targeted educational interventions designed to enhance awareness, foster positive attitudes, and promote proactive behaviors related to cervical spine health. Ultimately, improving public knowledge and encouraging preventive practices may alleviate the burden of cervical spondylosis and contribute to better overall population health outcomes.

With improvements in living standards, people are experiencing increasing work pressures, leading to a rise in various occupational diseases [10]. Among these, cervical conditions have become more prevalent due to prolonged periods of sitting in unhealthy postures [11]. Currently, research predominantly emphasizes surgical treatments for cervical spondylosis. However, as a degenerative condition, the onset age of cervical spondylosis is progressively decreasing [12, 13], partly due to insufficient preventive measures. The importance of prevention is often overlooked, particularly for healthy individuals, those with suboptimal health, and patients who can be managed through conservative approaches [14, 15]. While previous studies have examined the knowledge of cervical myelopathy among medical students and physicians [16], research specifically focusing on the healthy general population remains limited. Given the varying health statuses, levels of cognition, and perceptions of cervical spondylosis across these groups, this study aims to explore the knowledge, attitudes, and practices (KAP) of the healthy general population concerning cervical spondylosis.

Methods

Study design and participants

This cross-sectional study was conducted among the healthy general population at Peking University Third Hospital between May and December 2023. Inclusion criteria encompassed healthy individuals aged 18 to 80 years who had not experienced significant cervical spine-related symptoms in the preceding three months. Participants were excluded prior to questionnaire completion if they reported specific symptoms, including: Neck or shoulder pain, Upper limb pain or radiating pain, Gait instability (assessed through self-reported difficulty in walking straight or maintaining balance), Fine motor difficulties (evaluated through self-reported challenges in activities requiring precise hand movements). Additionally, participants with conditions potentially causing similar symptoms were excluded, such as: Osteoarthritis of the limbs, Rheumatoid arthritis, Ankylosing spondylitis, History of cervical, thoracic, or lumbar spine conditions, History of limb trauma, History of cancer (due to potential cervical spine-related symptoms). Ethical clearance for the study was obtained from the Peking University Third Hospital Medical Science Research Ethics Committee, and informed consent was obtained from all participants.

Sample size calculation

To determine the required sample size for a cross-sectional study, the following formula is used [17]: $n = (Z^2 \times P \times (1 - P)) / E^2$ where $Z = 1.96$ (corresponding to a 95% confidence level), P is the estimated proportion of the population (commonly assumed to be 0.5 when unknown, as this maximizes the required sample size), and E represents the margin of error (typically set at 0.05). The theoretical sample size was determined to be 384. To account for potential attrition or dropouts during the study, an additional 20% was included, resulting in a final sample size of 480.

Questionnaire

The questionnaire design was informed by established guidelines and relevant literature in the field [18, 19]. Following its initial development, feedback from a specialist in the Orthopedics Department at Peking University Third Hospital prompted adjustments. A pilot study involving 42 participants was subsequently conducted, yielding a Cronbach's α coefficient of 0.791 for the finalized questionnaire, indicating satisfactory internal consistency.

The final questionnaire, presented in Chinese (Appendix), encompassed four main sections: demographic information (including age, gender, residence, education, occupation involving prolonged sitting, employment in the medical industry or related fields, average daily sitting duration, years of employment, family history of cervical spondylosis among parents, siblings, or children, occupational disease status, annual expenditure on cervical spine health, smoking status, physical activity, and

history of cervical spondylosis diagnosis), the knowledge dimension, the attitude dimension, and the practice dimension. The knowledge dimension comprised two components with a total of eight questions. Correct responses were awarded 1 point, while incorrect or unclear responses received 0 points, resulting in a score range of 0–8. The attitude dimension comprised nine questions using a five-point Likert scale. For most questions, responses ranged from "strongly agree" (5 points) to "strongly disagree" (1 point). However, the 2nd and 4th questions were reverse-scored, where "strongly agree" scored 1 point and "strongly disagree" scored 5 points, as these items were negatively worded to mitigate response bias. The total score range was 9–45 points. The practice dimension involved 10 questions, with responses ranging from very proactive behavior (4 points) to very passive behavior (1 point). The 10th question was descriptive only, resulting in a score range of 9–36 points. An overall score exceeding 70% in each dimension was considered indicative of adequate knowledge, a positive attitude, and proactive practices [20].

Selected variables (outcome and independent)

In this study, three outcome variables were assessed: knowledge score (ranging from 0 to 8), attitude score (ranging from 9 to 45), and practice score (ranging from 9 to 36). Independent variables encompassed demographic characteristics (gender, age, residence, and education level), occupational factors (prolonged sitting work status, years of employment, and employment in the medical industry), and health-related factors (occupational diseases, annual expenditure on cervical spine health, smoking status, daily physical activity time, and personal and family history of cervical spondylosis).

Questionnaire distribution and quality control

In this study, a convenience sampling method was used to select participants, and a team of three trained doctors, acting as research assistants, managed the promotion and distribution of the questionnaire. The research team underwent a comprehensive training program that included several key components. First, all team members were ensured to have a thorough understanding of the research questions, objectives, and the ethical considerations involved in participant data collection. They were also trained on how to properly distribute the questionnaires, explain the study's purpose to participants, and obtain informed consent. Additionally, the training covered how to address participants' questions or concerns and provide assistance with completing the questionnaire, both electronically and in paper format.

The online questionnaire was hosted on www.wenjuan.com, which automatically generated digital responses, making the data accessible to healthcare professionals. This system minimized human error by eliminating the need for manual data entry, thereby ensuring the accuracy of responses. Recruitment was carried out through both physical and electronic posters (including social media outreach). Participants were contacted via telephone to explain the study's purpose and provide relevant information. The researcher then sent participants a QR code for the online questionnaire, allowing them to complete the survey by scanning the QR code. While most participants completed the questionnaire online, accommodations were made for individuals, such as elderly participants in nursing homes, who faced difficulties using electronic devices. These participants were provided with paper-based questionnaires, which were subsequently digitized and entered into the database.

To ensure high-quality data and comprehensive responses, the study employed measures such as restricting submissions to one per IP address and mandating the completion of all questionnaire items. Participants were assured of anonymity throughout the survey process. After data collection, the responses were exported from the platform for cleaning and analysis. During the cleaning process, the research team meticulously reviewed all submissions for completeness, internal consistency, and logical coherence. Questionnaires with incomplete responses or logical errors, such as inconsistent or contradictory responses, were excluded. For example, responses from participants who provided identical answers to all questions or demonstrated answering patterns indicative of inattention were discarded.

A total of 506 responses were collected. The following questionnaires were excluded: two cases with missing baseline data (annual expenditure on cervical spine health); 46 cases with logical inconsistencies, such as discrepancies between whether participants had visited a specialist clinic, received a cervical spondylosis diagnosis, or had a history of the condition; 10 cases involving participants who did not engage in prolonged sitting work or worked for over eight hours per day while seated [21]; two cases with incomplete or logically incorrect responses in the attitude section; and 23 cases with incomplete responses in the practice section. After excluding these anomalies, 425 valid responses were retained, yielding an effective response rate of 83.99%.

Statistical analysis

Data analysis was performed using SPSS 26.0 and AMOS 26.0 (IBM, Armonk, NY, USA). Continuous data are presented as means and standard deviations (SD), while categorical data are expressed as number and percentage (%). Continuous variables were tested for normality. For normally distributed data, comparisons between two groups were performed using the t-test, while the Wilcoxon Mann-Whitney test was applied for non-normally

distributed data. For three or more groups, analysis of variance (ANOVA) was used for normally distributed continuous variables with homogeneous variances. Structural equation modeling (SEM) was employed to test the hypotheses that knowledge influences attitude, attitude influences practice, and knowledge influences practice. A two-sided *P*-value of less than 0.05 was considered statistically significant.

Results

Among the valid respondents, 276 (64.94%) were female, 190 (44.71%) were aged 30–45 years, 281 (66.12%) held a college or bachelor's degree, 295 (69.41%) engaged in prolonged sitting work, and 150 (35.29%) had been employed for more than 20 years. Additionally, 269 (63.29%) attributed their cervical spondylosis to occupational factors, 220 (51.76%) reported being physically active for one hour per day, and 170 (40%) indicated that their relatives also suffered from cervical spondylosis. The mean knowledge score was 4.1 ± 1.2 (possible range: 0–8), indicating moderate understanding of cervical spondylosis. The mean attitude score was 35.7 ± 3.7 (possible range: 9–45), reflecting generally positive attitudes toward cervical spine health. The mean practice score was 27.0 ± 4.4 (possible range: 9–36), suggesting that participants engaged in suboptimal preventive behaviors and practices. Knowledge scores varied significantly by demographic and behavioral factors ($P < 0.05$), including gender, age, educational level, years of employment, smoking status, daily physical activity duration, history of cervical spondylosis diagnosis, and employment in the medical industry or related fields. Attitude scores also differed significantly based on gender, age, and education ($P < 0.05$). Variations in average annual expenditure on cervical spine health were significantly associated with differences in practice ($P < 0.001$) (Table 1).

Analysis of the knowledge dimension showed that the two items with the highest incorrect response rates were "What tests are needed to diagnose cervical spondylosis?" (K8) at 93.88% and "Severe cervical spondylosis can lead to paralysis, rendering patients unable to care for themselves." (K6) at 89.41%. The items with the highest correct response rates were "Which of the following are symptoms that may occur with cervical spondylosis?" (K3) at 98.82% and "What treatment modalities do you think are necessary for cervical spondylosis?" (K4) at 88.71% (Fig. 1).

Participants demonstrated an overall positive attitude, with 53.88% expressing a strong willingness to learn more about cervical spondylosis to protect their cervical spine (A6) and 52.47% eager to learn and regularly perform health exercises for cervical spine protection (A3). Additionally, 48.24% agreed that physical health or emotional problems could affect social activities (A4), while 48.24% disagreed with the statement that cervical spine pain does not affect normal life at all (A2) (Fig. 2).

In terms of practice, 45.18% reported always and 42.21% reported sometimes changing their pillows when they were uncomfortable (P7), the most positive response among practice-related items. Other notable behaviors included 61.88% who sometimes adjusted their habits when experiencing cervical discomfort (P9), 55.76% who sometimes moved their necks after prolonged work or exercise (P3), and 55.29% who sometimes took breaks during extended computer use or television watching (P2) (Fig. 3).

In the correlation analyses, significant positive correlations were found between knowledge and attitude ($r = 0.178$, $P < 0.001$), knowledge and practice ($r = 0.183$, $P < 0.001$), and attitude and practice ($r = 0.337$, $P < 0.001$), respectively (Table 2).

The Structural Equation Modeling (SEM) model achieved an excellent fit (Chi-Square Minimum/Degrees of Freedom [CMIN/DF] value: 2.702, Root Mean Square Error of Approximation [RMSEA] value: 0.063, Incremental Fit Index [IFI] value: 0.849, Tucker-Lewis Index [TLI] value: 0.832, and Comparative Fit Index [CFI] value: 0.848) (Table 3). The results of the model shown that knowledge had direct effects on attitude ($\beta = 0.589$, $P = 0.002$) and practice ($\beta = 0.353$, $P = 0.020$). Moreover, attitude have a direct impact on practice ($\beta = 0.442$, $P < 0.001$) (Table 4**and** Fig. 4).

Discussion

This study reveals that the healthy general population exhibits insufficient knowledge, positive attitudes, and suboptimal practices regarding cervical spondylosis. These findings underscore the need for educational interventions to enhance knowledge levels, which may consequently improve attitudes and practices toward the prevention and management of cervical spondylosis.

The observed differences in knowledge scores based on gender and age align with previous research. Consistent with existing studies, females demonstrated higher health-related knowledge scores than males, potentially due to differences in health-seeking behavior and information acquisition patterns [22]. Furthermore, younger individuals showed higher knowledge scores, reflecting the impact of education and greater exposure to health-related information among younger age groups [23]. Regarding attitudes, significant disparities across age groups and years of employment are supported by findings from other studies. Middle-aged individuals often adopt more proactive health behaviors due to increased awareness of age-related health risks [24]. Although significant differences in practice scores were associated with annual expenditures on cervical spine health, the effect size was small, indicating limited clinical relevance.

Table 1 Demographic characteristics and KAP scores

	N (%)	Knowledge		Attitude		Practice	
		Score	*P*	Score	*P*	Score	*P*
Total score		4.1 ± 1.2		35.7 ± 3.7		27.0 ± 4.4	
Gender			0.001		0.018		0.507
Male	149(35.06)	3.8 ± 1.3		35.2 ± 3.8		26.8 ± 4.5	
Female	276(64.94)	4.2 ± 1.2		36.0 ± 3.6		27.1 ± 4.4	
Age, years			0.001		0.006		0.347
Below 30	87(20.47)	4.3 ± 1.1		35.2 ± 3.5		26.6 ± 4.8	
30–45	190(44.71)	4.1 ± 1.3		36.3 ± 3.6		27.1 ± 4.4	
Above 45	148(34.82)	3.8 ± 1.2		35.2 ± 3.8		27.1 ± 4.1	
Residence			0.751		0.252		0.154
Urban	378(88.94)	4.1 ± 1.2		35.8 ± 3.6		27.1 ± 4.4	
Non-urban	47(11.06)	4.0 ± 1.5		35.1 ± 4.3		26.2 ± 4.2	
Education			0.015		0.649		0.641
Junior high/high school/technical school	47(11.06)	3.5 ± 1.6		36.2 ± 3.4		26.6 ± 4.7	
College /undergraduate	281(66.12)	4.1 ± 1.2		35.7 ± 3.6		27.2 ± 4.3	
Postgraduate and above	97(22.82)	4.3 ± 1		35.4 ± 4.1		26.6 ± 4.5	
Prolonged Sitting Work			0.191		0.251		0.675
Yes	295(69.41)	4.2 ± 1.1		35.8 ± 3.7		26.9 ± 4.2	
No	130(30.59)	3.9 ± 1.5		35.4 ± 3.7		27.2 ± 4.7	
Years of employment, years			0.021		0.009		0.080
5	80(18.82)	4.3 ± 1.1		35.3 ± 3.6		26.3 ± 4.8	
5–10	68(16)	4.2 ± 1.2		36.2 ± 3.4		26.8 ± 4.5	
10–20	127(29.88)	4.1 ± 1.3		36.3 ± 3.7		27.7 ± 4.3	
20	150(35.29)	3.9 ± 1.3		35.2 ± 3.7		26.9 ± 4.1	
Occupational diseases							
Cervical spondylosis	269(63.29)	4.1 ± 1.2	0.779	36.0 ± 3.6	0.027	26.9 ± 4.2	0.567
Lumbar disc herniation	160(37.65)	4.1 ± 1.3	0.431	36.0 ± 3.5	0.130	27.6 ± 4.5	0.004
Lumbar back pain	237(55.76)	4.1 ± 1.2	0.295	35.8 ± 3.5	0.397	26.6 ± 4.3	0.072
Computer-related eye diseases	188(44.24)	4.1 ± 1.2	0.457	35.9 ± 3.7	0.184	26.9 ± 4.4	0.752
Gastrointestinal diseases	160(37.65)	4.1 ± 1.1	0.606	35.8 ± 3.6	0.558	26.7 ± 4.5	0.337
Average annual expenditure on cervical spine health, CNY			0.497		0.536		< 0.001
Below 500	314(73.88)	4.1 ± 1.3		35.6 ± 3.7		26.5 ± 4.5	
500–1000	56(13.18)	3.9 ± 1.3		35.7 ± 3.7		28.3 ± 4.2	
Above 1000	55(12.94)	4.1 ± 1.1		36.2 ± 3.4		28.5 ± 3.4	
Smoking			0.015		0.473		0.238
Never smoked	340(80)	4.2 ± 1.2		35.8 ± 3.7		26.9 ± 4.3	
Former smoker, quit smoking	34(8)	3.7 ± 1.5		35.1 ± 3.7		28.1 ± 4.7	
Current smoker	51(12)	3.7 ± 1.3		35.6 ± 3.6		26.8 ± 4.4	
Daily Physical Activity Time			0.001		0.065		0.115
1 h	220(51.76)	4.1 ± 1.2		35.9 ± 3.6		26.6 ± 3.9	
1–2 h	117(27.53)	3.8 ± 1.4		35.0 ± 3.8		27.2 ± 4.9	
2–3 h	47(11.06)	4.1 ± 1.3		35.5 ± 3.7		27.9 ± 4.7	
4 h	41(9.65)	4.7 ± 0.9		36.8 ± 3.7		27.9 ± 4.56	
History of Cervical Spondylosis			0.023		0.663		0.069
Yes	134(31.53)	4.2 ± 1.1		35.8 ± 3.6		27.6 ± 4.1	
No	198(46.59)	4.2 ± 1.2		35.5 ± 3.6		27.0 ± 4.3	
Unclear	93(21.88)	3.7 ± 1.5		35.9 ± 3.9		26.2 ± 4.9	
Employment in the medical industry or related fields			< 0.001		0.863		0.109
Yes	154(36.24)	4.5 ± 1.0		35.6 ± 3.8		27.6 ± 4.8	
No	271(63.76)	3.8 ± 1.3		35.7 ± 3.6		26.7 ± 4.1	
Family history of cervical spondylosis among parents, siblings, or children			0.446		0.712		0.054
Yes	170(40)	4.1 ± 1.1		35.9 ± 3.4		27.5 ± 4.2	
No	162(38.12)	4.1 ± 1.2		35.6 ± 3.7		26.9 ± 4.3	
Unclear	93(21.88)	3.9 ± 1.5		35.6 ± 4.1		26.3 ± 4.8	

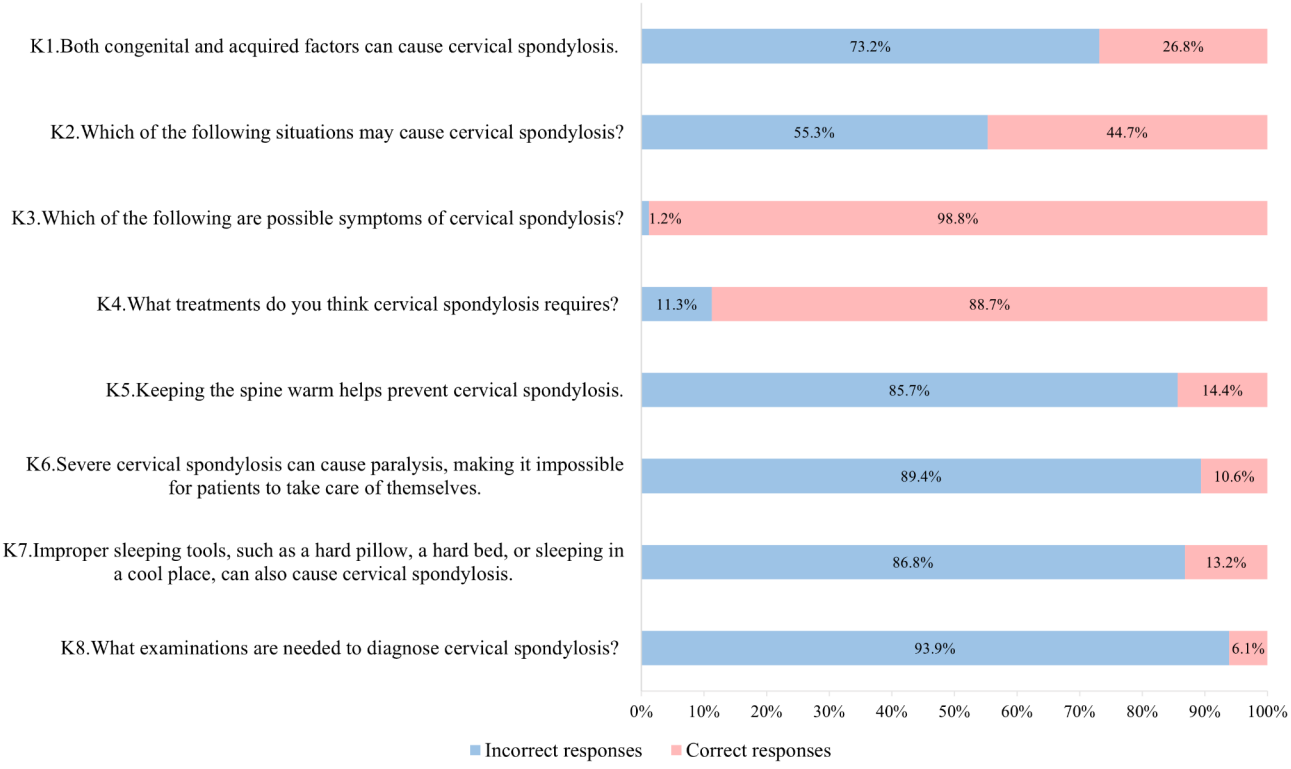

Fig. 1 Distribution of knowledge dimension responses

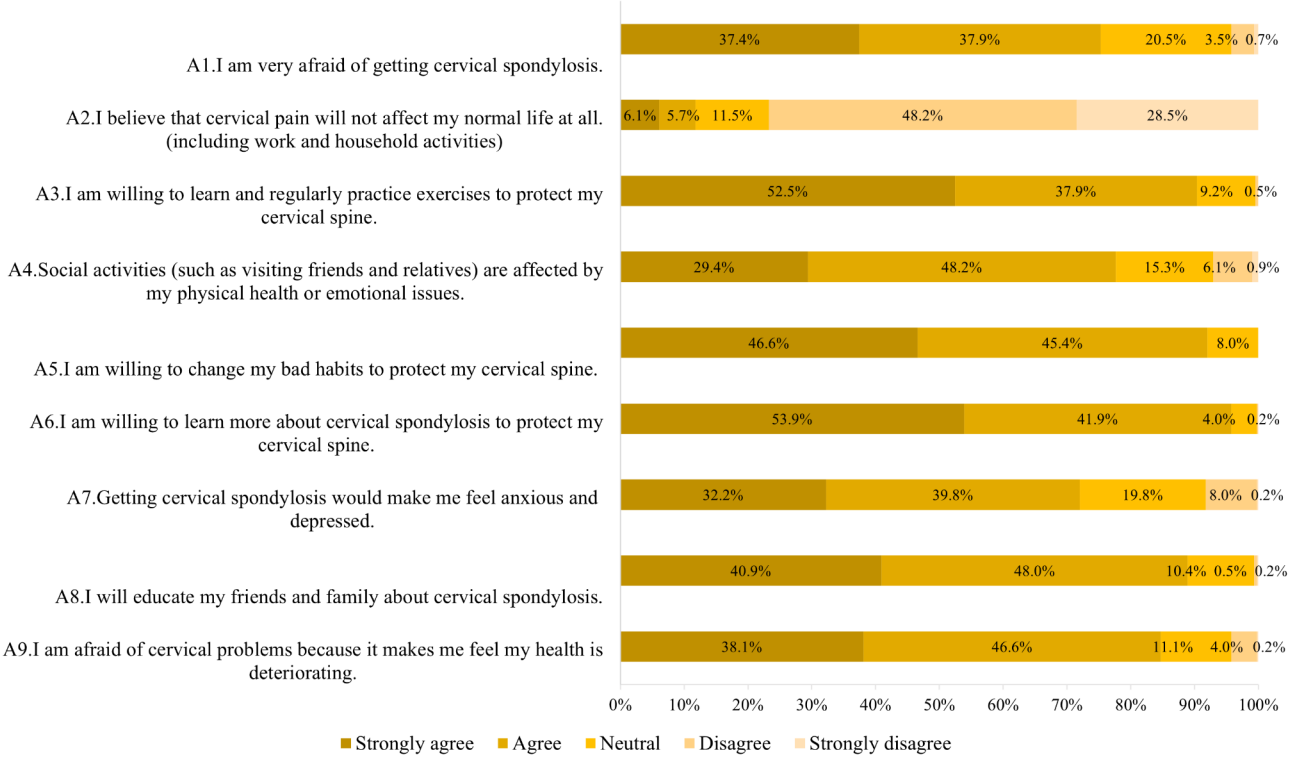

Fig. 2 Distribution of attitude dimension responses

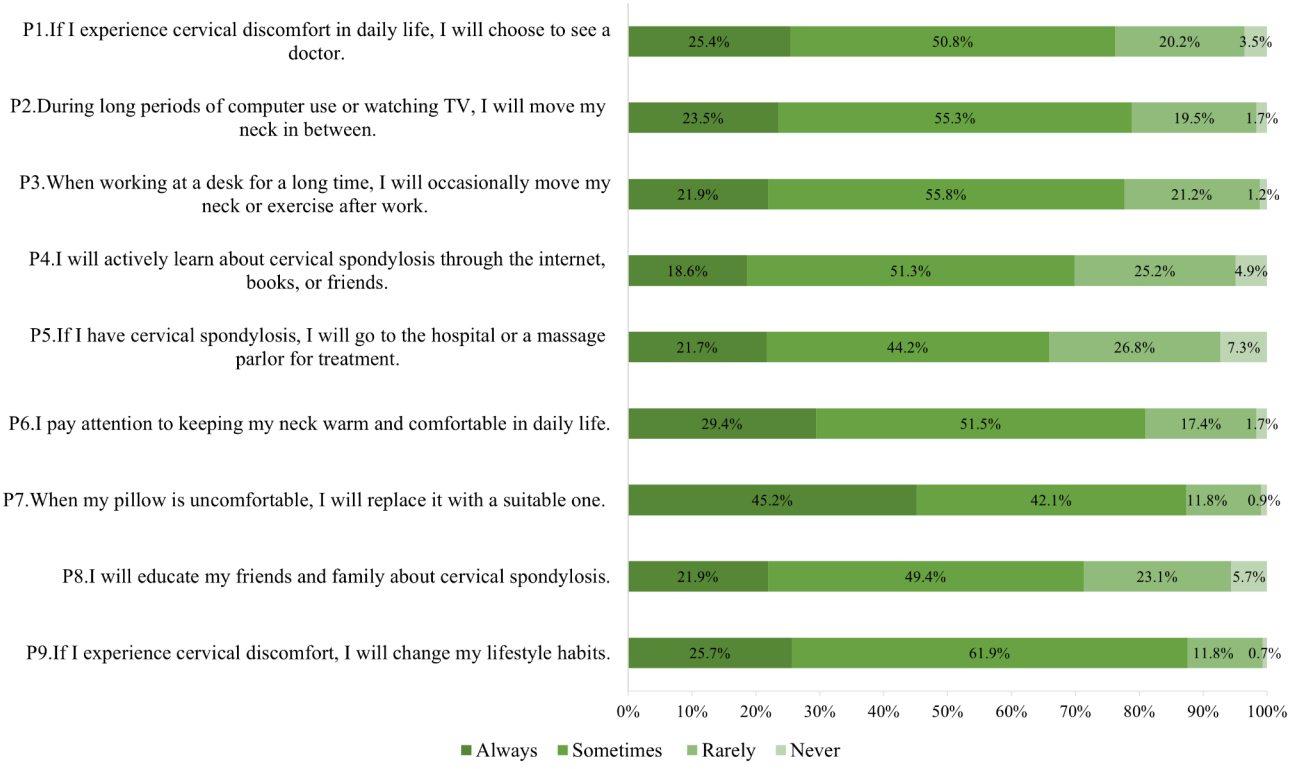

Fig. 3 Distribution of practice dimension responses

Table 2 Pairwise correlation of knowledge attitude and practice toward cervical spondylosis

	Knowledge	Attitude	Practice
Attitude	0.178(<0.001)		
Practice	0.183(<0.001)	0.337(<0.001)	

Table 3 Knowledge influences attitude, attitude influences practice, and knowledge influences practice

Model indicators	Ref.	Measured results
CMIN/DF	1–3 excellent, 3–5 good	2.702
RMSEA	< 0.08 good	0.063
IFI	> 0.8 good	0.849
TLI	> 0.8 good	0.832
CFI	> 0.8 good	0.848

Future research should investigate whether larger financial investments or other factors result in more substantial behavioral changes. Additionally, individuals with a history of lumbar disc herniation may display heightened awareness and adherence to preventive spinal health measures, emphasizing the role of personal health experiences in fostering proactive behaviors. The positive association between higher expenditure on cervical spine health and practice scores highlights the influence of financial resources on health-conscious behaviors. Access to resources may enhance adherence to preventive measures, underscoring the importance of financial and infrastructural support in promoting public health [25, 26].

The correlation analyses revealed statistically significant but weak positive relationships between knowledge, attitude, and practice. While these findings are statistically noteworthy, their clinical significance may be limited. Correlation coefficients of 0.1 or 0.2 suggest that factors beyond knowledge and attitude likely play a more substantial role in shaping health-related behaviors [27]. The SEM further reinforces these relationships, elucidating the direct effects of knowledge on attitude and practice, underscoring the pivotal role of knowledge acquisition in shaping individuals' attitudes and subsequent behaviors toward cervical spondylosis prevention. These findings highlight the importance of educational interventions aimed at improving knowledge levels as a foundational step toward fostering positive

Table 4 SEM results

			β	S.E.	C.*R.*	*P*
attitude	<---	knowledge	0.2	0.191	3.087	0.002
practice	<---	attitude	0.5	0.058	7.601	< 0.001
practice	<---	knowledge	0.1	0.151	2.327	0.020

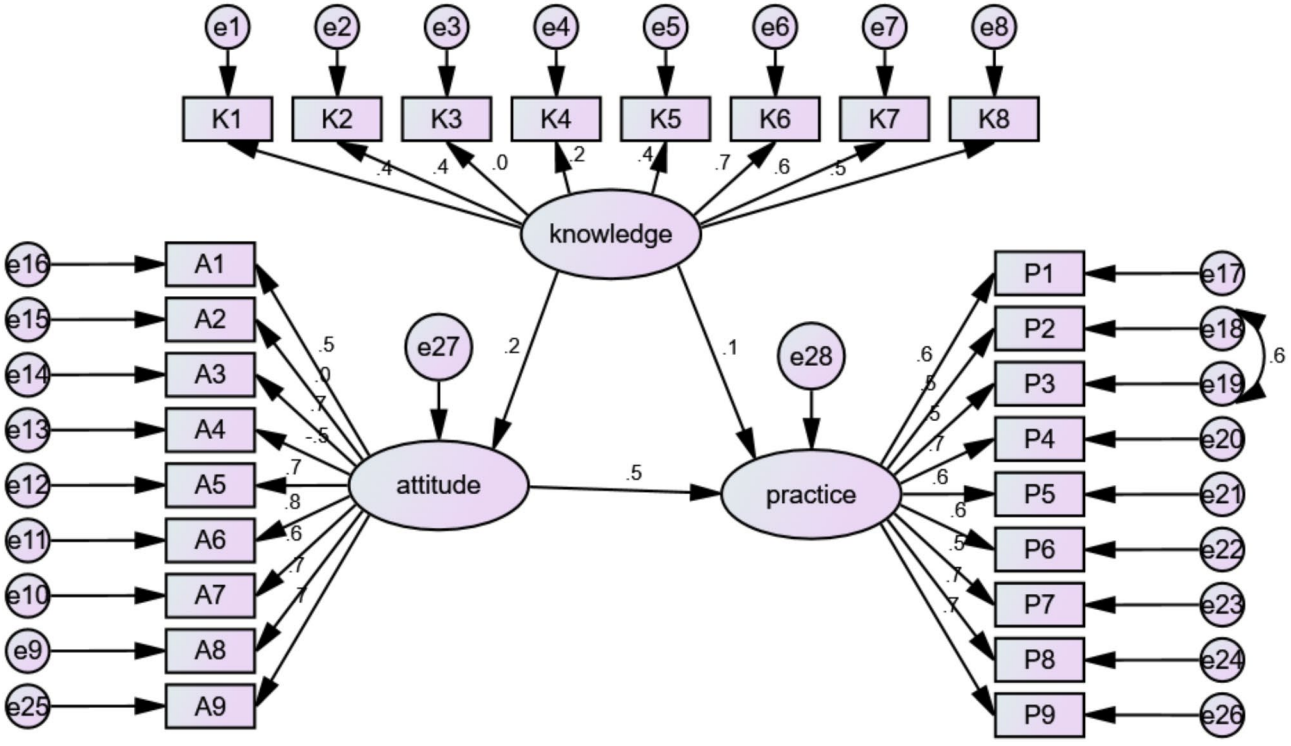

Fig. 4 SEM results

health behaviors. Moreover, the direct impact of attitude on practice emphasizes the intermediary role of attitude in translating knowledge into action, underscoring the need to address attitudinal barriers to effectively facilitate behavior change [16, 28].

The distribution of responses in the knowledge dimension reveals both strengths and areas for improvement in participants' understanding of cervical spondylosis. Notably, while a majority of respondents correctly identified possible causes of cervical spondylosis, including congenital and acquired factors, a substantial proportion demonstrated misconceptions regarding preventive measures and symptoms. For example, although most participants acknowledged the importance of seeking medical attention for neck discomfort, many erroneously believed that keeping the spine warm could prevent cervical spondylosis. Similarly, there was a significant disparity in recognizing symptoms associated with the condition, with many participants failing to identify relevant signs. To address these gaps, educational campaigns should prioritize disseminating accurate information on preventive measures and symptoms of cervical spondylosis. Utilizing diverse communication channels, such as social media platforms and community-based workshops, can enhance the reach and impact of these campaigns, fostering greater awareness among the population [29, 30].

The analysis of the attitude dimension responses sheds light on participants' perceptions and emotional responses toward cervical spondylosis. Encouragingly, most respondents expressed a willingness to engage in preventive behaviors and educate others about cervical spine health. However, notable variations emerged in attitudes toward the impact of neck pain on daily life, with a substantial proportion underestimating its potential consequences. Additionally, while many participants recognized the importance of seeking information and adopting positive lifestyle changes, a significant minority reported feelings of anxiety and depression associated with cervical spondylosis.

To foster positive attitudes and emotional well-being, interventions should integrate strategies for stress management, coping skills training, and social support enhancement. Promoting a positive narrative surrounding cervical spine health through media campaigns and community engagement initiatives can help destigmatize the condition and empower individuals to take proactive steps toward prevention [31, 32].

The analysis of the practice dimension responses provides insights into participants' self-reported behaviors and habits concerning cervical spondylosis prevention. While most respondents expressed a willingness to seek medical attention and adopt healthy lifestyle practices, notable discrepancies were observed between intentions and actual behaviors. For example, although many participants reported performing intermittent neck movements during sedentary activities, a considerable

proportion admitted to rarely or never seeking information about cervical spondylosis or modifying lifestyle habits in response to neck discomfort. Practical recommendations should focus on implementing behavioral prompts, such as reminders and goal-setting exercises, to facilitate the translation of positive intentions into sustainable habits. Additionally, interventions should leverage social support networks, workplace wellness programs, and community resources to reinforce healthy behaviors and provide ongoing encouragement for cervical spine health maintenance [33].

This study has several limitations. First, reliance on a single hospital setting may introduce sampling bias, potentially limiting the generalizability of the findings. Second, the use of self-reported data through questionnaires may be subject to response biases and inaccuracies, which could affect the validity of the assessment. Third, the cross-sectional design restricts the ability to establish causal relationships between knowledge, attitude, and practice (KAP) variables. Despite these limitations, the study has notable strengths that enhance its significance. The use of structural equation modeling (SEM) provides a comprehensive analysis by elucidating the interrelationships between KAP factors. Additionally, the large sample size and extensive data collection period bolster the study's credibility and reliability, offering a robust foundation for future research and targeted interventions to improve public awareness and practices related to cervical spondylosis.

Conclusions

In conclusion, this study reveals that the healthy general population demonstrates insufficient knowledge, a positive attitude, and suboptimal practices concerning cervical spondylosis. Healthcare professionals should prioritize educational interventions to enhance public knowledge, foster positive attitudes, and promote preventive practices for effective management and prevention of cervical spondylosis.

Abbreviations

KAP	Knowledge,attitude and practice
SD	Standard deviations
SEM	Structural equation modeling

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12889-025-22051-5.

Supplementary Material 1

Acknowledgements

Not applicable.

Author contributions

Shuyang Li and Feifei Zhou carried out the studies, performed the statistical analysis, and drafted the manuscript. Tongyu Liu and Qian Yang participated in collecting data and the statistical analysis. Yanbin Zhao, Xin Chen, Shengfa Pan and Yu Sun participated in acquisition, analysis, or interpretation of data and draft the manuscript. All authors read and approved the final manuscript. and participated in its design.

Funding

None.

Data availability

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

Declarations

Ethics approval and consent to participate

The study was approved by Peking University Third Hospital Medical Science Research Ethics Committee(M2023240). All participants were informed about the study protocol and provided written informed consent to participate in the study. I confirm that all methods were performed in accordance with the relevant guidelines. All procedures were performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Received: 28 July 2024 / Accepted: 21 February 2025
Published online: 14 March 2025

References

1. Chen J, Wang Z, Tu Y, Liu X, Jorgenson K, Ye G, et al. Regional homogeneity and multivariate pattern analysis of cervical spondylosis neck pain and the modulation effect of treatment. Front Neurosci. 2018;12:900.
2. Kang J, Chen G, Zhai X, He X. In vivo three-dimensional kinematics of the cervical spine during maximal active head rotation. PLoS ONE. 2019;14(4):e0215357.
3. Kalsi-Ryan S, Karadimas SK, Fehlings MG. Cervical spondylotic myelopathy: the clinical phenomenon and the current pathobiology of an increasingly prevalent and devastating disorder. Neuroscientist. 2013;19(4):409–21.
4. Grešš Halász B, Bérešová A, Tkáčová Ľ, Magurová D, Lizáková Ľ. Nurses' Knowledge and Attitudes towards Prevention of Pressure Ulcers. Int J Environ Res Public Health. 2021;18(4).
5. Xue B, Zhang X, Li T, Gu Y, Wang R, Chen W, et al. Knowledge, attitude, and practice of obesity among university students. Ann Palliat Med. 2021;10(4):4539–46.
6. Lans A, Bales JR, Borkhetaria P, Schwab JH, Verlaan JJ, Rossi LP, et al. Impact of health literacy on Self-Reported health outcomes in spine patients. Spine (Phila Pa 1976). 2023;48(7):E87–93.
7. Tan J, Luo L, Zhang M, Chen H, Zhang D, Dong C, et al. A Chinese and Western medication adherence scale in patients with chronic kidney disease. Patient Prefer Adherence. 2019;13:1487–95.
8. Li L, Zhang J, Qiao Q, Wu L, Chen L. Development, reliability, and validity of theKnowledge-Attitude-Practice questionnaire of foreigners on traditional Chinese medicine treatment. Evid Based Complement Alternat Med. 2020;2020:8527320.
9. Khalid A, Haque S, Alvi S, Ferdous M, Genereux O, Chowdhury N, et al. Promoting health literacy about cancer screening among Muslim immigrants in canada: perspectives of imams on the role they can play in community. J Prim Care Community Health. 2022;13:21501319211063051.
10. Min W, Cui H, Han Q, Zou F. A scene recognition and semantic analysis approach to unhealthy sitting posture detection during Screen-Reading. Sens (Basel). 2018;18(9).
11. A. J. Health Consequences From Poor Posture.

12. Dzakpasu FQS, Carver A, Brakenridge CJ, Cicuttini F, Urquhart DM, Owen N, et al. Musculoskeletal pain and sedentary behaviour in occupational and non-occupational settings: a systematic review with meta-analysis. Int J Behav Nutr Phys Act. 2021;18(1):159.
13. Kocur P, Wilski M, Lewandowski J, Łochyński D. Female office workers with moderate neck pain have increased anterior positioning of the cervical spine and stiffness of upper trapezius myofascial tissue in sitting posture. Pm R. 2019;11(5):476–82.
14. Ma Z, Ma X, Yang H, Guan X, Li X. Anterior cervical discectomy and fusion versus cervical arthroplasty for the management of cervical spondylosis: a meta-analysis. Eur Spine J. 2017;26(4):998–1008.
15. Zuo G, Gao TC, Xue BH, Gu CC, Yan YT, Zhang YW, et al. Assessment of the efficacy of acupuncture and chiropractic on treating cervical spondylosis radiculopathy: A systematic review and meta-analysis. Med (Baltim). 2019;98(48):e17974.
16. Waqar M, Wilcock J, Garner J, Davies B, Kotter M. Quantitative analysis of medical students' and physicians' knowledge of degenerative cervical myelopathy. BMJ Open. 2020;10(1):e028455.
17. Chen Q, Zhang Y, Li H. Knowledge, attitude, and practice toward non-nutritive sweeteners among the population with reduced sugar intake requirement. Front Nutr. 2023;10:1268599.
18. Latka D, Miekisiak G, Jarmuzek P, Lachowski M, Kaczmarczyk J. Treatment of degenerative cervical spondylosis with radiculopathy. Clinical practice guidelines endorsed by the Polish society of spinal surgery. Neurol Neurochir Pol. 2016;50(2):109–13.
19. Watanabe M, Chikuda H, Fujiwara Y, Furuya T, Kanchiku T, Nagoshi N, et al. Japanese orthopaedic association (JOA) clinical practice guidelines on the management of cervical spondylotic Myelopathy,2020 - Secondary publication. J Orthop Sci. 2023;28(1):1–45.
20. 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.
21. Edelmann D, Pfirrmann D, Heller S, Dietz P, Reichel JL, Werner AM, et al. Physical activity and sedentary behavior in university Students-The role of gender, age, field of study, targeted degree, and study semester. Front Public Health. 2022;10:821703.
22. Lai WK, Mohd Sidik S, Lekhraj R, Gan WY, Ismail SIF. Prevalence and predictors of overweight and obesity among adolescents in Seremban, negeri Sembilan, Malaysia. Cureus. 2022;14(1):e21795.
23. Khan MU, Ahmad A, Aqeel T, Salman S, Ibrahim Q, Idrees J, et al. Knowledge, attitudes and perceptions towards polio immunization among residents of two highly affected regions of Pakistan. BMC Public Health. 2015;15:1100.
24. Solhi M, Pirouzeh R, Zanjari N. Perspectives on healthy aging in middle age: evidence for health promotion interventions. J Educ Health Promot. 2022;11:5.
25. Kato S. Complications of thoracic spine surgery - Their avoidance and management. J Clin Neurosci. 2020;81:12–7.
26. Ohgoshi Y, Kubo EN. Inter-semispinal plane block for cervical spine surgery. J Clin Anesth. 2018;46:94–5.
27. Rolving N, Oestergaard LG, Willert MV, Christensen FB, Blumensaat F, Bünger C, et al. Description and design considerations of a randomized clinical trial investigating the effect of a multidisciplinary cognitive-behavioural intervention for patients undergoing lumbar spinal fusion surgery. BMC Musculoskelet Disord. 2014;15:62.
28. Garg K, Sahu R, Agrawal M, Mishra S, Borkar S, Chandra PS, et al. Use of assessment tools in cervical spondylotic Myelopathy-Results of an anonymized survey among Indian spine surgeons. Neurol India. 2022;70(Supplement):S276–81.
29. Guan H, Zhu H, Gao J, Ding T, Wu Q, Bi Y, et al. A systematic review of tuina for cervical hypertension: A protocol for systematic review and meta-analysis. Med (Baltim). 2022;101(40):e30699.
30. Yao S, Ouyang B, Lu T, Chen Q, Luo C. Treatment of cervical spondylotic radiculopathy with posterior percutaneous endoscopic cervical discectomy: Short-term outcomes of 24 cases. Med (Baltim). 2020;99(20):e20216.
31. Lee GW, Shin H, Chang MC. Deep learning algorithm to evaluate cervical spondylotic myelopathy using lateral cervical spine radiograph. BMC Neurol. 2022;22(1):147.
32. Luyao H, Xiaoxiao Y, Tianxiao F, Yuandong L, Ping W. Management of cervical spondylotic radiculopathy: A systematic review. Global Spine J. 2022;12(8):1912–24.
33. Zhu C, Tao J, Mo S. Esophageal cervical spondylosis complicated with cervical disc herniation: A rare case report. Med (Baltim). 2022;101(39):e30804.

Publisher's note