

BMJ Open is committed to open peer review. As part of this commitment we make the peer review history of every article we publish publicly available.

When an article is published we post the peer reviewers' comments and the authors' responses online. We also post the versions of the paper that were used during peer review. These are the versions that the peer review comments apply to.

The versions of the paper that follow are the versions that were submitted during the peer review process. They are not the versions of record or the final published versions. They should not be cited or distributed as the published version of this manuscript.

BMJ Open is an open access journal and the full, final, typeset and author-corrected version of record of the manuscript is available on our site with no access controls, subscription charges or pay-per-view fees (<u>http://bmjopen.bmj.com</u>).

If you have any questions on BMJ Open's open peer review process please email <u>info.bmjopen@bmj.com</u>

# **BMJ Open**

## Knowledge, attitudes, and practices among patients with impacted wisdom teeth toward teeth extraction

Journal:	BMJ Open
Manuscript ID	bmjopen-2024-087110
Article Type:	Original research
Date Submitted by the Author:	01-Apr-2024
Complete List of Authors:	Sun, Jing; Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases, School and Hospital of Stomatology, Cheeloo College of Medicine; Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration, Jinan Stomatological Hospital, Department of Periodontology Meng, Junru; Jinan Stomatological Hospital, Hospital Infection Management Office Wang, Xin ; Jinan Stomatological Hospital, Department of Periodontology, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration Wang, Bing; Jinan Stomatological Hospital, Department of Oral and Maxillofacial Surgery, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration Luan, Xiao ; Jinan Stomatological Hospital, Department of Periodontology, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration Luan, Xiao ; Jinan Stomatological Hospital, Department of Periodontology, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration Li, Shu; School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases, Department of Periodontology Tong, Dongdong; School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Y. Cheeloo College of Medicine, Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases, Department of Oral and Maxillofacial Surgery
Keywords:	Cognition, ORAL MEDICINE, Surveys and Questionnaires

#### SCHOLARONE<sup>™</sup> Manuscripts



I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our <u>licence</u>.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which <u>Creative Commons</u> licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

terez oni

Enseignement Superieur (ABES) Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies



Knowledge, attitudes, and practices among patients with impacted wisdom teeth toward teeth extraction

Running Title: KAP toward wisdom teeth extraction

Jing Sun<sup>1,2†</sup>, Junru Meng<sup>3,†</sup>, Xin Wang<sup>2</sup>, Bing Wang<sup>4</sup>, Xiao Luan<sup>2</sup>, Shu Li<sup>5,\*</sup>, Dongdong Tong<sup>6,\*</sup>

<sup>1</sup> School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases,No.44-1 Wenhua Road West, 250012, Jinan, Shandong, China

<sup>2</sup> Department of Periodontology, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration, Jinan Stomatological Hospital, Jinan 250000, China.

<sup>3</sup>Hospital Infection Management Office, Jinan Stomatological Hospital, Jinan 250000, China

<sup>4</sup> Department of Oral and Maxillofacial Surgery, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration, Jinan Stomatological Hospital, Jinan 250000, China.

<sup>5</sup>Department of Periodontology, School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases,No.44-1 Wenhua Road West, 250012, Jinan, Shandong, China

<sup>6</sup> Department of Oral and Maxillofacial Surgery, School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University & Shandong Key Laboratory of

Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases,No.44-1 Wenhua Road West, 250012, Jinan, Shandong, China

<sup>†</sup>These authors contributed equally to this work.

\*Corresponding Author:

Dongdong Tong

E-mail: kqtongdong@163.com

Tel: +86-18805310185

Shu Li

E-mail: lishu@sdu.edu.cn

re teres on

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

#### ABSTRACT

**Objectives:** This study aimed to assess the knowledge, attitudes, and practices (KAP) among patients with impacted wisdom teeth toward tooth extraction, with the intention of identifying gaps and opportunities for improved dental health education and practices. **Design:** A cross-sectional study employing a web-based questionnaire.

**Setting:** The study was conducted at the Department of Oral and Maxillofacial Surgery, School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University, and Jinan Stomatological Hospital.

**Participants:** This study garnered responses from 3,467 individuals presenting with impacted wisdom teeth at the study settings between March and May 2023.

**Primary and Secondary Outcome Measures:** The primary outcomes measured were the levels of knowledge, attitudes, and practices toward wisdom teeth extraction among participants. The knowledge was assessed on a scale of 0-11, attitudes on a scale of 10-50, and practices on a scale of 11-55. Secondary outcomes included the exploration of relationships between knowledge, attitudes, and practices using structural equation modeling.

**Results:** Participants demonstrated a mean knowledge score of  $9.1\pm1.4$ , mean attitude score of  $38.0\pm2.7$ , and mean practice score of  $41.7\pm8.2$ . The analysis using a structural equation model revealed a direct effect of knowledge on attitudes (path coefficient = 2.042, p<0.001) and a direct effect of attitudes on practices (path coefficient = 1.460, p<0.001).

**Conclusions:** The findings suggest that patients with impacted wisdom teeth possess sufficient knowledge and favorable attitudes towards teeth extraction, which positively influences their practices. However, there is still a need for tailored interventions to further enhance the KAP toward wisdom teeth extraction in this population.

Page 5 of 48

#### Strengths and limitations of this study

- This study, while offering significant insights into the knowledge, attitudes, and practices of patients with impacted wisdom teeth regarding tooth extraction, is characterized by both strengths and limitations related to its methodology. Firstly, the large sample size utilized in the survey enhances the representativeness and generalizability of the findings, ensuring that the results can be applied to a broader population with similar conditions.
- Furthermore, the comprehensive exploration of the relationships between knowledge, attitudes, and practices provides valuable insights that can inform clinical guidance and patient education strategies.
- However, the study's reliance on self-reported data may introduce discrepancies between reported behaviors and actual practices, potentially affecting the accuracy of the findings.

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

 Additionally, the exclusive use of online surveys for data collection could lead to non-response bias, as certain demographics may be underrepresented among respondents. Despite these limitations, the study's methodological strengths contribute to a deeper understanding of patient perspectives on wisdom teeth extraction, offering a foundation for future research and clinical improvements in this area.

Keywords: Knowledge; Attitude; Practice; Cross-Sectional Study; Wisdom teeth;

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

#### Introduction

Impacted wisdom teeth constitute a significant public health issue due to their high prevalence and the associated complications[1]. Epidemiological evidence indicates that a substantial proportion of the adult population will develop at least one impacted wisdom teeth, necessitating consideration for extraction to mitigate potential risks such as infection, crowding, and other dental pathologies[1, 2].

Nevertheless, the extraction procedure for impacted wisdom teeth is fraught with challenges. It is well-documented that these procedures can elicit significant psychological stress in patients, resulting in dental anxiety or phobia[3]. This stress is exacerbated by the complexity and invasiveness inherent in the extraction of impacted teeth, which can amplify patients' apprehensions and uncertainties concerning dental care[4, 5]. Such anxiety and uncertainty negatively impact patients' attitudes towards dental health and treatment, potentially leading to detrimental dental health behaviors, delayed care-seeking, and consequently, poorer dental and overall health outcomes[6,

7].

Knowledge-Attitude-Practice (KAP) model posit that an individual's knowledge significantly influences their attitudes towards health and illness, which, in turn, shapes their health-related behaviors[8, 9]. Despite the recognition of dental anxiety among patients with impacted wisdom teeth, there exists a conspicuous gap in the research literature regarding the application of the KAP model to comprehend and address this issue. Predominant research efforts have been directed towards delineating the prevalence of dental anxiety and its determinants within this demographic[3, 10, 11],

**BMJ** Open

with insufficient focus on elucidating how knowledge and attitudes concerning wisdom teeth impaction and extraction affect health behaviors.

Thus, this study aims to bridge this gap by leveraging the KAP framework to investigate the knowledge, attitudes, and practices toward wisdom teeth extraction among patients with impacted wisdom teeth.

#### **Materials and Methods**

#### Study design and participants

This cross-sectional study was conducted between March and May 2023 at Department of Oral and Maxillofacial Surgery, School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University and Jinan Stomatological Hospital.

The inclusion criteria as follows: 1) patients diagnosed with impacted wisdom teeth at the Department of Oral and Maxillofacial Surgery, School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University, and 2) patients proficient in the Chinese language to ensure effective communication during the data collection process. Conversely, those who reported participation in similar studies were excluded from this study. This study was approved by the Ethics Committee of the School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University (Ethical No. 20230361), The medical ethics committee of Jinan Stomatological Hospital (JNSKQYY-2023-001) and informed consent was obtained from all patients.

#### Questionnaire introduction and data collection

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

The questionnaire was designed with reference to relevant guidelines and previous literature[12, 13], and was revised by two chief physicians and one vice-chief physician. A pilot test was conducted (n=34) and Cronbach's  $\alpha$  coefficient value was 0.819, indicating a good internal consistency.

The final questionnaire contains four dimensions: demographic characteristics, knowledge, attitudes and practices. The knowledge dimension consists of 13 questions, with 1 point for a correct answer and 0 points for the rest. Questions K5 and K10 were designed as trap questions, presenting exactly opposite meanings. patients who selected "right" or "wrong" for both questions were deemed to have a logical conflict and were excluded from the survey. Consequently, the knowledge scores ranged from 0 to 11 points. The attitudes dimension consists of 13 questions, wherein questions A11-A13 are designated exclusively for descriptive analysis purposes. The remaining questions utilized a 5-point Likert scale, ranging from very positive (5 points) to very negative (1 point), yielding a possible score range of 10-50 points. The practices dimension consists of 11 questions using a 5-point Likert scale as well, ranging between very conforming (5 points) to very non-conforming (1 point), with a possible score range of 11-55 points. Both electronic and printed versions of the questionnaire were utilized in this study. The electronic questionnaire was hosted on Sojump (http://www.sojump.com), an online survey platform. At the onset of it, patients were required to indicate their consent by clicking the option "I agree to participate in this study" before proceeding to respond to the questions. The data collection process ensured anonymity. Additionally, an IP restriction was implemented to prevent duplication of responses,

restricting the survey completion to a single instance from each unique IP address. To accommodate individuals less acquainted with electronic devices, such as elderly patients, printed questionnaires were made available during their clinic visit, and they were requested to complete the printed forms. During the dissemination of it, five trained research assistants first introduced the study face-to-face to patients before distributing the questionnaires. They also assisted patients when needed, checked questionnaire completeness, and asked the patients to complete any missing information.

#### Statistical analysis

STATA 17.0 (STATA Corporation, College Station, TX, USA) was utilized for statistical analyses. Continuous variables were presented as mean±standard deviation (SD) and were compared using the student's t-test or one-way analysis of variance (ANOVA). Categorical variables were presented as numbers (percentages). In this study, 70% of the total score was used as the cut-off value, that means the threshold for sufficient knowledge, favorable attitudes, and proactive practices were 7.7, 35 and 38.5 points respectively[14]. Pearson correlation was used to analyze the correlation between knowledge, attitudes, and practices. Variables with p<0.02 in the single-factor logistic regression analysis are included in the multivariate logistic regression analysis. AMOS 24.0 (IBM, NY, USA) was utilized to construct a structural equation model (SEM) examining the knowledge, attitudes, and practices of patients with impacted wisdom toward wisdom teeth extraction. This SEM tested the main hypotheses as follows: 1) knowledge had direct effects on attitudes, 2) knowledge had direct effects

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

on practices, and 3) attitudes had direct effects on practices. Model fit was evaluated using CMIN/DF (Chi-square goodness-of-fit test/Degrees of Freedom), RMSEA (Root Mean Square Error of Approximation), IFI (Incremental Fixation Index), TLI (Tucker-Lewis index) and CFI (Comparative Fixation Index). A two-sided p-value <0.05 was considered statistically significant.

#### Results

A total of 3467 patients participated in this study. Among them, 1092 (31.50%) were aged 30 or below, 2259 (65.16%) were female, 2927 (84.42%) lived in urban areas, and 2391 (68.96%) brushed their teeth twice daily. In addition, 1790 (51.63%) had undergone wisdom teeth extraction. The mean scores of knowledge, attitudes, and practices were  $9.1\pm1.4$  (possible range: 0-11),  $38.0\pm2.7$  (possible range: 10-50), and  $41.7\pm8.2$  (possible range: 11-55), respectively (**Table S1**).

The three knowledge items with the highest correctness rates were "The primary issues associated with wisdom teeth are insufficient space and misalignment." (K2), with a correctness rate of 89.59%, "Wisdom teeth are unlikely to cause damage to neighboring teeth, even if left untreated promptly." (K5), with a correctness rate of 88.78%, and "Delaying the treatment of wisdom teeth may result in harm to neighboring teeth." (K10), with a correctness rate of 88.78%. The three items with the lowest correctness rates were "In cases where the growth of wisdom teeth leads to a severe infection, fever may not necessarily be present." (K4), with a correctness rate of 74.53%, "Various treatment options exist for wisdom teeth, including medications (antibiotics, traditional

Chinese medicine, etc.) and surgical procedures (incision and drainage, wisdom teeth extraction, etc.)." (K9), with a correctness rate of 78.40%, and "Wisdom teeth, also known as third molars, are the last and farthest-back teeth to emerge in the mouth. They typically surface in adults between the ages of 18 and 25 years." (K1), with a correctness rate of 80.93% (**Table 1**).

#### Table 1. Knowledge

Knowledge	Correctness Rate N(%)
K1. Wisdom teeth, also known as third molars, are the last and farthest-back teeth to emerge in the mouth. They typically surface in $125$ (T	2806 (80.93)
adults between the ages of 18 and 25 years. ( <b>True</b> ) K2. The primary issues associated with wisdom teeth are insufficient space and misalignment. ( <b>True</b> )	3106 (89.59)
K3. The emergence of wisdom teeth can lead to pain, inflammation, facial and jaw congestion, edema, and difficulty in swallowing.	2826 (81.51)
(True) K4. In cases where the growth of wisdom teeth leads to a severe infection, fever may not necessarily be present. (False)	2584 (74.53)
K5. Wisdom teeth are unlikely to cause damage to neighboring teeth, even if left untreated promptly. (False)	3078 (88.78)
K6. The growth of wisdom teeth can create gaps that allow food debris to enter, resulting in a range of symptoms, including inflammation. <b>(True)</b>	2906 (83.82)
K7. Consuming spicy, hard, and sticky foods can exert pressure on the teeth, leading to pain and swelling. Additionally, sugars in food and drinks can contribute to plaque buildup on teeth, causing dental caries and other oral problems. Thus, it is advisable to minimize their intake.	3043 (87.77)
( <b>True</b> ) K8. Not all patients require wisdom teeth extraction, particularly if they are growing normally and not causing any dental problems. ( <b>False</b> )	2871 (82.81)
K9. Various treatment options exist for wisdom teeth, including medications (antibiotics, traditional Chinese medicine, etc.) and surgical procedures (incision and drainage, wisdom teeth extraction, etc.). (True)	2718 (78.40)
K10. Delaying the treatment of wisdom teeth may result in harm to neighboring teeth. ( <b>True</b> )	3078 (88.78)

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

K11. Wisdom teeth extraction may cause temporary discomfort and	-
swelling, but it generally does not have any long-term effects on the	2998 (86.47)
function and appearance of the mouth. (True)	
K12. Following the wisdom teeth extraction, patients should adhere	
to the prescribed regimen, which may include ice compresses, a	3022 (87.16)
specific diet, and proper oral care, to alleviate pain. (True)	
K13. Wisdom teeth extraction always leads to a slimmer face. (False)	2819 (81.31)

A significant majority of the patients (93.86%) strongly agreed or agreed that they are willing to proactively engage in discussions with their doctor about their condition and receive professional medical support (A1). Similarly, a high percentage (92.70%) claimed that they believe in actively seeking medical treatment if they experience visible symptoms in their wisdom teeth (A5). Additionally, an overwhelming 90.51% of the patients expressed trust in the treatment plan proposed by an oral surgeon and demonstrated their willingness to heed the professional advice given by the oral surgeon (A7). However, it is worth noting that a considerable portion (58.23%) of the patients admitted to experiencing fear and anxiety when undergoing procedures related to wisdom teeth (A6). Additionally, 58.96% of the patients expressed fear concerning potential hazards associated with wisdom teeth (A4). Furthermore, 25.12% of the patients strongly agreed or agreed that the daily care or wisdom teeth extraction may demand a significant amount of time and energy, leading to a lack of willingness to prioritize it (A8). The decision-making process for undergoing wisdom teeth extraction is influenced by the reimbursement rates provided by medical insurance, as mentioned by 46.47% of the patients (A13). Additionally, 47.6% of the patients preferred medication as an intervention for wisdom teeth rather than opting for surgical procedures (A12). Interestingly, a substantial 80.3% of the patients expressed their

willingness to undergo prophylactic wisdom teeth extraction if recommended by their doctor (A11) (**Table 2**).

to occur terien only

Fable 2. AttitudesImage: Strongly agree N(%)Neutral Strongly agree N(%)Disagree N(%)Disagree N(%)Strongly disagree N(%)A1. You are willing to proactively discuss your condition with your doctor and seek professional medical support. (Positive)1863 (53.75%)1391 (40.14%)99 (2.86%)99 (2.86%)Colspan="2">Colspan="2"Colspan="2">Colspan="2"Colspan="2				by copyright, including	jopen-2024-087110		
N(%)N(%)N(%)N(%)N(%)N(%)A1. You are willing to proactively discuss your condition with your doctor and seek professional medical support. (Positive)1863 (53.75%)1391 (40.14%)99 (2.86%)99 (2.86%)99 (2.34%)33 (0.95%)A2. You are open to discussing your wisdom teeth condition with friends or family and seeking their advice on whether to retain or extract them. (Positive)144 (32.97%)1664 (48.00%)424 (12.23%)426 (5.14%)57 (1.64%)A3. You are willing to acquire medical knowledge related to the risks and wisdom teeth extraction through concise online videos or books. (Positive)1180 (34.06%)1878 (54.18%)216 (6.23%)90 (9.22%)86 (2.48%)A4. You are concerned about potential hazards posed by wisdom teeth in your daily life, such as inflammation and infection. (Negative)1884 (54.41%)1330 (38.38%)124 (3.57%)149 (4.29%)A5. You firmly believe in seeking medical treatment if you experience visible symptoms related to your wisdom teeth extraction would elicit feelings of fear or anxiety about the surgery. 668 (19.27%)1351 (38.96%)880 (25.40%)149 (4.29%)A7. You place trust in your oral surgeon's treatment plan and are receptive to their professional advice. (Positive)1414 (40.80%)1724 (49.72%)216 (6.23%)90 (2.17%)38 (1.10%)A8. You consider the daily care or extraction of your windom teath to be this accounting and anement1414 (40.80%)1724 (49.72%)216 (6.23%)90 (2.17%)38 (1.10%)A8. You consider the daily care or extraction of your windom teath to be this accounting and anem	able 2. Attitudes				on ω	94	_
A1. You are willing to proactively discuss your condition with your doctor and seek professional medical support. (Positive) A2. You are open to discussing your wisdom teeth condition with friends or family and seeking their advice on whether to retain or extract them. (Positive) A3. You are willing to acquire medical knowledge related to the risks and wisdom teeth extraction through concise online videos or books. (Positive) A4. You are concerned about potential hazards posed by wisdom teeth in your daily life, such as 644 (18.56%) 1400 (40.39%) 1017 (29.33% models (2.44%) 1330 (38.38%) 124 (3.57%) are simple professional advice. A5. You experience visible symptoms related to your wisdom teeth extraction would elicit feelings of fear or anxiety about the surgery. A6. Undergoing wisdom teeth extraction would elicit feelings of fear or anxiety about the surgery. A7. You place trust in your oral surgeon's treatment plan and are receptive to their professional advice. (Positive) A8. You consider the daily care or extraction of your wisdom teet he time concurring and enargy.				Neutrai g	Disagree	0.0	
condition with friends or family and seeking their advice on whether to retain or extract them. (Positive) A3. You are willing to acquire medical knowledge related to the risks and wisdom teeth extraction through concise online videos or books. (Positive) A4. You are concerned about potential hazards posed by wisdom teeth in your daily life, such as inflammation and infection. (Negative) A5. You firmly believe in seeking medical treatment if you experience visible symptoms related to your wisdom teeth. (Positive) A6. Undergoing wisdom teeth extraction would elicit feelings of fear or anxiety about the surgery. (Negative) A7. You place trust in your oral surgeon's treatment plan and are receptive to their professional advice. (Positive) A8. You consider the daily care or extraction of your wisdom teeth to he time consuming, and anarow A8. You consider the daily care or extraction of your wisdom teeth to the time consuming, and anarow A8. You consider the daily care or extraction of your wisdom teeth to the time consuming, and anarow A8. You consider the daily care or extraction of your wisdom teeth to the time consuming, and anarow A8. You consider the daily care or extraction of your wisdom teeth to the time consuming, and anarow A8. You consider the daily care or extraction of your wisdom teeth to the time consuming, and anarow A8. You consider the daily care or extraction of your windom teeth to the time consuming, and anarow A8. You consider the daily care or extraction of your windom teeth to the time consuming, and anarow A6. You place trust in your oral surgeon's treatment plan and are receptive to their professional advice. A8. You consider the daily care or extraction of your windom teeth to bair consuming, and anarow A8. You consider the daily care or extraction of your windom teeth to bair consuming, and anarow A6. You consider the daily care or extraction of your windom teeth to bair consuming, and anarow A8. You consider the daily care or extraction of your windom teeth to ban the top consuming and	condition with your doctor and seek professional medical support. (Positive)			es r	inse inse inse inse inse inse inse inse		
A3. You are willing to acquire medical knowledge related to the risks and wisdom teeth extraction through concise online videos or books. ( <b>Positive</b> ) A4. You are concerned about potential hazards posed by wisdom teeth in your daily life, such as inflammation and infection. ( <b>Negative</b> ) A5. You firmly believe in seeking medical treatment if you experience visible symptoms related to your wisdom teeth. ( <b>Positive</b> ) A6. Undergoing wisdom teeth extraction would elicit feelings of fear or anxiety about the surgery. A7. You place trust in your oral surgeon's treatment plan and are receptive to their professional advice. ( <b>Positive</b> ) A8. You consider the daily care or extraction of your wisdom teath to be time concurring and energy.	condition with friends or family and seeking their advice on whether to retain or extract them.	1144 (32.97%)	1664 (48.00%)	424 (12.23%)	ent Supplied	57 (1.64%)	
by wisdom teeth in your daily life, such as 644 (18.56%) 1400 (40.39%) 1017 (29.33% 1000 (9.22%) 86 (2.48%) 1400 (40.39%) 1017 (29.33% 1000 (9.22%) 86 (2.48%) 1000 (9.22%) 86 (2.48%) 1400 (40.39%) 1017 (29.33% 1000 (9.22%) 86 (2.48%) 1100 (40.39%) 124 (3.57%) 1100 (9.22%) 86 (2.48%) 1100 (9.22%) 86 (2.48%) 1100 (9.22\%) 1100 (9.22\%) 1100 (9.22\%) 1100 (9.22\%) 1100 (9.22\%) 1100 (9.22\%) 1100 (9.22\%) 1100 (9.22\%) 1100 (9.22\%) 1100 (9.22\%) 1100 (9.22\%) 1100 (9.2	A3. You are willing to acquire medical knowledge related to the risks and wisdom teeth extraction	1180 (34.06%)	1878 (54.18%)	, ín		79 (2.28%)	
if you experience visible symptoms related to your 1884 (54.41%) 1330 (38.38%) 124 (3.57%) Mile T (3.38%) 12 (0.35%) 12 (0.35%) A6. Undergoing wisdom teeth extraction would elicit feelings of fear or anxiety about the surgery. 668 (19.27%) 1351 (38.96%) 880 (25.40%) (Negative) A7. You place trust in your oral surgeon's treatment plan and are receptive to their professional advice. 1414 (40.80%) 1724 (49.72%) 216 (6.23%) (Positive) A8. You consider the daily care or extraction of your wiedom teeth to be time consuming and energy.	by wisdom teeth in your daily life, such as inflammation and infection. (Negative)	644 (18.56%)	1400 (40.39%)	Þ		86 (2.48%)	
feelings of fear or anxiety about the surgery. $668 (19.27\%)$ 1351 (38.96%) 880 (25.40%) $\overrightarrow{t}$ (19 (12.08%) 149 (4.29%) (Negative) A7. You place trust in your oral surgeon's treatment plan and are receptive to their professional advice. 1414 (40.80%) 1724 (49.72%) 216 (6.23%) $\overrightarrow{t}$ (2.17%) 38 (1.10%) (Positive) A8. You consider the daily care or extraction of your wisdom teeth to be time consuming and energy	if you experience visible symptoms related to your wisdom teeth. (Positive)		1330 (38.38%)	124 (3.57%) and sim	417 (3.38%)	12 (0.35%)	
plan and are receptive to their professional advice. 1414 (40.80%) 1724 (49.72%) 216 (6.23%) $\frac{1}{5}$ (2.17%) 38 (1.10%) (Positive) A8. You consider the daily care or extraction of your wisdom teeth to be time consuming and energy	feelings of fear or anxiety about the surgery. (Negative)		1351 (38.96%)	chn	une une	149 (4.29%)	
wisdom teeth to be time consuming and energy	plan and are receptive to their professional advice. (Positive)	1414 (40.80%)	1724 (49.72%)	216 (6.23%) <b>bigging</b>	10, 755 (2.17%) 25 at	38 (1.10%)	
wisdom teeth to be time-consuming and energy- demanding, hence, you do not prioritize it.       325 (9.38%)       546 (15.75%)       408 (11.76%)       588 (17.00%)         (Negative)       Image: State of the state	wisdom teeth to be time-consuming and energy- demanding, hence, you do not prioritize it.	325 (9.38%)	546 (15.75%)	408 (11.76%)	ce Bi	588 (17.00%)	_

Page 15 of 48		BMJ	Open		ijopen-2 d by cop	
1 2 3					jopen-2024-087110 o I by copyright, includ	
4 5 6 7 8	A9. You recognize the significance of a good diet and oral hygiene in preventing and managing wisdom teeth issues. ( <b>Positive</b> ) A10. You acknowledge the importance of regular	1382 (39.87%)	1550 (44.69%)	345 (9.95%)	ing 5 1022 (3.52%)	68 (1.96%)
9 10 11	oral check-ups in preventing wisdom teeth-related diseases. (Positive)	1407 (40.57%)	1727 (49.77%)	201 (5.79%)	ecembe(2024) Enseigneme Enseigneme	70 (2.02%)
12		Yes	No			
13 14 15	A11. If the doctor recommends prophylactic wisdom teeth extraction, you would be willing to undergo the surgery.	2784 (80.30%)	683 (19.70%)		Downloade Nt Superieu o text and c	
16 17 18 19	A12. You prefer medication over surgery as an intervention for wisdom teeth, viewing surgery as a last resort rather than a first-choice approach.	1650 (47.60%)	1817 (52.40%)		id from http r (ABES) . lata mining,	
20 21 22 23 24	A13. The reimbursement rates of medical insurance for wisdom teeth extraction and related costs significantly influence your decision on whether to undergo the procedure.	1403 (46.47%)	2064 (59.53%)		d from http://bmjopen.br (ABES) . ata mining, Al training, a	
25 26 27 28 29 30 31 32 33 34 35 36					mj.com/ on June 10, 2025 at Agence and similar technologies.	
37 38 39 40 41					e Bibliographique de	
42 43 44 45 46	For peer review o	nly - http://bmjoper	14 1.bmj.com/site/abou	t/guidelines.xhtn	nl de l	

Enseignement Superieur (ABES) Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies

Moreover, 83.89% of the patients reported (very confirming or confirming) that they are highly capable of evaluating the risks and benefits associated with wisdom teeth extraction, and they readily accept their dentist's treatment recommendations (P9). Additionally, 79.23% claimed that they utilize dental floss to clean the crevices that a toothbrush cannot effectively reach during oral cleaning (P5). Moreover, 74.70% of the patients asserted their ability to evaluate issues and make incremental adjustments concerning their experiences with wisdom teeth prevention or treatment (P11). However, the proportion of patients who confirmed their intention to inform their family or friends about the potential hazards of wisdom teeth and remind them to seek prompt medical attention or have their wisdom teeth extracted was only 33.89% (P8). Similarly, only 47.76% of the patients reported being consciously vigilant about their oral health by regularly visiting the dental clinic (P3) (**Table 3**).

Revenues on the second

age 17 of 48			BMJ Open		ijopen-2024-087110 4 by copyright, incl	
					open-2024-087110 on by copyright, includir	
	Table 3. Practices	Very conforming N(%)	Conforming N(%)	Neutral N(%)	<u> </u>	Very non-conforming N(%)
)   2 3 4	P1: You will attend lectures on the topic of wisdom teeth and other oral health problems that can arise throughout your life, or you can acquire knowledge about the risks and wisdom teeth extraction through books and online resources.	931 (26.88%)	1100 (31.79%)		ember 2024%) es related to text a 417 to text a	216 (6.23%)
3	P2: If you are prescribed medication, it is essential to thoroughly read the instructions to comprehend its proper usage and potential adverse effects.	858 (24.77%)	1044 (30.16%)	631 (18.23%)	oaded from http: prieur (ABES) - 639mining	295 (8.53%)
	P3: Regularly, you conscientiously monitor your oral health by visiting the dental clinic.	751 (21.70%)	905 (26.14%)	1041 (30.06%)	567 <b>4</b> 1639%)	203 (5.87%)
	P4: When brushing your teeth, use a soft toothbrush and pay careful attention to cleaning the back row of wisdom teeth, neighboring teeth, and gums.	1140 (32.92%)	1388 (40.08%)		ning, and similar	108 (3.12%)
	P5: To address areas that a toothbrush cannot effectively reach during oral cleaning, utilize dental floss to clean the crevices.	1379 (39.83%)	1368 (39.49%)	345 (9.96%)	256m7.40%)	119 (3.44%)
	P6: As part of your routine, you regularly rinse your mouth with mouthwash to maintain good oral hygiene.	1141 (32.95%)	1446 (41.77%)	384 (11.08%)	gies. (8.90%)	188 (5.44%)
	P7: Regarding your diet, you are conscious of reducing the consumption of sugary or spicy foods, and you promptly clean food	944 (27.32%)	1277 (36.90%)	822 (23.75%)	278 (8.05%) ق	146 (4.23%)
	For pe	eer review only - http://b	mjopen.6mj.com/si	te/about/guidelines	iographique de l	

		BMJ Open		ijopen-2024- 1 by copyrig	
<ul><li>debris through methods like brushing and flossing.</li><li>P8: You will inform your family or friends about the hazards of wisdom teeth and remind them to seek medical attention or promptly have their wisdom teeth removed</li></ul>	1062 (30.70%)	113 (3.27%)	895 (25.87%)	open-2024-087110 on 31 December %) Enseigneme by copyright, including for uses related t 274	123 (3.56%)
<ul> <li>if necessary.</li> <li>P9: You are capable of evaluating the risks and benefits associated with wisdom teeth extraction and accepting your doctor's treatment recommendations.</li> <li>P10: You remain vigilant for symptoms</li> </ul>	1551 (44.79%)	1354 (39.10%)		o text and det from htsuperiour (ABES) 119 data mining 525 g	47 (1.36%)
<ul> <li>such as swollen gums, teeth pain, and a foul taste in the mouth.</li> <li>P11: You have the ability to evaluate issues and make adjustments gradually based on your experiences with wisdom teeth prevention or treatment.</li> </ul>	880 (25.43%) 1094 (31.61%)	1117 (32.28%) 1496 (43.24%)		525 g 15 7%) Al training 167 g, and	160 (4.63%) 77 (2.23%)
			0	om/ on June 10, 2025 similar technologies.	
				10, 2025 at Agence lologies.	
		17		Bibliographique de	
For pe	eer review only - http	://bmjopen.bmj.com/si	ite/about/guideline	s.xhtml 🖕	

Page 18 of 48

Discussion

#### **BMJ** Open

The correlation analysis showed that the knowledge score and the attitude score were positively correlated (r = 0.288, p<0.001), and the knowledge score and the practice score were also positively correlated (r = 0.348, p<0.001). Additionally, there was a positive correlation between attitude and practice scores (r = 0.452, p<0.001) (**Table** ).

Table 4.	Correlation	analysis

	Knowledge	Attitudes	Practices
Knowledge	G		
Attitudes	0.288 (P<0.001)	1	
Practices	0.348 (P<0.001)	0.452 (P<0.001)	1

The SEM was established to further investigate whether patients with impacted wisdom' knowledge and attitude toward wisdom teeth extraction affect their practice, whether attitude plays an intermediary role between knowledge and practice, and whether knowledge can directly affect their practice according to the KAP theory. It also investigated the effect of other factors including residence and monthly per capita household income on the three dimensions mentioned above (**Table S2**). The fitting index of the structural model (CMIN/DF = 13.905; RMSEA = 0.061; IFI = 0.847; TLI = 0.834; CFI = 0.847) outperformed the respective threshold value, signifying that the data fit the structural model satisfactorily (**Table S3**). The SEM demonstrated that knowledge had direct effects on attitudes, as indicated by a path coefficient of 2.042 (p<0.001) and a significant and attitudes had direct effects on practices, with a path coefficient of 1.460 (p<0.001) (**Figure 1**).

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies

Patients with impacted wisdom had sufficient knowledge, favorable attitudes, and proactive practices toward wisdom teeth extraction.

However, this study still identified deficiencies of certain aspects. Additionally, variances in KAP levels were observed across different demographic characteristics within the patients. These findings underscore the importance of considering these factors in the development of subsequent health education programs. The present study found that male and younger patients (<30 years) tend to have higher KAP scores. This finding is different from previous studies which reported higher oral health knowledge and behaviors among female and partipants older than 30 years [15, 16]. Nonetheless, the previous studies were not conducted in a Chinese population, and characteristics of their participants were distinctive different from participants in our study. Further education and tailored interventions should be designed for female and older patients in China. Furthermore, the present study identified that urban residents, those with higher education levels, non-smokers, non-drinkers, those who had not undergone dental treatment other than wisdom teeth removal, and those who were not informed and education about wisdom teeth during their dental treatment had lower KAP scores, and future programs should also consider the knowledge needs of these patients to enhance the dental care quality and the KAP towards wisdom teeth.

The present study found sufficient knowledge of wisdom teeth and that most patients would accept being educated about wisdom teeth during other oral therapies. patients had good knowledge about potential complications associated with wisdom teeth and the importance of treating wisdom teeth in a timely manner. This finding is consistent with previous knowledge and awareness studies conducted on medical students: a large percentage of the study population was aware of wisdom teeth impaction and its consequences[17, 18]. Patients in the present study had less knowledge about infection

#### **BMJ** Open

related to wisdom teeth and different treatment options. Hanna et al. have found that patients used the internet to seek information related to wisdom teeth, but internet use was not associated with better wisdom teeth knowledge[19]. Therefore, it is important for healthcare professionals to provide patients with accurate information and internet guidance to improve wisdom teeth knowledge. Zincir et al. reported that patients found educational videos related to wisdom teeth surgical removal were excellent for patient education, and educational videos in Chinese should be made available to improve patients' knowledge[20]. Increased awareness of hazards and removal of wisdom teeth among patients with impacted wisdom will help in the management of wisdom teeth[21].

In the present study, most patients had a positive attitude toward seeking professional advice and medical treatments, and they also trusted the treatment plan formulated by their oral surgeon. This result reflected a high level of patient trust in dentists, and the level of trust is higher than previously reported[22, 23]. This discrepancy can be explained by the larger proportion of patients with higher education in the present study[24]. Similar to previous findings, patients in the present study reported a high level of anxiety about the potential hazards of wisdom teeth and extraction surgery[25-27]. Lack of knowledge about the procedure is one of the possible contributors to anxiety related to oral surgery[27]. Effective education toward wisdom teeth extraction is critical in reducing anxiety in patients and improving the quality of care. Moreover, in the present study, medical insurance reimbursement rates were a decisive factor for wisdom teeth extraction, which is consistent with a previous study conducted in the United States[28]. Thus, there is a need to improve insurance coverage of wisdom teeth treatments to improve adherence to dentists' recommendations.

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies

Most patients claimed that they would weigh the risks and benefits of wisdom teeth extraction to make an informed decision, and around 80% would use dental floss regularly. Zhao et al. reported that very few Chinese adults use dental floss, and the patients with impacted wisdom in the present study might have better practice than the general population due to their disease experience and better dental knowledge[29]. Liu et al. reported that the rate of dental care visits and the utilization of oral health resources are low in the Chinese general population[30]. It is important to enhance patients' practice by improving their knowledge and attitude toward wisdom teeth extraction. Furthermore, this study found that patients who had prior wisdom teeth extraction demonstrated better knowledge, attitudes and practices compared to those without previous wisdom teeth extraction experience. Similarly, Brasileiro et al. also identified that patients with a history of teeth extraction and those without it presented different patterns of knowledge about wisdom teeth extraction [27]. Patients who had no experience with wisdom teeth extraction may need more attention to improve their KAP in this area.

The results of correlation analysis and SEM demonstrated that patients with impacted wisdom' knowledge had direct effects on attitudes, and attitudes had direct effects on practices. These implies that patients with impacted wisdom with better knowledge about wisdom teeth would have more favorable attitudes, which indirectly results in better practice toward wisdom teeth[31]. The finding highlighted the importance of education in patients with impacted wisdom to improve their knowledge, as well as their attitude and practice toward wisdom teeth. It also found that residence had direct effects on attitudes. This finding is consistent with previous studies on dental health and dental care utilization in China[30, 32, 33]. Patients with lower income and those who lived

in rural areas tend to have poorer knowledge and health-seeking behaviors, and more clinical and research attention should be paid to these patients.

This study has some limitations. The self-reported nature of the data collection may result in deviations between reported and actual practices. Meanwhile, the use of online surveys may introduce non-response bias. Nevertheless, this study also has considerable strengths. The large sample size enhances representativeness and generalizability of the results. Furthermore, this study provides an in-depth exploration of the relationship between patients with impacted wisdom' knowledge, attitudes, and practices regarding wisdom teeth extraction. These findings offer valuable insights to inform clinical guidance in this area.

#### Conclusions

In conclusion, this KAP study demonstrated sufficient knowledge, favorable attitudes, and proactive practices toward wisdom teeth extraction among patients with impacted wisdom. Further tailored interventions should be developed and implemented in this population to improve their KAP of wisdom teeth.

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

For peer review only - http://bmjopen2bmj.com/site/about/guidelines.xhtml

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

#### 

#### Declarations

#### Ethics approval and consent to participate

This study was approved by the Ethics Committee of the School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University (Ethical No. 20230361), The medical ethics committee of Jinan Stomatological Hospital (JNSKQYY-2023-001) and Informed consent was obtained from all patients. 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.

#### Availability of data and materials

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

#### **Competing interests**

The authors declare that they have no competing interests.

#### Funding

The study was supported by grants from the Open Foundation of Shandong Province Key Laboratory of Oral Tissue Regeneration (SDDX202003)to Jing Sun and the second batch of Science and Technology Plan Projects of Jinan Municipal Health Commission (2020-3-49) to Jing Sun; The Dean's Reserch Fund of Jinan Stomatological Hospital(2021-01,2019-06).

#### **Authors' contributions**

 conceived and designed the experiments: Jing Sun, Junru Meng, Shu Li, Dongdong Tong

2	
3	2) perf
4 5 6	Tong
7	
8 9	3) ana
10 11	Dongo
12 13	4) con
14 15	Wang,
16 17 18	5) wro
19 20	Ackno
21 22	The a
23 24	researd
25 26	signifi
27 28	Sigiiii
29	
30 31	
32	
33	
34 35	
36	
37	
38 39	
40	
41	
42 43	
44	
45	
46 47	
48	
49	
50 51	
52	
53	
54 55	
56	
57	
58 59	
60	

 2) performed the experiments: Jing Sun, Xin Wang, Bing Wang, Xiao Luan, Dongdong Tong

3) analyzed and interpreted the data: Jing Sun, Junru Meng, Xin Wang, Shu Li, Dongdong Tong

4) contributed reagents, materials, analysis tools or data: Jing Sun, Junru Meng, Xin

Wang, Bing Wang, Xiao Luan, Shu Li, Dongdong Tong

5) wrote the paper: Jing Sun, Junru Meng, Shu Li, Dongdong Tong

#### Acknowledgments

The authors would like to thank the experts who contributed to this study, the researchers who assisted in the carrying out of the study and all participants for their significant contributions.

#### References

1. Hounsome J, Pilkington G, Mahon J, *et al.* Prophylactic removal of impacted mandibular third molars: a systematic review and economic evaluation. *Health Technol Assess* 2020;24:1-116.

2. Lodi G, Azzi L, Varoni EM, *et al.* Antibiotics to prevent complications following tooth extractions. *Cochrane Database Syst Rev* 2021;2:CD003811.

3. Seligman LD, Hovey JD, Chacon K, *et al.* Dental anxiety: An understudied problem in youth. *Clin Psychol Rev* 2017;55:25-40.

4. Qiao F, Zhang M, Zhang T, *et al.* Dental anxiety is related to postoperative symptoms in third molar surgery. *Front Psychiatry* 2022;13:956566.

5. Yap AU, Lee DZR. Dental fear and anxiety in Asian youths: response components and inducing stimuli. *Clin Oral Investig* 2022;26:5953-60.

6. Steinvik LM, Svartdal F, Johnsen JK. Delay of Dental Care: An Exploratory Study of Procrastination, Dental Attendance, and Self-Reported Oral Health. *Dent J (Basel)* 2023;11.

 Ekanayake L, Weerasekare C, Ekanayake N. Needs and demands for dental care in patients attending the University Dental Hospital in Sri Lanka. *Int Dent J* 2001;51:67-72.

8. Aldhamy H, Maniatopoulos G, McCune VL, *et al.* Knowledge, attitude and practice of infection prevention and control precautions among laboratory staff: a mixed-methods systematic review. *Antimicrob Resist Infect Control* 2023;12:57.

9. Nwagbara UI, Osual EC, Chireshe R, *et al.* Knowledge, attitude, perception, and preventative practices towards COVID-19 in sub-Saharan Africa: A scoping review. *PLoS One* 2021;16:e0249853.

#### **BMJ** Open

10. Muneer MU, Ismail F, Munir N, *et al.* Dental Anxiety and Influencing Factors in Adults. *Healthcare (Basel)* 2022;10.

11. Blumer S, Ram D, Costa L, *et al.* Dental Anxiety among Israeli Postgraduate Pediatric Dental Students and their Instructors. *J Clin Pediatr Dent* 2019;43:161-6.

12. Coulthard P, Bailey E, Esposito M, *et al.* Surgical techniques for the removal of mandibular wisdom teeth. *Cochrane Database Syst Rev* 2014:Cd004345.

13. Mettes TD, Ghaeminia H, Nienhuijs ME, *et al.* Surgical removal versus retention for the management of asymptomatic impacted wisdom teeth. *Cochrane Database Syst Rev* 2012:Cd003879.

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.

15. Al-Ansari JM, Honkala S. Gender differences in oral health knowledge and behavior of the health science college students in Kuwait. *J Allied Health* 2007;36:41-6.

16. Bhardwaj T, Tandon S, Chand S, *et al.* Knowledge, attitude and practice towards preventive dental care- A KAP study. *Journal of Global Oral Health*;2.

17. Raghu K, Nandhana N, Sathyanarayanan R, *et al.* Knowledge and Awareness About Tooth Impaction among Medical Students

Pursuing their Internship in Pondicherry, a Cross-Sectional Study. *Acta Scientific Dental Sciences* 2022;6:164-73.

18. Twyana R, Khanal P, Chaudhary B, *et al.* Knowledge of Impacted Teeth among the Undergraduate Dental Students of a Medical College: A Descriptive Cross-Sectional Study. *JNMA J Nepal Med Assoc* 2021;59:678-82.

 19. Hanna K, Sambrook P, Armfield J, *et al.* Internet use, online information seeking and knowledge among third molar patients attending public dental services. *Australian dental journal* 2017;62:323-30.

20. Zincir ÖÖ, Bozkurt AP, Gas S. Potential patient education of YouTube videos related to wisdom tooth surgical removal. *Journal of Craniofacial Surgery* 2019;30:e481-e4.

21. Balakrishnana G, Kumar JA, Palaniappan J, *et al.* Knowledge and Awareness About Wisdom Teeth Among Preclinical Dental Students in Chennai, India. *Borno Medical Journal* 2021;18.

22. Zhao D-H, Rao K-Q, Zhang Z-R, *et al.* Patient Trust in Physicians: Empirical Evidence from Shanghai, China. *Chinese Medical Journal* 2016;129:814-8.

23. Tucker JD, Wong B, Nie J-B, *et al.* Rebuilding patient–physician trust in China. *The Lancet* 2016;388:755.

24. Lu T, Xu Y, Wallace S. Internet usage and patient's trust in physician during diagnoses: a knowledge power perspective. *Journal of the Association for Information Science and Technology* 2018;69:110-20.

25. de Jongh A, Olff M, van Hoolwerff H, *et al.* Anxiety and post-traumatic stress symptoms following wisdom tooth removal. *Behaviour research and therapy* 2008;46:1305-10.

26. Wang TF, Wu YT, Tseng CF, *et al.* Associations between dental anxiety and postoperative pain following extraction of horizontally impacted wisdom teeth: A prospective observational study. *Medicine (Baltimore)* 2017;96:e8665.

27. Brasileiro BF, de Bragança RMF, Van Sickels JE. An evaluation of patients' knowledge about perioperative information for third molar removal. *Journal of oral and maxillofacial surgery* 2012;70:12-8.

#### **BMJ** Open

28. Cunha-Cruz J, Rothen M, Spiekerman C, et al. Recommendations for third molar removal: a practice-based cohort study. *American journal of public health* 2014;104:735-43.

29. Zhao Q, Wang S-B, Xu G, *et al.* Periodontal health: A national cross-sectional study of knowledge, attitudes and practices for the public oral health strategy in China. *Journal of Clinical Periodontology* 2019;46:406-19.

30. Liu L, Zhang Y, Wu W, *et al.* Characteristics of dental care-seeking behavior and related sociodemographic factors in a middle-aged and elderly population in northeast China. *BMC Oral Health* 2015;15:66.

31. Pan H-H, Shih H-L, Wu L-F, *et al.* Path modeling of knowledge, attitude and practice toward palliative care consultation service among Taiwanese nursing staff: a cross-sectional study. *BMC Palliative Care* 2017;16:42.

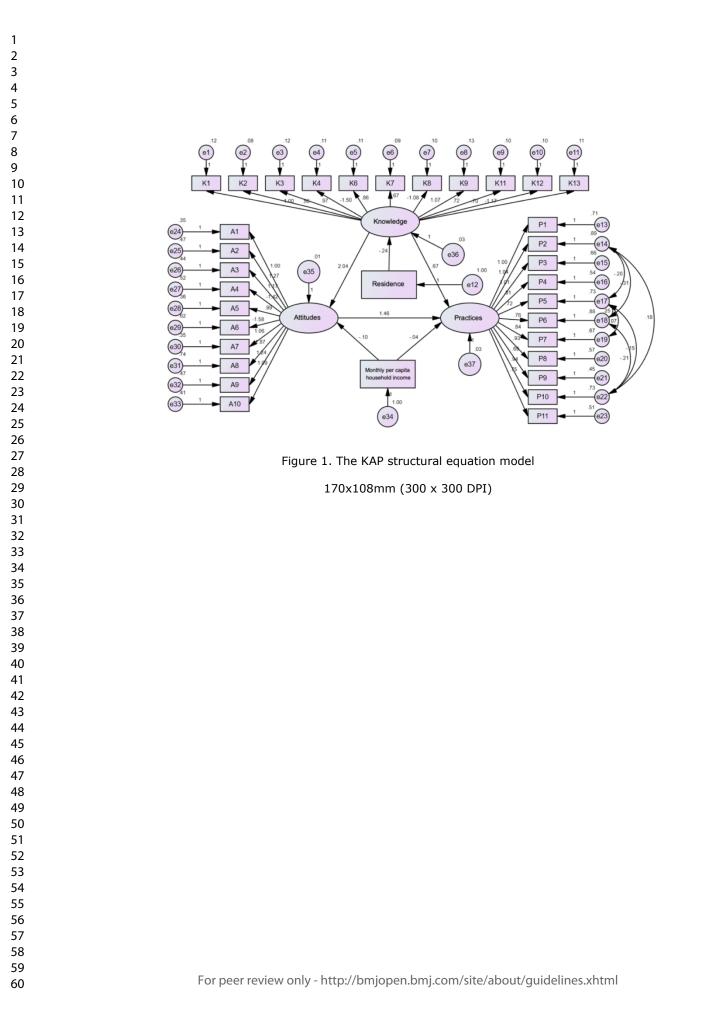
32. Li C, Yao N, Yin A. Disparities in dental healthcare utilization in China. *Community Dentistry and Oral Epidemiology* 2018;46:576-85.

33. Li C, Yao NA. Socio–Economic Disparities in Dental Health and Dental Care Utilisation Among Older Chinese. *International Dental Journal* 2021;71:67-75.

#### **Figure Legends**

Figure 1. The KAP structural equation model

to occur terien only



### Supplementary Tables

				n-2024-08711ı copyright, inc		
nation and KAD	500,005			jopen-2024-087110 on 31 Decemb Ense by copyright, including for uses i		
	Knowledge		Attitudes	er 202 relater	Practices	
N (%)	Mean ± SD	Р	Mean ± SD	d to te te	Mean ± SD	Р
3467	9.14±1.35	< 0.001	38.01±2.72	wnloa∰ec superieur strancoda	41.65±8.24	<0.00
1208 (34.84)	9.47±1.02		$39.02 \pm 1.97$	l from (ABE ata mi	48.55±5.59	
2259 (65.16)	8.97±1.47		37.47±2.91	in http: S) ·	37.97±6.96	
		< 0.001		⊲मू.0		< 0.00
1092 (31.50)	9.57±1.03		39.32±2.12	open	48.89±5.41	
889 (25.64)	9.39±1.19		38.31 ±2.55	.bmj. J, and	42.46±7.30	
1051 (30.31)	8.81±1.53		37.02±2.77	com/	36.62±6.06	
435 (12.55)	8.37±1.36		36.50±2.60	on Ju lar teo	34.01 ±4.13	
		< 0.001				< 0.00
540 (15.58)	9.43±1.01		39.11±1.74	), 202 ogie:	50.34±4.43	
2927 (84.42)	$9.09 \pm 1.40$		37.80±2.82	at	$40.05 \pm 7.76$	
131 (3.78)	9.21±1.05	<0.001	38.99±1.57	<0.00000000000000000000000000000000000	51.73±2.87	<0.00
	N (%) 3467 1208 (34.84) 2259 (65.16) 1092 (31.50) 889 (25.64) 1051 (30.31) 435 (12.55) 540 (15.58) 2927 (84.42)	N (%)Mean $\pm$ SD34679.14 $\pm$ 1.351208 (34.84)9.47 $\pm$ 1.022259 (65.16)8.97 $\pm$ 1.471092 (31.50)9.57 $\pm$ 1.03889 (25.64)9.39 $\pm$ 1.191051 (30.31)8.81 $\pm$ 1.53435 (12.55)8.37 $\pm$ 1.36540 (15.58)9.43 $\pm$ 1.012927 (84.42)9.09 $\pm$ 1.40	N (%)Knowledge $3467$ $9.14 \pm 1.35$ P $3467$ $9.14 \pm 1.35$ <0.001	N (%)KnowledgeAttitudes $3467$ 9.14 ±1.35PMean ± SD $3467$ 9.14 ±1.35 $<0.001$ $38.01 \pm 2.72$ $1208 (34.84)$ 9.47 ±1.02 $39.02 \pm 1.97$ $2259 (65.16)$ $8.97 \pm 1.47$ $37.47 \pm 2.91$ $2259 (65.16)$ $8.97 \pm 1.47$ $39.32 \pm 2.12$ $1092 (31.50)$ $9.57 \pm 1.03$ $39.32 \pm 2.12$ $889 (25.64)$ $9.39 \pm 1.19$ $38.31 \pm 2.55$ $1051 (30.31)$ $8.81 \pm 1.53$ $37.02 \pm 2.77$ $435 (12.55)$ $8.37 \pm 1.36$ $36.50 \pm 2.60$ $540 (15.58)$ $9.43 \pm 1.01$ $39.11 \pm 1.74$ $2927 (84.42)$ $9.09 \pm 1.40$ $37.80 \pm 2.82$ $<0.001$ $<0.001$ $<0.001$	nation and KAP scores.N (%)KnowledgeAttitudesMean $\pm$ SDPMean $\pm$ SDPfet scores.34679.14 $\pm$ 1.3538.01 $\pm$ 2.72and score sc	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $

Page 33 of 48				BMJ Open		ijopen-2( 1 by cop		
1 2 3						jopen-2024-087110 on 31 December 2024. Enseigneme J by copyright, including for uses related t		
4 5 6 7	High school/Technical secondary school	354 (10.21)	9.44±0.93		39.17±1.77	on 31 Dec Iding for u	50.35 ±4.61	
8 9	Junior college/Undergraduate	2382 (68.70)	9.24±1.33		38.02±2.73	ember 2 Enseigr Ises rela	41.46±7.76	
10 11 12	Postgraduate and above <b>Occupation</b>	600 (17.31)	8.56±1.51	< 0.001	37.06±2.97		35.08±5.34	< 0.001
13 14 15 16	State Organ and Enterprise Leaders Professional and Technical	239 (6.89)	9.40±0.99		39.21±1.81	Bownloaded ∯Superieur Øext and da	51.03±4.51	
17 18 19 20	Personnel (e.g., teachers, doctors, engineers, writers,	976 (28.15)	9.54±1.03		39.04±2.05		47.84±5.90	
20 21 22 23 24	etc.) General Employees and Support Staff	473 (13.64)	9.40±1.15		38.41 ±2.50	//bmjopen.t Al training,	42.44±7.03	
24 25 26 27 28	Commercial and Service Industry Workers	345 (9.95)	9.19±1.43		37.72±2.75	omj.com/ on and similar	39.81 ±7.22	
29 30 31 32 33 34 35	Agriculture,Forestry,AnimalHusbandry,Fisheries,andWaterResources Workers	199 (5.74)	8.89±1.45		37.64±2.58	from http://bmjopen.bmj.com/ on June 10, 2025 at Age (ABES) . ta mining, Al training, and similar technologies.	37.77 ±6.75	
36 37 38 39 40 41						at Agence Bibliographique de		
41 42 43 44 45 46		For peer revi	iew only - http://br	njopen.bmj.cor	n/site/about/guidelines.xl	hique de l		

				BMJ Open		ijopen-2024-087110 on 31 December 2024. Downloaded Enseignement Superieur d by copyright, including for uses related to text and da			Page 34 of 48
1						024-08 yright			
2 3						3711( ,, inc			
4						0 on Iudir			
5 6	Duadwation and Tuananant					31 D Ng fo			
7	Production and Transport Equipment Operators	174 (5.02)	$8.81 \pm 1.49$		36.82±2.83	r us	$36.56 \pm 94$		
8 9	Equipment Operators					nbei nsei es re			
10	Military	48 (1.38)	8.90±1.74		37.67±2.91	· 202 Jatec	37.29±6.83		
11 12	Student	748 (21.57)	$8.71 \pm 1.48$		36.85±3.00	4. D d to	35.66±5.34		
13	Others	265 (7.64)	$8.61 \pm 1.62$		37.15±3.02	own Sup text	35.40±6.45		
14 15	Medical Insurance					load and			
16 17	No medical insurance	306 (8.83)				ed fr ur (A data			
18	Social medical insurance	1283 (37.01)				min BES			
19 20 21	Social and commercial medical insurance	1878 (54.17)				from http://bmjo耍n.bmj.com/ on June 10, 20褒 (ABES) . ta mining, Al traio,ng, and similar technologie令			
22	Monthly per capita			< 0.001				< 0.001	
23 24	household income (CNY)			<0.001	$\mathbf{Q}_{\mathbf{A}}$	ing,		<0.001	
25	<2,000	218 (6.29)	9.33±0.95		39.30±1.78	and and	51.41±3.98		
26 27	2,000-5,000	682 (19.67)	9.58±1.01		39.14±1.84	simila	49.18±5.10		
28 29	5,000-10,000	1263 (36.43)	$9.35 \pm 1.25$		38.13±2.71	n Jui r tec	41.99±7.28		
30	10,000-20,000	831 (23.97)	8.78±1.50		37.28±2.86	ne 10 hno	36.34±5.96		
31 32	>20,000	473 (13.64)	$8.51 \pm 1.54$		36.74±2.96	0, 20 logi	$34.75 \pm 5.03$		
33	Smoking			< 0.001				< 0.001	
34 35	Yes	503 (14.51)	9.40±0.99		39.18±1.60	at Agen	50.80±3.47		
36	No	2964 (85.49)	9.10±1.40		37.81±2.82		40.10±7.79		
37	Alcohol consumption			< 0.001		<0.0 <b>6</b> 1		< 0.001	
38 39	Yes	656 (18.92)	9.44±1.00		39.26±1.78	iblio	50.25±4.43		
40						ogral			
41 42						Bibliographique es.xhtml de			
43		For peer revi	ew only - http://bn	niopen.bmi.com	/site/about/guidelin	es.xhtml <b>Q</b>			
44 45			, incp/////		,, and and galacini	<u>0</u>			
45 46									

Page 35 of 48			В	MJ Open	ijopen-20 1 by copy	
1 2 3 4					jopen-2024-087110 on 31 De d by copyright, including for	
5	No	2811 (81.08)	$9.07 \pm 1.41$	37.72±2.82	ing 31 39.65±7.60	)
7 8	Frequency of teeth brushing (per day)		<	<0.001	⊆_ŏ	
9 10	1 time	550 (15.86)	9.47±0.99	$39.19 \pm 1.78$	relate 50.02 ±4.79	)
11 12	2 times	2391 (68.96)	9.22±1.36	38.03±2.72	eignement 50.02 ±4.79 50.02 ±4.79 41.32 ±7.78	;
13 14	3 times	469 (13.53)	$8.48 \pm 1.45$	36.71±3.00	14.54±4.76	)
15	4 times or more	57 (1.64)	8.35±1.38	36.46±2.47	States <p< td=""><td>,</td></p<>	,
16 17 18 19 20	OralDiseaseComplications(multiplechoices)		· .	36.46±2.47	from http: (ABES) . ta mining,	
21 22	Gum Disease	986 (28.44)			bmjol VI train	
23 24	Dental Caries	1536 (44.30)			pen.b	
25 26	Pulpitis	689 (19.87)			and s	
27	Oral Cancer	450 (12.98)			imila	
28 29	Oral ulcers	700 (20.19)			n Jun	
30 31	Dentition defects	348 (10.04)			//bmjopen.bmj.com/ on June 10, 2025 Al training, and similar technologies.	
32 33 34 35	Irregular teeth alignment	1082 (31.21)			2025 at Agence Bibliographique de gies.	
35	Loose teeth	279 (8.05)			geno	
37 38	Other oral diseases	276 (7.96)			е В.	
39					bliog	
40 41					yrapt	
42					nique	
43 44		For peer rev	view only - http://bmjo	pen.bmj.com/site/about/guidelines.x	html e	
45					-	

< 0.001

/

			BMJ Open		open-202 by copy		Pag
No oral conditions as described above	215 (6.20)				ijopen-2024-087110 on 31 Dec 1 by copyright, including for u		
Undergone wisdom teeth extraction			< 0.001		Sem∰ber EASeig √Sereig		< 0.001
Yes	1790 (51.63)	9.51±1.08		38.90±2.33	er 2024. Ignemei elated t	46.45±6.87	
No	1677 (48.37)	8.75±1.49		37.05±2.78	bottext ar	36.53±6.25	
If have, the age at that time (years old)			< 0.001				<0.001
20 and below	350 (10.10)	9.29±0.99		39.39±1.91	from <mark>h</mark> (ABES) Ita mini	51.24±3.55	
21-30 30 and above	855 (24.66) 585 (16.87)	9.55±1.03 9.57±1.19		39.19±2.18 38.19±2.61	om http://bmjopen.bmj.com/ on June 10, 2025 BES) . mining, Al training, and similar technologies.	47.72±6.08 41.73±6.68	
If have, the reasons were (multiple choices):					ıjopen. raining ∕		/
Recurring painful inflammation	1091 (31.47)				bmj.con , and si		
Get stuck between the teeth or cheek grinding	903 (26.05)				n/ on June milar techn		
Dental caries or periodontal disease	774 (22.32)				ine 10, 2 chnolog		
Prophylactic extractions or findings on check-ups	912 (26.31)						
Surgical requirements	388 (11.19)				at Agence Bibl		
					Bibliographique s.xhtml de		
	For peer r	eview only - http://b	mjopen.bmj.cc	om/site/about/guideline	s.xhtml		

Page 37 of 48				BMJ Open		open- by cc		
1 2 3 4 5 6 7 8 9 10	Other <b>Undergone oral therapy</b> <b>other than treatment for</b> <b>wisdom teeth related oral</b> <b>diseases</b>	113 (3.26)		<0.001		jopen-2024-087110 on 31 Dece册ber 2024. Downloaded fro E琛eignement Superieur (AB d by copyright, including for us쯗 related to text and data n		<0.001
11 12	Yes	1780 (51.34)	9.50±1.07		38.89±2.34	24. Do ment S ed to te	46.55±6.80	
13 14 15	No	1687 (48.66)	8.76±1.50		37.08±2.78	wnloac Superic ext and	36.49±6.22	
16 17 18 19 20	Acceptance of being informed and educated about wisdom teeth during other oral therapies			<0.001		⊖ning,		<0.001
21 22	Yes	2540 (73.26)	9.33±1.24		38.41±2.58	//bmjopen.l Al training	43.97±7.86	
23 24 -	No	927 (26.74)	8.63±1.49		36.89±2.79	<u> </u>	35.30±5.41	
25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44		For peer revi	ew only - http://bn	njopen.bmj.com	n/site/about/guideline	mj.com/ on June 10, 2025 at Agence Bibliographique de I and similar technologies.		

			BMJ Open	open-20 by copy	
Table S2. Test re	sults of the hypothesis.			jopen-2024-087110 on 31 1 by copyright, including 1	
	Hypothesized paths			କ୍ଟିଟ୍ସ path & Defficient	P value
Hypothesis 1	Knowledge	<	Residence	_@@##	< 0.001
Hypothesis 2	Attitudes	<	Knowledge	edate 1	< 0.001
Hypothesis 3	Attitudes	<	Monthly per capita househol	r2024, Downloaded from htttg//bmjogen.bn inement Superieur (A時的), 6 inted to text and data miningr Al train仍有, a	<0.001
Hypothesis 4	Practices	<	Attitudes	ta min	< 0.001
Hypothesis 5	Practices	<	Knowledge	ing.666	0.104
Hypothesis 6	Practices	<	Monthly per capita househol	ld -(50, a	0.052
				nd similar technologies.	
	Fo	r peer review only - h	ttp://bmjopen.bmj.com/site/about/guideline	es.xhtml <b>d</b>	

3	BMJ Open	ıjopen-2024-087110 d by copyright, inclu
Table S3. Model fitness indices for t	he KAP structural equation model	Jopen-2024-087110 on 31 Desaurement value by copyright, including for uses related to t
Goodness-of-Fit Indices	Ideal standards	ទួ Maasurement value
CMIN/DF	1-3 excellent, 3-5 good	
RMSEA	<0.08 good	
IFT	>0.8 good	ont D ext ext 47
TLI	>0.8 good	and compared an
CFI	>0.8 good	data mining a set field a set
	lex.	//bmjopen.bmj.com/ on June 10, 2025 Al training, and similar technologies.
		<u>ආ</u>
		at

<ul> <li>5. Occupation</li> <li>5. Occupation</li> <li>a. State Organ and Engineers, writers, etc. General Employeer</li> </ul>	nical second by school dergraduate for above hterprise Iseacers
Part I Demographic information         1. Gender       a. Male         b. Female       b. Female         2. Age, years	ding for uses related to text and data methods below text and data methods discussed by school dergraduate Attacks
Part I Demographic information         1. Gender       a. Male         b. Female       b. Female         2. Age, years	ding for uses related to text and data methods below text and data methods discussed by school dergraduate Attacks
Part I Demographic information         1. Gender       a. Male         b. Female       b. Female         2. Age, years	reignement 2024.     Downloaded     to text and data from y school     lelow mice from y school     lergraduate     At tage     bove At tage
Part I Demographic information         1. Gender       a. Male         b. Female       b. Female         2. Age, years	reignement 2024.     Downloaded     to text and data from y school     lelow mice from y school     lergraduate     At tage     bove At tage
1. Gender       a. Male         b. Female       b. Female         2. Age, years	reignement 2024.     Downloaded     to text and data from y school     lelow mice from y school     lergraduate     At tage     bove At tage
1. Gender       a. Male         b. Female       b. Female         2. Age, years	ated to text and data metric below and data metric l below and data metric l below ate metric hical second data metric above At taba above taba
2. Age, years	to the superior of the superio
2. Age, years	to the superior of the superio
3. Residence       a. Rural         b. Urban       b. Urban         4. Education       a. Middle school and         b. High school/Tech       c. Junior college/Und         c. Junior college/Und       d. Postgraduate and a         5. Occupation       a.State Organ and En         b. Professional and       engineers, writers, et         c. General Employee       c.General Employee	below ta monoporte school dergraduate from the school dergraduate from t
b. Urban         4. Education       a. Middle school and         b. High school/Technic       b. High school/Technic         c. Junior college/Und       d. Postgraduate and and         5. Occupation       a.State Organ and End         b. Professional and       engineers, writers, etd         c. General Employee       c.General Employee	below a bove hterprise I below hterprise I below
4. Education       a. Middle school and         b. High school/Tech       c. Junior college/Und         c. Junior college/Und       d. Postgraduate and a         5. Occupation       a.State Organ and En         b. Professional and       engineers, writers, et         c. General Employee       c.General Employee	below a bove hterprise I below hterprise I below
5. Occupation b. High school/Tech b. High school/Tech c. Junior college/Und d. Postgraduate and a a.State Organ and En b.Professional and engineers, writers, et c.General Employee	nical second lergraduate above A nterprise Iseaters
5. Occupation c. Junior college/Und d. Postgraduate and a a.State Organ and En b.Professional and engineers, writers, et c.General Employee	lergraduate. $\vec{e}$ above iterprise leaders
d. Postgraduate and a         5. Occupation       a.State Organ and En         b.Professional and engineers, writers, et         c.General Employeer	above A Branders
5. Occupation a.State Organ and En b.Professional and engineers, writers, et c.General Employee	nterprise Iseacers
b.Professional and engineers, writers, et c.General Employee	<b>—</b> • <u>~</u>
engineers, writers, et c.General Employee	$\mathbf{T}$ 1 $\mathbf{T}$ $\mathbf{D}$
c.General Employee	Technica Personnel (e.g., teachers, doctors,
d Commercial and S	
	ervice Indestry Workers
Resources Workers	try, Aningal Husbandry, Fisheries, and Water
	neport Foringent Operators
o Military	nsport Equipment Operators
h.Student	0
I.Others	rt Age
a No medical insura	
6. Medical Insurance: b. Social medical insura	
	urance Bi jographique elines.xhtml de
For peer review only - http://bmjopen.bmj.com/site/about/guide	lines.xhtml

8	BMJ Open S P K
	Jopen-2024-087110 o BMJ Open BMJ Open
	c. Social and commercial med ansurance
7. Monthly per capita household income (CNY)	
	b. 2,000-5,000
	c. 5,000-10,000
	a. <2,000 Pruses related to 2024
	e. >20,000
8. Smoking	a. Yes
	a. Yes te suppo b. No aprice
9. Alcohol consumption	a. Yes deur d
	b. No <sup>10</sup> A ft
10. Frequency of teeth brushing (per day)	a. 1 time b. 2 times c. 3 times d. 4 times or more
	b. 2 times
	c. 3 times
	d. 4 times or more
11. Oral Disease Complications	a. Gum Disease
	b. Dental Caries
	c. Pulpitis
	d. Oral Cancer
	e. Oral ulcers
	f. Dentition defects
	g. Irregular teeth alignment
	a. Gum Disease b. Dental Caries c. Pulpitis d. Oral Cancer e. Oral ulcers f. Dentition defects g. Irregular teeth alignment h. Loose teeth
	i. Other oral diseases
	j. No oral conditions as described bove
12. Undergone wisdom teeth extraction	a. Yes B
For peer review or	nly - http://bmjopen.bmj.com/site/about/guidelines.xhtml

BMJ C	by copy	Page 42 of 48
	jopen-2024-087110 o	
	b. No g v	_
12.1 If have, the age at that time (years old)		_
12.2 If have, the reasons were:	a. Recurring painful inflamma	-
	b. Get stuck between the teethape dieek grinding	
	c. Dental caries or periodontal	
	d. Prophylactic extractions or builtings on check-ups	
	e. Surgical requirements	
	e. Surgical requirements	
13. Undergone oral therapy other than treatment for wisdom teeth related	a. Yes	_
oral diseases	b. No	
14. Acceptance of being informed and educated about wisdom teeth	2. Mag	-
during other oral therapies	b. No g, · · ·	
	Al training, and similar technologies. Al promj.com/site/about/guidelines.xhtml	
For peer review only - http://bmjopen.l	omj.com/site/about/guidelines.xhtml	

of 48	BMJ Open	jopen-2024-087110 on 31 1 by copyright, including	
		-2024 opyri	
		-087 ght, i	
		inclu	
	Part II Knowledge	on 3	
	K1. Wisdom teeth, also known as third molars, are the last and farthest-back teeth to	31 Dec 1 1g for u	
	emerge in the mouth. They typically surface in adults between the ages of 18 and 25	Sшg	
	years.	A.Yes	B.No
	K2. The primary issues associated with wisdom teeth are insufficient space and	ner ate	
	misalignment.	A.Yes 5 m	B.No
	K3. The emergence of wisdom teeth can lead to pain, inflammation, facial and jaw	A.Yes an	
	congestion, edema, and difficulty in swallowing.	A.Yes a co	B.No
	K4. In cases where the growth of wisdom teeth leads to a severe infection, fever may	d data m A.Yes a m	D.M.
	not necessarily be present.	A. Yes a ≥ F	B.No
	K5. Wisdom teeth are unlikely to cause damage to neighboring teeth, even if left	A.Yesg.	B.No
	untreated promptly. K6. The growth of wisdom teeth can create gaps that allow food debris to enter,		D.INO
	resulting in a range of symptoms, including inflammation.	Al train A.Yesini	B.No
	K7. Consuming spicy, hard, and sticky foods can exert pressure on the teeth, leading		2110
	to pain and swelling. Additionally, sugars in food and drinks can contribute to plaque	, ang	
	buildup on teeth, causing dental caries and other oral problems. Thus, it is advisable	ng, and simila A.Yes	
	to minimize their intake.	A.Yes a	B.No
	K8. Not all patients require wisdom teeth extraction, particularly if they are growing		
	normally and not causing any dental problems.	A.Yesol	B.No
	K9. Various treatment options exist for wisdom teeth, including medications	0, 2025 logies.	
	(antibiotics, traditional Chinese medicine, etc.) and surgical procedures (incision and	0	
	drainage, wisdom teeth extraction, etc.).	A.Yes	B.No
	K10. Delaying the treatment of wisdom teeth may result in harm to neighboring teeth.	gence	
	KTO. Delaying the treatment of wisdom teeth may result in harm to herghboring teeth.		B.No
		A.Yes Bi iographique t/guidelines.xhtml de	
		yrap	
		hiqu	
	For peer review only - http://bmjopen.bmj.com/site/abou	t/guidelines.xhtml	

	BMJ Open	ijopen-2 1 by cop		Page 44 of 48
1 2 3		jopen-2024-087110 on 31 D 1 by copyright, including fo		
4 5 6	K11. Wisdom teeth extraction may cause temporary discomfort and swelling, but it generally does not have any long-term effects on the function and appearance of the	0 on 31 December Iuding for uses re A.Yes re		
7 8	mouth.	A.Yes s g g g	B.No	
9	K12. Following the wisdom teeth extraction, patients should adhere to the prescribed	nber s reig		
10	regimen, which may include ice compresses, a specific diet, and proper oral care, to	at ne 20		
11 12	alleviate pain.	A. Yes to ment	B.No	
13	K12 Window tooth autmation always loads to a alignment face	t Sul		
14 15	K13. Wisdom teeth extraction always leads to a slimmer face.	t Superie text and A.Yes and	B.No	
16	$O_{\frown}$	l dat		
17		led from http://bmjopen.bmj.com/ on June 10, 2025 ur (ABES) . data mining, Al training, and similar technologies.		
18 19		≡S) inin		
20		ġ, <del>t</del> p://		
21		Al tra		
22		aini		
23 24		ng, b		
25		and mi.		
26		sin M		
27 28		nilar		
20		· tec		
30		/bmjopen.bmj.com/ on June 10, 2025 Al training, and similar technologies.		
31		0, 2 olog		
32 33		ies.		
34		at		
35		Agence		
36		nce		
37 38				
39		olio		
40		graf		
41 42		chic		
42 43		Bibliographique 'guidelines.xhtml de		
13 14	For peer review only - http://bmjopen.bmj.com/site/about/	guidelines.xhtml		
5		—		
46				

f 48	ВМ	1J Open		jopen-2024-087110 on 31 De 3 by copyright, including før		
	Part II	I Attitudes		1 Dece		
	A1. You are willing to proactively discuss your condition with your doctor and seek professional medical support.	a.Strongly agree	b.Agree	c. Norreign c. Norreign	d.Disagree	e.Strongly Disagree
	A2. You are open to discussing your wisdom teeth condition with friends or family and seeking their advice on whether to retain or extract them.	a.Strongly agree	b.Agree	20124. Downl netteent Sup ated to text a د. N	d.Disagree	e.Strongly Disagree
	A3. You are willing to acquire medical knowledge related to the risks and wisdom teeth extraction through concise online videos or books.	a.Strongly agree	b.Agree	nloaded from iperfeur (ABE c. N data mi	d.Disagree	e.Strongly Disagree
	A4. You are concerned about potential hazards posed by wisdom teeth in your daily life, such as inflammation and infection.	a.Strongly agree	b.Agree		d.Disagree	e.Strongly Disagree
	A5. You firmly believe in seeking medical treatment if you experience visible symptoms related to your wisdom teeth.	a.Strongly agree	b.Agree	c. Negutral	d.Disagree	e.Strongly Disagree
	A6. Undergoing wisdom teeth extraction would elicit feelings of fear or anxiety about the surgery.	a.Strongly agree	b.Agree	c. Neutral	d.Disagree	e.Strongly Disagree
	A7. You place trust in your oral surgeon's treatment plan and are receptive to their professional advice.	a.Strongly agree	b.Agree	c. Notice on the contract of t	d.Disagree	e.Strongly Disagree
1	A8. You consider the daily care or extraction of your wisdom teeth to be time-consuming and energy-demanding, hence, you do not prioritize it.	a.Strongly agree	b.Agree	الله 10, 20 edinologie c. Nologie	d.Disagree	e.Strongl Disagree
	A9. You recognize the significance of a good diet and oral hygiene in preventing and managing wisdom teeth issues.	a.Strongly agree	b.Agree	c. Neutrat Ag	d.Disagree	e.Strongly Disagree
	A10. You acknowledge the importance of regular oral check-ups in preventing wisdom teeth-related diseases.	a.Strongly agree	b.Agree	c. Neutrad	d.Disagree	e.Strongly Disagree
	For peer review only - http://bmjop	en.bmj.com/site	e/about/guidelir	bliographique nes.xhtml de l		

	BMJ Open	jopen-20 1 by copy	Page 46 of 48
1 2 3		jopen-2024-087110 o 1 by copyright, includ	
4 5 6	A11. If the doctor recommends prophylactic wisdom teeth a.Yes b.No extraction, you would be willing to undergo the surgery.		
7 8 9 10	A12. You prefer medication over surgery as an intervention for a.Yes b.No	use use	
11 12 13 14 15	wisdom teeth, viewing surgery as a last resort rather than a first- choice approach.	.4. Downloan nent Superie d to text and	
16 17 18		loaded from http://bmjopen.bmj.com/ on June 10, 2025 erieur (ABES) . and data mining, Al training, and similar technologies.	
19		ning	
20		, AI	
21 22		trai <sup>m</sup> jo	
22		inin oper	
24		g, a	
25		nd	
26 27		sim on	
27		ilar on	
29		Jur	
30		hno	
31		0, 2	
32 33		ies.	
34		at	
35		Ag	
36		Agence	
37			
38		<u>b</u>	
39 40		Bibliographique	
40 41		aph	
42		riqu	
43	For peer review only - http://bmjopen.bmj.com/site/about/gui	delines.xhtml <b>Q</b>	
44	i of peer review only intep//onlyopen.onlyopen.onlyote/dobut/gu	delines.xhtml	
45			
46			

Page 47 of 48	Jopen-2024-087110 BMJ Open BMJ Open
1	oyright
2	, inc. 11
5 4	including 3
5	
6 7	Part IV Practice
8	P1: You will attend lectures on the topic of wisdom teeth and other oral health problems that can arise the new books and wisdom tooth extraction through books and online resources
9	knowledge about the risks and wisdom teem extraction through books and online resources.
10 11	a. Very conforming
12	
13	c. Neutral
14 15	d. Non-conforming
16	e. Very non-conforming
17	P2: If you are prescribed medication, it is essential to thoroughly read the instructions to comprehend $\frac{1}{2}$ proper usage and potential adverse
18 19	effects.
20	a. Very conforming
21	b. Conforming c. Neutral
22 23	
24	d. Non-conforming e. Very non-conforming
25	
26 27	P3: Regularly, you conscientiously monitor your oral health by visiting the dental clinic. a. Very conforming b. Conforming c. Neutral
28	b. Conforming
29	c. Neutral
30 31	d. Non-conforming
32	b. Conforming c. Neutral d. Non-conforming e. Very non-conforming ·
33	P4: When brushing your teeth, use a soft toothbrush and pay careful attention to cleaning the back row of window teeth, neighboring teeth, and
34 35	
36	a. Very conforming
37	b. Conforming
38 39	
40	ý gra
41	
42 43	gums. a. Very conforming b. Conforming For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml
44	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml
45	
46	

	BMJ Open BMJ
	-087
	in cluc
c. Neutral	
d. Non-conforming	
e. Very non-conforming	
P5: To address areas that a too	othbrush cannot effectively reach during oral cleaning, utilize dental floss the crevices.
a. Very conforming	anemo lated
b. Conforming	
c. Neutral	tes several sev
d. Non-conforming	t an log
e. Very non-conforming	
P6: As part of your routine, yo	ou regularly rinse your mouth with mouthwash to maintain good oral hygi
a. Very conforming	
b. Conforming	ng, g
c. Neutral	
d. Non-conforming	i i i i i i i i i i i i i i i i i i i
e. Very non-conforming	
P7: Regarding your diet, you	are conscious of reducing the consumption of sugary or spicy foods, and y are comptly clean food debris through
methods like brushing and flo	issing.
a. Very conforming	
b. Conforming	
c. Neutral	une 10, 202
d. Non-conforming	
e. Very non-conforming	
P8: You will inform your fam	ily or friends about the hazards of wisdom teeth and remind them to seek mediaal attention or promptly have their
wisdom teeth removed if nece	essary.
a. Very conforming	essary.
b. Conforming	
	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml <b>de</b>
	Jrap
	हि For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml व्

Page 49 of 48	BMJ Open copy 20
1 2 3 4	BMJ Open BMJ
5	c. Neutral
6	d. Non-conforming
7 8	e. Very non-conforming
9	P9: You are capable of evaluating the risks and benefits associated with wisdom teeth extraction and accepting your doctor's treatment
10	recommendations.
11 12	a. Very conforming
13	b. Conforming
14	c. Neutral
15	d. Non-conforming
16 17	e. Very non-conforming
18	P10: You remain vigilant for symptoms such as swollen gums, teeth pain, and a foul taste in the mouth.
19	a. Very conforming
20 21	b. Conforming
22	b. Conforming c. Neutral d. Non-conforming
23	d. Non-conforming
24	a Very non conforming
25 26	P11: You have the ability to evaluate issues and make adjustments gradually based on your experiences with wisdom teeth prevention or treatment. a. Very conforming b. Conforming c. Neutral d. Non-conforming e. Very non-conforming
27	treatment.
28	a. Very conforming
29 30	b. Conforming
31	c. Neutral
32	d. Non-conforming
33 34	e. Very non-conforming
35	
36	Agence
37	
38 39	
40	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml de
41	
42 43	
43 44	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml
45	—
46	

# Knowledge, attitudes, and practices among patients with impacted wisdom teeth toward teeth extraction in Jinan, Shandong Province, China: A Cross-Sectional Study

Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases, Department of Periodontology Tong, Dongdong; School and Hospital of Stomatology, Cheeloo College of	Journal:	BMJ Open
Date Submitted by the Author:       31-Oct-2024         Complete List of Authors:       Sun, Jing; Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases, School and Hospital of Stomatology, Cheeloo College of Medicine; Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration, Jinan Stomatological Hospital, Department of Periodontology Meng, Junru; Jinan Stomatological Hospital, Department of Periodontology, Meng, Junru; Jinan Stomatological Hospital, Department of Oral and Maxillofacial Surgery, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration Uan, Xiao ; Jinan Stomatological Hospital, Department of Oral and Maxillofacial Surgery, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration Luan, Xiao ; Jinan Stomatological Hospital, Department of Periodontology, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration Luan, Xiao ; Jinan Stomatological Hospital, Department of Periodontology, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases, Department of Periodontology Tong, Dongdong; School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases, Department of Periodontology Tong, Dongdong; School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shando	Manuscript ID	bmjopen-2024-087110.R1
Author:       31-OCC-2024         Complete List of Authors:       Sun, Jing; Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases, School and Hospital of Stomatology, Cheeloo College of Medicine; Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration, Jinan Stomatological Hospital, Department of Periodontology         Weng, Xin ; Jinan Stomatological Hospital, Department of Periodontology, Central laboratory, Jinan Stomatological Hospital, Department of Oral and Maxillofacial Surgery, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration Luan, Xiao ; Jinan Stomatological Hospital, Department of Oral and Maxillofacial Surgery, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration Luan, Xiao ; Jinan Stomatological Hospital, Department of Periodontology, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration         Li, Shu; School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases, Department of Periodontology Tong, Dongdong; School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases, Department of Periodontology Tong, Dongdong; School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University & Shandong Rey Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Sh	Article Type:	Original research
Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases, School and Hospital of Stomatology, Cheeloo College of Medicine; Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration, Jinan Stomatological Hospital, Department of Periodontology Meng, Junru; Jinan Stomatological Hospital, Hospital Infection Management Office Wang, Xin ; Jinan Stomatological Hospital, Department of Periodontology, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration Wang, Bing; Jinan Stomatological Hospital, Department of Oral and Maxillofacial Surgery, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration Luan, Xiao ; Jinan Stomatological Hospital, Department of Periodontology, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration Luan, Xiao ; Jinan Stomatological Hospital, Department of Periodontology, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration Li, Shu; School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University & Shandong Forvincial Clinical Research Center for Oral Diseases, Department of Periodontology Tong, Dongdong; School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University & Shandong Provincial Clinical Research Center for Oral Diseases, Department of Oral and Maxillofacial Surgery       Heading   Dentistry and oral medicineDentistry and oral medicine		31-Oct-2024
Heading:     Dentistry and oral medicine       Secondary Subject Heading:     Dentistry and oral medicine	Complete List of Authors:	Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases, School and Hospital of Stomatology, Cheeloo College of Medicine; Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration, Jinan Stomatological Hospital, Department of Periodontology Meng, Junru; Jinan Stomatological Hospital, Hospital Infection Management Office Wang, Xin ; Jinan Stomatological Hospital, Department of Periodontology, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration Wang, Bing; Jinan Stomatological Hospital, Department of Oral and Maxillofacial Surgery, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration Luan, Xiao ; Jinan Stomatological Hospital, Department of Periodontology, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration Luan, Xiao ; Jinan Stomatological Hospital, Department of Periodontology, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration Li, Shu; School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases, Department of Periodontology Tong, Dongdong; School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Yeovincial Clinical Research Center for Oral Diseases, Department of Periodontology Tong, Dongdong; School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases, Department of Oral and Maxillofa
		Dentistry and oral medicine
Keywords: Knowledge, Attitude, Awareness	Secondary Subject Heading:	Dentistry and oral medicine
	Keywords:	Knowledge, Attitude, Awareness

1         2         3         4         5         6         7         8         9         10         11         12         13         14         15         16         17         18         19         20         21         22         23         24         25         26         27         28         29         30         31         32         33         34         35         36         37         38         39         40         41         42         43         44         45         46         47         48         49         50         51         52         53         54	
55 56 57 58 59 60	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Enseignement Superieur (ABES) Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies



I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our <u>licence</u>.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which <u>Creative Commons</u> licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

## **BMJ** Open

Knowledge, attitudes, and practices among patients with impacted wisdom teeth toward teeth extraction in Jinan, Shandong Province, China: A Cross-Sectional Study

Running Title: KAP toward wisdom teeth extraction

Jing Sun<sup>1,2†</sup>, Junru Meng<sup>3,†</sup>, Xin Wang<sup>2</sup>, Bing Wang<sup>4</sup>, Xiao Luan<sup>2</sup>, Shu Li<sup>5,\*</sup>, Dongdong Tong<sup>6,\*</sup>

<sup>1</sup> School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases,No.44-1 Wenhua Road West, 250012, Jinan, Shandong, China

<sup>2</sup> Department of Periodontology, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration, Jinan Stomatological Hospital, Jinan 250000, China.

<sup>3</sup>Hospital Infection Management Office, Jinan Stomatological Hospital, Jinan 250000, China

<sup>4</sup> Department of Oral and Maxillofacial Surgery, Central laboratory, Jinan Key Laboratory of Oral Tissue Regeneration, Jinan Stomatological Hospital, Jinan 250000, China.

<sup>5</sup>Department of Periodontology, School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases,No.44-1 Wenhua Road West, 250012, Jinan, Shandong, China <sup>6</sup> Department of Oral and Maxillofacial Surgery, School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University & Shandong Key Laboratory of Oral Tissue Regeneration & Shandong Engineering Research Center of Dental Materials and Oral Tissue Regeneration & Shandong Provincial Clinical Research Center for Oral Diseases,No.44-1 Wenhua Road West, 250012, Jinan, Shandong, China

<sup>†</sup>These authors contributed equally to this work.

\*Corresponding Author:

Dongdong Tong

E-mail: kqtongdong@163.com

Tel: +86-18805310185

Shu Li

E-mail: lishu@sdu.edu.cn

Review only

## ABSTRACT

**Objectives:** This study aimed to assess the knowledge, attitudes, and practices (KAP) of patients with impacted wisdom teeth toward tooth extraction, with the intention of identifying both gaps and opportunities for improved dental health education and practices.

Design: A cross-sectional study utilizing a web-based questionnaire.

**Setting:** The study was conducted at the Department of Oral and Maxillofacial Surgery, School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University, and Jinan Stomatological Hospital.

**Participants:** This study included responses from 3,467 individuals presenting with impacted wisdom teeth at the study settings between March and May 2023.

**Primary and Secondary Outcome Measures:** The primary outcomes measured were the levels of knowledge, attitudes, and practices toward wisdom teeth extraction among participants. The knowledge was assessed on a scale of 0-11, attitudes on a scale of 10-50, and practices on a scale of 11-55. Secondary outcomes included the exploration of associations between knowledge, attitudes, and practices using structural equation modeling.

**Results:** Participants demonstrated a mean knowledge score of  $9.1\pm1.4$ , mean attitude score of  $38.0\pm2.7$ , and mean practice score of  $41.7\pm8.2$ . The analysis using a structural equation model revealed a direct effect of knowledge on attitudes (path coefficient = 2.042, p<0.001) and a direct effect of attitudes on practices (path coefficient = 1.460, p<0.001).

**Conclusions:** The findings suggest that patients with impacted wisdom teeth possess adequate knowledge and favorable attitudes towards teeth extraction, which positively

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

> influences their practices. However, tailored interventions are still needed to further enhance KAP regarding this procedure in this population.

# Strengths and limitations of this study

- Large sample size enhances the representativeness of findings.
- Structural equation modeling strengthens analysis of relationships between KAP factors.
- The online survey method enables convenient, large-scale data collection.
- Reliance on self-reported data may introduce reporting bias.
- Exclusive use of online surveys could result in non-response bias.

Keywords: Knowledge; Attitude; Practice; Cross-Sectional Study; Wisdom teeth;

 Impacted wisdom teeth constitute a significant public health issue due to their high prevalence and the associated complications<sup>1</sup>. Epidemiological evidence indicates that a substantial proportion of the adult population will develop at least one impacted wisdom teeth, necessitating extraction to mitigate potential risks such as infection, crowding, and other dental pathologies<sup>1, 2</sup>.

Nevertheless, the extraction procedure for impacted wisdom teeth poses numerous challenges. It is well-documented that these procedures can elicit significant psychological stress in patients, resulting in dental anxiety or phobia<sup>3</sup>. This stress is exacerbated by the complexity and invasiveness inherent in the extraction of impacted teeth, which can amplify patients' apprehensions and uncertainties concerning dental care<sup>4, 5</sup>. Such anxiety and uncertainty negatively may negatively influence patients' attitudes towards dental health and treatment, potentially leading to suboptimal dental health behaviors, delayed care-seeking, and consequently, poorer dental and overall health outcomes<sup>6, 7</sup>.

Knowledge-Attitude-Practice (KAP) model suggests that an individual's knowledge significantly influences their attitudes towards health and illness, which, in turn, shapes their health-related behaviors<sup>8, 9</sup>. Despite the recognition of dental anxiety among patients with impacted wisdom teeth, there exists a notable gap in the research literature regarding the application of the KAP model to better understand and address this issue. Previous research efforts have been directed towards delineating the prevalence of dental anxiety and its determinants within this demographic<sup>3, 10, 11</sup>, with insufficient

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

focus on elucidating how knowledge and attitudes concerning wisdom teeth impaction and extraction affect health behaviors.

Thus, this study aims to address this gap by leveraging the KAP framework to investigate the knowledge, attitudes, and practices toward wisdom teeth extraction among patients with impacted wisdom tooth.

# **Materials and Methods**

# Study design and participants

This cross-sectional study was conducted between March and May 2023 at the Department of Oral and Maxillofacial Surgery, School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University and Jinan Stomatological Hospital. The inclusion criteria were as follows: 1) patients diagnosed with impacted wisdom tooth either at the Department of Oral and Maxillofacial Surgery, School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University, and 2) patients proficient in the Chinese to ensure effective communication during the data collection. Conversely, those who reported prior participation in similar studies were excluded from this study. Ethical approval was approved by the Ethics Committee of the School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University (Ethical No. 20230361), The medical ethics committee of Jinan Stomatological Hospital (JNSKQYY-2023-001) and informed consent was obtained from all patients. **Ouestionnaire introduction and data collection** 

Page 9 of 50

## **BMJ** Open

The questionnaire was designed with reference to relevant guidelines and previous literature<sup>12, 13</sup>, and was revised by two chief physicians and one vice-chief physician. A pilot test was conducted (n=34) and Cronbach's  $\alpha$  coefficient value was 0.819, indicating a good internal consistency.

The final questionnaire contains four dimensions: demographic characteristics, knowledge, attitudes and practices. The knowledge dimension consists of 13 questions, with 1 point for a correct answer and 0 points for the rest. Given that the necessity of wisdom teeth extraction is a common misconception among patients, often due to a lack of understanding of guideline recommendations, question K8 was designed to address this issue. Questions K5 and K10 were designed as trap questions, presenting exactly opposite meanings<sup>14, 15</sup>. patients who selected "right" or "wrong" for both questions were deemed to have a logical conflict and were excluded from the survey. Consequently, the knowledge scores ranged from 0 to 11 points. The attitudes dimension consists of 13 questions, wherein questions A11-A13 are designated exclusively for descriptive analysis purposes. The remaining questions utilized a 5point Likert scale, ranging from very positive (5 points) to very negative (1 point), yielding a possible score range of 10-50 points. The practices dimension consists of 11 questions using a 5-point Likert scale as well, ranging between very conforming (5 points) to very non-conforming (1 point), with a possible score range of 11-55 points. Both electronic and printed versions of the questionnaire were utilized in this study. The electronic questionnaire hosted the Sojump platform was on (http://www.sojump.com), an online survey platform. At the onset of the survey,

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

patients were required to indicate their consent by clicking the option "I agree to participate in this study" before proceeding to respond to the questions. The data collection process ensured participant anonymity. Additionally, an IP restriction was implemented to prevent duplication of responses, restricting participants to a single submission from each unique IP address. To accommodate individuals who may be less acquainted with electronic devices, such as elderly patients, printed questionnaires were made available during their clinic visit, and they were requested to complete the printed forms. During questionnaire distribution, five trained research assistants first introduced the study face-to-face to patients before distributing the questionnaires. They also provided assistance when necessary, reviewed questionnaire completeness, and asked the patients to complete any missing information.

## Statistical analysis

STATA 17.0 (STATA Corporation, College Station, TX, USA) was utilized for statistical analyses. Continuous variables were presented as mean±standard deviation (SD) and were compared using the student's t-test or one-way analysis of variance (ANOVA). Categorical variables were presented as numbers (percentages). In this study, 70% of the total score was used as the cut-off value, that means the threshold for sufficient knowledge, favorable attitudes, and proactive practices were 7.7, 35 and 38.5 points respectively<sup>16</sup>. Pearson correlation was used to analyze the correlation between knowledge, attitudes, and practices. Variables with p<0.02 in the single-factor logistic regression analysis are included in the multivariate logistic regression analysis. AMOS 24.0 (IBM, NY, USA) was utilized to construct a structural equation model (SEM)

examining the knowledge, attitudes, and practices of patients with impacted wisdom teeth toward wisdom teeth extraction. This SEM tested the main hypotheses as follows: 1) knowledge had direct effects on attitudes, 2) knowledge had direct effects on practices, and 3) attitudes had direct effects on practices. Model fit was evaluated using CMIN/DF (Chi-square goodness-of-fit test/Degrees of Freedom), RMSEA (Root Mean Square Error of Approximation), IFI (Incremental Fixation Index), TLI (Tucker-Lewis index) and CFI (Comparative Fixation Index). A two-sided p-value <0.05 was considered statistically significant.

## Results

A total of 3467 patients participated in this study. Among them, 1092 (31.50%) were aged 30 or below, 2259 (65.16%) were female, 2927 (84.42%) lived in urban areas, and 2391 (68.96%) brushed their teeth twice daily. In addition, 1790 (51.63%) had undergone wisdom teeth extraction. The mean scores for knowledge, attitudes, and practices were  $9.1\pm1.4$  (possible range: 0-11),  $38.0\pm2.7$  (possible range: 10-50), and  $41.7\pm8.2$  (possible range: 11-55), respectively (**Table S1**).

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

The three knowledge items with the highest correctness rates were "The primary issues associated with wisdom teeth are insufficient space and misalignment." (K2), with a correctness rate of 89.59%, "Wisdom teeth are unlikely to cause damage to neighboring teeth, even if left untreated promptly." (K5), with a correctness rate of 88.78%, and "Delaying the treatment of wisdom teeth may result in harm to neighboring teeth." (K10), with a correctness rate of 88.78%. The three items with the lowest correctness

> rates were "In cases where the growth of wisdom teeth leads to a severe infection, fever may not necessarily be present." (K4), with a correctness rate of 74.53%, "Various treatment options exist for wisdom teeth, including medications (antibiotics, traditional Chinese medicine, etc.) and surgical procedures (incision and drainage, wisdom teeth extraction, etc.)." (K9), with a correctness rate of 78.40%, and "Wisdom teeth, also known as third molars, are the last and farthest-back teeth to emerge in the mouth. They typically surface in adults between the ages of 18 and 25 years." (K1), with a correctness

rate of 80.93% (**Table 1**).

# Table 1. Knowledge

Knowledge		Correctness Rate N(%)
K1. Wisdom teeth, also known as third molar	s, are the last and	
farthest-back teeth to emerge in the mouth. They	typically surface in	2806 (80.93)
adults between the ages of 18 and 25 years. (True	·	
K2. The primary issues associated with wisdom t	eeth are insufficient	3106 (89.59)
space and misalignment. (True)		5100 (05.55)
K3. The emergence of wisdom teeth can lead to		
facial and jaw congestion, edema, and difficu	lty in swallowing.	2826 (81.51)
(True)		
K4. In cases where the growth of wisdom teet		2584 (74.53)
infection, fever may not necessarily be present. (I		()
K5. Wisdom teeth are unlikely to cause damage to	o neighboring teeth,	3078 (88.78)
even if left untreated promptly. (False)		
K6. The growth of wisdom teeth can create gaps th		/
to enter, resulting in a range of symptoms, inclu	iding inflammation.	2906 (83.82)
(True)		
K7. Consuming spicy, hard, and sticky foods can e	1	
teeth, leading to pain and swelling. Additionally,	-	
drinks can contribute to plaque buildup on teeth, c	-	3043 (87.77)
and other oral problems. Thus, it is advisable to m	inimize their intake.	
(True)		
K8. Not all patients require wisdom teeth extract	· - ·	
they are growing normally and not causing an	y dental problems.	2871 (82.81)
(False)		

K9. Various treatment options exist for wisdom teeth, including	
medications (antibiotics, traditional Chinese medicine, etc.) and	2718 (78.40)
surgical procedures (incision and drainage, wisdom teeth extraction,	2710(70.40)
etc.). (True)	
K10. Delaying the treatment of wisdom teeth may result in harm to	3078 (88.78)
neighboring teeth. (True)	3078 (88.78)
K11. Wisdom teeth extraction may cause temporary discomfort and	
swelling, but it generally does not have any long-term effects on the	2998 (86.47)
function and appearance of the mouth. (True)	
K12. Following the wisdom teeth extraction, patients should adhere	
to the prescribed regimen, which may include ice compresses, a	3022 (87.16)
specific diet, and proper oral care, to alleviate pain. (True)	
K13. Wisdom teeth extraction always leads to a slimmer face. (False)	2819 (81.31)

A significant majority of the patients (93.86%) reported that they are willing to proactively engage in discussions with their doctor about their condition and receive professional medical support (A1). Similarly, a high percentage (92.70%) claimed that they believe in actively seeking medical treatment if they experience any visible symptoms in their wisdom teeth (A5). Additionally, an overwhelming 90.51% of the patients expressed trust in the treatment plan proposed by an oral surgeon and demonstrated willingness to heed the professional advice given by the oral surgeon (A7). However, it is worth noting that a considerable portion (58.23%) of the patients admitted to experiencing fear and anxiety regarding procedures related to wisdom teeth (A6). Additionally, 58.96% of the patients expressed fear concerning potential hazards associated with wisdom teeth (A4). In addition, 25.12% of the patients strongly agreed or agreed that the daily care or wisdom teeth extraction requires a significant amount of time and energy, leading to a lack of willingness to prioritize it (A8). The decisionmaking process for undergoing wisdom teeth extraction is influenced by the reimbursement rates provided by medical insurance, as mentioned by 46.47% of the

Enseignement Superieur (ABES) Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies

patients (A13). Additionally, 47.6% of the patients preferred medication as an intervention for wisdom teeth rather than opting for surgical procedures (A12). Notably, a substantial 80.3% of the patients expressed their willingness to undergo prophylactic wisdom teeth extraction if recommended by their doctor (A11) (**Table 2**).

for been teriew only

	BMJ	Open	l by copy	jopen-20	
Table 2. Attitudes			by copyrignt, including	jopen-2024-087110 on 3	
<u></u>	Strongly agree N(%)	Agree N(%)	Neutral of N(%)	Disagree	Strongly disa N(%)
A1. You are willing to proactively discuss y condition with your doctor and seek profession medical support. (Positive)		1391 (40.14%)	99 (2.86%)	nseignen (2.34%)	33 (0.95%)
A2. You are open to discussing your wisdom te condition with friends or family and seeking the advice on whether to retain or extract the (Positive)	heir 1144 (32 97%)	1664 (48.00%)	424 (12.23%)	ent Superieu Superieu	57 (1.64%)
A3. You are willing to acquire medical knowled related to the risks and wisdom teeth extract through concise online videos or books. (Positive	tion 1180 (34.06%)	1878 (54.18%)	216 (6.23%)	r A from 4 (3.29%)	79 (2.28%)
A4. You are concerned about potential hazards po by wisdom teeth in your daily life, such inflammation and infection. (Negative)	as 644 (18.56%)	1400 (40.39%)	م 1017 (29.33%	20 (9.22%)	86 (2.48%)
A5. You firmly believe in seeking medical treatm if you experience visible symptoms related to y wisdom teeth. ( <b>Positive</b> )	our 1884 (54.41%)	1330 (38.38%)	124 (3.57%)	₽ ₽ ₽ ₽ ₽ 17 (3.38%)	12 (0.35%)
A6. Undergoing wisdom teeth extraction would el feelings of fear or anxiety about the surge (Negative)	ery. 668 (19.27%)	1351 (38.96%)	880 (25.40%) ar	419 (12.08%)	149 (4.29%)
A7. You place trust in your oral surgeon's treatment plan and are receptive to their professional adv (Positive)	ice. 1414 (40.80%)	1724 (49.72%)	216 (6.23%)	- 75 (2.17%)	38 (1.10%)
A8. You consider the daily care or extraction of y wisdom teeth to be time-consuming and ener demanding, hence, you do not prioritize (Negative)	gy- 375 (0.38%)	546 (15.75%)	408 (11.76%)	ан Ад 19600 (46.14%) Се В.	588 (17.00%)

	BMJ	Open		jopen-2024-087110 I by copyright, incl		Page 16 of 50
				087110 or		
<ul><li>A9. You recognize the significance of a good diet and oral hygiene in preventing and managing wisdom teeth issues. (Positive)</li><li>A10. You acknowledge the importance of regular</li></ul>	1382 (39.87%)	1550 (44.69%)	215 (0.050()	ing for uses	68 (1.96%)	
oral check-ups in preventing wisdom teeth-related diseases. (Positive)	1407 (40.57%)	1727 (49.77%)	201 (5.79%)	or D22 (3.52%) December Enseignember Enseignement USES related to	70 (2.02%)	
	Yes	No		l to		
A11. If the doctor recommends prophylactic wisdom teeth extraction, you would be willing to undergo the surgery.	2784 (80.30%)	683 (19.70%)		ownload Superieu		
A12. You prefer medication over surgery as an intervention for wisdom teeth, viewing surgery as a last resort rather than a first-choice approach.	1650 (47.60%)	1817 (52.40%)		ed from http ur (ABES) . data mining.		
A13. The reimbursement rates of medical insurance for wisdom teeth extraction and related costs significantly influence your decision on whether to undergo the procedure.	1403 (46.47%)	2064 (59.53%)		Downloaded from http://bmjopen.b nt Superieur (ABES) . o text and data mining. Al training.		
		4	00	mj.com/ on		
				June 10, 2025 technologies.		
				at		
				Agence		
				Bibliographique de		
				grapl		
				hiqu		
For peer review o	nly - http://bmjoper	1. bmj.com/site/abou	t/guidelines.xhtm	e de		
				-		

## **BMJ** Open

Moreover, 83.89% of patients indicated that they are highly capable of evaluating the risks and benefits associated with wisdom teeth extraction, and they readily accept their dentist's treatment recommendations (P9). Additionally, 79.23% reported using dental floss to clean the crevices that a toothbrush cannot effectively reach during oral cleaning (P5). Moreover, 74.70% of patients asserted their ability to evaluate issues and make incremental adjustments concerning their experiences with wisdom teeth prevention or treatment (P11). However, the proportion of patients who confirmed their intention to inform their family or friends about the potential hazards of wisdom teeth and remind them to seek prompt medical attention or have their wisdom teeth extracted was only 33.89% (P8). Similarly, only 47.76% of the patients reported being consciously vigilant about their oral health by regularly attending the dental clinic (P3) (**Table 3**).

Enseignement Superieur (ABES) Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies

		BMJ Open		ijopen-2024-087110 on 4 by copyright, includir	
Table 3. Practices	Very conforming N(%)	Conforming N(%)	Neutral N(%)	ng si	Very non-confor N(%)
P1: You will attend lectures on the topic of wisdom teeth and other oral health problems that can arise throughout your life, or you can acquire knowledge about the risks and wisdom teeth extraction through books and online resources.	931 (26.88%)	1100 (31.79%)		mber 2024(%) inseignentent Superie 417fo text and	216 (6.23%)
P2: If you are prescribed medication, it is essential to thoroughly read the instructions to comprehend its proper usage and potential adverse effects.	858 (24.77%)	1044 (30.16%)	631 (18.23%)	G39mining 639mining	295 (8.53%)
<ul><li>P3: Regularly, you conscientiously monitor your oral health by visiting the dental clinic.</li><li>P4: When brushing your teeth, use a soft</li></ul>	751 (21.70%)	905 (26.14%)	1041 (30.06%)	g, Attaining	203 (5.87%)
toothbrush and pay careful attention to cleaning the back row of wisdom teeth, neighboring teeth, and gums. P5: To address areas that a toothbrush	1140 (32.92%)	1388 (40.08%)	677 (19.55%)	g, and 4.45%)	108 (3.12%)
cannot effectively reach during oral cleaning, utilize dental floss to clean the crevices.	1379 (39.83%)	1368 (39.49%)	345 (9.96%)	256177.40%) tech7.40%)	119 (3.44%)
P6: As part of your routine, you regularly rinse your mouth with mouthwash to maintain good oral hygiene. P7: Regarding your diet, you are conscious	1141 (32.95%)	1446 (41.77%)	384 (11.08%)	<u>بة</u> 308 (8.90%)	188 (5.44%)
of reducing the consumption of sugary or spicy foods, and you promptly clean food	944 (27.32%)	1277 (36.90%)	822 (23.75%)	Agence%) 278 (8. Bibliographique s.xhtml de	146 (4.23%)
For pe	er review only - http://b	mjopen.bmj.com/si	te/about/guidelines	.xhtml <b>d</b>	

 Page 18 of 50

Page 19 of 50			BMJ Open		ijopen-2 1 by cop	
1 2 3 4					jopen-2024-087110 on 31 Decemt Ens I by copyright, including for uses	
5	debris through methods like brushing and flossing.				n 31 D ing for	
7 8	P8: You will inform your family or friends				ecemb Ense uses	
9 10 11	about the hazards of wisdom teeth and remind them to seek medical attention or	1062 (30.70%)	113 (3.27%)	895 (25.87%)	31 December 2024 Ing for uses related 274ted	123 (3.56%)
12 13	promptly have their wisdom teeth removed if necessary.					
14 15	P9: You are capable of evaluating the risks and benefits associated with wisdom teeth	1551 (44.79%)	1354 (39.10%)	396 (11.45%)	to text and dec 119dd	47 (1.36%)
16 17	extraction and accepting your doctor's treatment recommendations.		· · · ·		ed fron ur (ABI data m	
18 19 20	P10: You remain vigilant for symptoms such as swollen gums, teeth pain, and a foul	880 (25.43%)	1117 (32.28%)	785 (22.69%)	525aa 15a 17%)	160 (4.63%)
20 21 22	taste in the mouth. P11: You have the ability to evaluate issues				Al training 167 <b>g</b> ,4.	
23 24	and make adjustments gradually based on your experiences with wisdom teeth	1094 (31.61%)	1496 (43.24%)	633 (18.29%)		77 (2.23%)
25 26	prevention or treatment.			W O	and sim	
27 28 29					om/ on June 10, 2025 similar technologies.	
30 31					ine 10 chnol	
32 33					, 202! ogies	
34						
35 36					at Agence Bibliographique de	
37					Ce E	
38					Sibli	
39 40					ogr	
41					aph	
42					iqu	
43	For pe	er review only - http://b	mjopen.bmj.com/si	te/about/guidelines	s.xhtml	
44 45					<u> </u>	
46						

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, Al training, and similar technologies.

The correlation analysis showed that the knowledge score and the attitude score were positively correlated (r = 0.288, p<0.001), and the knowledge score and the practice score were also positively correlated (r = 0.348, p<0.001). Additionally, there was a positive correlation between attitude and practice scores (r = 0.452, p<0.001) (**Table 4**).

	Knowledge	Attitudes	Practices
Knowledge	G		
Attitudes	0.288 (P<0.001)	1	
Practices	0.348 (P<0.001)	0.452 (P<0.001)	1

## **Table 4. Correlation analysis**

The SEM was established to further investigate whether patients with impacted wisdom teeth knowledge and attitude toward wisdom teeth extraction affect their practice, whether attitude plays an intermediary role between knowledge and practice, and whether knowledge can directly affect their practice according to the KAP theory. It also investigated the effect of other factors including residence and monthly per capita household income on the three dimensions mentioned above (**Table S2**). The fitting index of the structural model (CMIN/DF = 13.905; RMSEA = 0.061; IFI = 0.847; TLI = 0.834; CFI = 0.847) outperformed the respective threshold value, signifying that the data fit the structural model satisfactorily (**Table S3**). The SEM demonstrated that knowledge had direct effects on attitudes, as indicated by a path coefficient of 2.042 (p<0.001) and a significant and attitudes had direct effects on practices, with a path coefficient of 1.460 (p<0.001) (**Figure 1**).

## Discussion

#### **BMJ** Open

Patients with impacted wisdom teeth had sufficient knowledge, favorable attitudes, and proactive practices toward wisdom teeth extraction.

However, this study still identified deficiencies of certain aspects. Additionally, variances in KAP levels were observed across different demographic characteristics within the patients. These findings underscore the importance of considering these factors in the development of subsequent health education programs. The present study found that male and younger patients (<30 years) tend to have higher KAP scores. This finding is different from previous studies which reported higher oral health knowledge and behaviors among female and partipants older than 30 years<sup>17, 18</sup>. Nonetheless, the previous studies were not conducted in a Chinese population, and characteristics of their participants were distinctive different from participants in our study. Further education and tailored interventions should be designed for female and older patients in China. Furthermore, the present study identified that urban residents, those with higher education levels, non-smokers, non-drinkers, those who had not undergone dental treatment other than wisdom teeth removal, and those who were not informed and education about wisdom teeth during their dental treatment had lower KAP scores, and future programs should also consider the knowledge needs of these patients to enhance the dental care quality and the KAP towards wisdom teeth.

The present study found sufficient knowledge of wisdom teeth and that most patients would accept being educated about wisdom teeth during other oral therapies. patients had good knowledge about potential complications associated with wisdom teeth and the importance of treating wisdom teeth in a timely manner. This finding is consistent with previous knowledge and awareness studies conducted on medical students: a large percentage of the study population was aware of wisdom teeth impaction and its consequences<sup>19, 20</sup>. Patients in the present study had less knowledge about infection

#### **BMJ** Open

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies

related to wisdom teeth and different treatment options. Hanna et al. have found that patients used the internet to seek information related to wisdom teeth, but internet use was not associated with better wisdom teeth knowledge<sup>21</sup>. Therefore, it is important for healthcare professionals to provide patients with accurate information and internet guidance to improve wisdom teeth knowledge. Zincir et al. reported that patients found educational videos related to wisdom teeth surgical removal were excellent for patient education, and educational videos in Chinese should be made available to improve patients' knowledge<sup>22</sup>. Increased awareness of hazards and removal of wisdom teeth among patients with impacted wisdom teeth will help in the management of wisdom teeth<sup>23</sup>.

In the present study, most patients had a positive attitude toward seeking professional advice and medical treatments, and they also trusted the treatment plan formulated by their oral surgeon. This result reflected a high level of patient trust in dentists, and the level of trust is higher than previously reported<sup>24, 25</sup>. This discrepancy can be explained by the larger proportion of patients with higher education in the present study<sup>26</sup>. Similar to previous findings, patients in the present study reported a high level of anxiety about the potential hazards of wisdom teeth and extraction surgery<sup>27-29</sup>. Lack of knowledge about the procedure is one of the possible contributors to anxiety related to oral surgery<sup>29</sup>. Effective education toward wisdom teeth extraction is critical in reducing anxiety in patients and improving the quality of care. Moreover, in the present study, medical insurance reimbursement rates were a decisive factor for wisdom teeth extraction, which is consistent with a previous study conducted in the United States<sup>30</sup>. Thus, there is a need to improve insurance coverage of wisdom teeth treatments to improve adherence to dentists' recommendations.

Page 23 of 50

#### **BMJ** Open

Most patients claimed that they would weigh the risks and benefits of wisdom teeth extraction to make an informed decision, and around 80% would use dental floss regularly. Zhao et al. reported that very few Chinese adults use dental floss, and the patients with impacted wisdom teeth in the present study might have better practice than the general population due to their disease experience and better dental knowledge<sup>31</sup>. Liu et al. reported that the rate of dental care visits and the utilization of oral health resources are low in the Chinese general population<sup>32</sup>. It is important to enhance patients' practice by improving their knowledge and attitude toward wisdom teeth extraction. Furthermore, this study found that patients who had prior wisdom teeth extraction demonstrated better knowledge, attitudes and practices compared to those without previous wisdom teeth extraction experience. Similarly, Brasileiro et al. also identified that patients with a history of teeth extraction<sup>29</sup>. Patients who had no experience with wisdom teeth extraction may need more attention to improve their KAP in this area.

The results of correlation analysis and SEM demonstrated that patients with impacted wisdom teeth knowledge had direct effects on attitudes, and attitudes had direct effects on practices. These implies that patients with impacted wisdom teeth with better knowledge about wisdom teeth would have more favorable attitudes, which indirectly results in better practice toward wisdom teeth<sup>33</sup>. The finding highlighted the importance of education in patients with impacted wisdom teeth to improve their knowledge, as well as their attitude and practice toward wisdom teeth. It also found that residence had direct effects on knowledge and monthly per capita household income had direct effects on attitudes. This finding is consistent with previous studies on dental health and dental care utilization in China<sup>32, 34, 35</sup>. Patients with lower income and those who lived in rural

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

#### **BMJ** Open

> areas tend to have poorer knowledge and health-seeking behaviors, and more clinical and research attention should be paid to these patients. In addition to common complications, patients should also be informed about rare but serious risks associated with wisdom teeth extraction, such as nerve damage. Damage to the inferior alveolar nerve (IAN) or the lingual nerve, which can occur during extraction of deeply impacted lower wisdom teeth, can result in long-term sensory changes, including numbness, tingling, or even pain in the lower lip, chin, or tongue. Although such nerve injuries are uncommon, with incidence rates reported between 0.4% and 8.4% depending on the complexity of the extraction, the potential impact on a patient's quality of life makes it essential for healthcare providers to discuss these risks. Providing patients with clear information about these rare but serious complications can support informed decisionmaking and reduce postoperative anxiety.

> This study has some limitations. The self-reported nature of the data collection may result in deviations between reported and actual practices. Additionally, since over half of the sample has undergone wisdom tooth removal, there might be inherent differences in knowledge and attitudes compared to those who have not experienced the procedure. Future research could consider handling these two groups separately or using a quasiexperimental design to better explore these differences. Moreover, while this study focuses on common outcomes, it may not fully capture rare complications associated with wisdom teeth extraction, such as changes in sensation due to nerve damage. The large sample size enhances representativeness and generalizability of the results. Furthermore, this study provides an in-depth exploration of the relationship between patients with impacted wisdom teeth knowledge, attitudes, and practices regarding wisdom teeth extraction. These findings offer valuable insights to inform clinical guidance in this area.

# Conclusions

In conclusion, this KAP study demonstrated sufficient knowledge, favorable attitudes, and proactive practices toward wisdom teeth extraction among patients with impacted wisdom teeth. Further tailored interventions should be developed and implemented in this population to improve their KAP of wisdom teeth.

to or oper teries only

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

#### 

# Declarations

## Ethics approval and consent to participate

This study was approved by the Ethics Committee of the School and Hospital of Stomatology, Cheeloo College of Medicine, Shandong University (Ethical No. 20230361), The medical ethics committee of Jinan Stomatological Hospital (JNSKQYY-2023-001) and Informed consent was obtained from all patients. 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.

## **Patient and Public Involvement**

Patients were not directly involved in the design, conduct, or reporting of this study. However, the study results are planned to be disseminated to participants and relevant patient communities, ensuring accessible formats and timings based on public interest.

## **Consent for publication**

Not applicable.

## Availability of data and materials

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

## **Competing interests**

The authors declare that they have no competing interests.

## Funding

The study was supported by grants from the Open Foundation of Shandong Province Key Laboratory of Oral Tissue Regeneration (SDDX202003)to Jing Sun and the second batch of Science and Technology Plan Projects of Jinan Municipal Health Commission (2020-3-49) to Jing Sun; The Dean's Reserch Fund of Jinan Stomatological Hospital(2021-01,2019-06).

2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
10	
17	
18	
19 20	
20	
21	
22	
73	
23 24	
24 25	
25	
26	
27	
28	
29	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	
41	
42	
43	
44	
45	
46	
40 47	
48	
49	
50	
51	
52	
53	
54	
55	
56	
57	
58	
59	

60

# Authors' contributions

 conceived and designed the experiments: Jing Sun, Junru Meng, Shu Li, Dongdong Tong

 2) performed the experiments: Jing Sun, Xin Wang, Bing Wang, Xiao Luan, Dongdong Tong

3) analyzed and interpreted the data: Jing Sun, Junru Meng, Xin Wang, Shu Li,Dongdong Tong

4) contributed reagents, materials, analysis tools or data: Jing Sun, Junru Meng, Xin

Wang, Bing Wang, Xiao Luan, Shu Li, Dongdong Tong

5) wrote the paper: Jing Sun, Junru Meng, Shu Li, Dongdong Tong

6) Dongdong Tong is the guarantor

## Acknowledgments

The authors would like to thank the experts who contributed to this study, the researchers who assisted in the carrying out of the study and all participants for their significant contributions.

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies.

### References

1. Hounsome J, Pilkington G, Mahon J, *et al.* Prophylactic removal of impacted mandibular third molars: a systematic review and economic evaluation. *Health Technol Assess* 2020;24:1-116.doi:10.3310/hta24300

 Lodi G, Azzi L, Varoni EM, *et al.* Antibiotics to prevent complications following tooth extractions. *Cochrane Database Syst Rev* 2021;2:CD003811.doi:10.1002/14651858.CD003811.pub3

3. Seligman LD, Hovey JD, Chacon K, *et al.* Dental anxiety: An understudied problem in youth. *Clin Psychol Rev* 2017;55:25-40.doi:10.1016/j.cpr.2017.04.004

4. Qiao F, Zhang M, Zhang T, *et al.* Dental anxiety is related to postoperative symptoms in third molar surgery. *Front Psychiatry* 2022;13:956566.doi:10.3389/fpsyt.2022.956566

5. Yap AU, Lee DZR. Dental fear and anxiety in Asian youths: response components and inducing stimuli. *Clin Oral Investig* 2022;26:5953-60.doi:10.1007/s00784-022-04555-1

6. Steinvik LM, Svartdal F, Johnsen JK. Delay of Dental Care: An Exploratory Study of Procrastination, Dental Attendance, and Self-Reported Oral Health. *Dent J (Basel)* 2023;11.doi:10.3390/dj11020056

 Ekanayake L, Weerasekare C, Ekanayake N. Needs and demands for dental care in patients attending the University Dental Hospital in Sri Lanka. *Int Dent J* 2001;51:67-72.doi:10.1002/j.1875-595x.2001.tb00824.x

8. Aldhamy H, Maniatopoulos G, McCune VL, *et al.* Knowledge, attitude and practice of infection prevention and control precautions among laboratory staff: a mixed-methods systematic review. *Antimicrob Resist Infect Control* 2023;12:57.doi:10.1186/s13756-023-01257-5

#### **BMJ** Open

2	
3	
4	
5	
6	
7	
7 8	
9	
10	
11	
12	
13	
1.0	
14	
15	
16	
17	
17 18 10	
10	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
28	
29	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	
41	
41	
43	
44	
45	
46	
47	
48	
49	
50	
51	
52	
53	
54	
55	
56	
57	
58	
59	
60	

9. Nwagbara UI, Osual EC, Chireshe R, *et al.* Knowledge, attitude, perception, and preventative practices towards COVID-19 in sub-Saharan Africa: A scoping review. *PLoS One* 2021;16:e0249853.doi:10.1371/journal.pone.0249853

10. Muneer MU, Ismail F, Munir N, *et al.* Dental Anxiety and Influencing Factors in Adults. *Healthcare (Basel)* 2022;10.doi:10.3390/healthcare10122352

11. Blumer S, Ram D, Costa L, *et al.* Dental Anxiety among Israeli Postgraduate Pediatric Dental Students and their Instructors. *J Clin Pediatr Dent* 2019;43:161-66.doi:10.17796/1053-4625-43.3.3

12. Mettes TD, Ghaeminia H, Nienhuijs ME, *et al.* Surgical removal versus retention for the management of asymptomatic impacted wisdom teeth. *Cochrane Database Syst Rev* 2012:Cd003879.doi:10.1002/14651858.CD003879.pub3

 Bailey E, Kashbour W, Shah N, *et al.* Surgical techniques for the removal of mandibular wisdom teeth. *Cochrane Database Syst Rev* 2020;7:Cd004345.doi:10.1002/14651858.CD004345.pub3

14. Abive-Bortsi M, Baidoo ST, Amiteye S. Assessment of Consumers' Perception ofChicken Eggs Consumption and Associated Health Implications in the Volta Region ofGhana.NutrMetabInsights

2022;15:11786388221118872.doi:10.1177/11786388221118872

15. Wang GY, Tang SF. Perceived psychosocial health and its sociodemographic correlates in times of the COVID-19 pandemic: a community-based online study in China. *Infect Dis Poverty* 2020;9:148.doi:10.1186/s40249-020-00770-8

16. 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

 17. Al-Ansari JM, Honkala S. Gender differences in oral health knowledge and behavior of the health science college students in Kuwait. *J Allied Health* 2007;36:41-6

18. Bhardwaj T, Tandon S, Chand S, *et al.* Knowledge, attitude and practice towards preventive dental care- A KAP study. *Journal of Global Oral Health*;2.doi:10.25259/JGOH\_34\_2019

19. Raghu K, Nandhana N, Sathyanarayanan R, *et al.* Knowledge and Awareness About Tooth Impaction among Medical Students

Pursuing their Internship in Pondicherry, a Cross-Sectional Study. *Acta Scientific* Dental Sciences 2022;6:164-73

20. Twyana R, Khanal P, Chaudhary B, *et al.* Knowledge of Impacted Teeth among the Undergraduate Dental Students of a Medical College: A Descriptive Cross-Sectional Study. *JNMA J Nepal Med Assoc* 2021;59:678-82.doi:10.31729/jnma.6385

21. Hanna K, Sambrook P, Armfield J, *et al.* Internet use, online information seeking and knowledge among third molar patients attending public dental services. *Australian dental journal* 2017;62:323-30

22. Zincir ÖÖ, Bozkurt AP, Gas S. Potential patient education of YouTube videos related to wisdom tooth surgical removal. *Journal of Craniofacial Surgery* 2019;30:e481-e84

23. Balakrishnana G, Kumar JA, Palaniappan J, et al. Knowledge and Awareness About Wisdom Teeth Among Preclinical Dental Students in Chennai, India. *Borno Medical Journal* 2021;18

24. Zhao D-H, Rao K-Q, Zhang Z-R, *et al.* Patient Trust in Physicians: Empirical Evidence from Shanghai, China. *Chinese Medical Journal* 2016;129:814-18.doi:10.4103/0366-6999.178971

#### **BMJ** Open

25. Tucker JD, Wong B, Nie J-B, *et al.* Rebuilding patient–physician trust in China.*The Lancet* 2016;388:755

26. Lu T, Xu Y, Wallace S. Internet usage and patient's trust in physician during diagnoses: a knowledge power perspective. *Journal of the Association for Information Science and Technology* 2018;69:110-20

27. de Jongh A, Olff M, van Hoolwerff H, *et al.* Anxiety and post-traumatic stress symptoms following wisdom tooth removal. *Behaviour research and therapy* 2008;46:1305-10

28. Wang TF, Wu YT, Tseng CF, et al. Associations between dental anxiety and postoperative pain following extraction of horizontally impacted wisdom teeth: A prospective observational study. *Medicine (Baltimore)*2017;96:e8665.doi:10.1097/md.00000000008665

29. Brasileiro BF, de Bragança RMF, Van Sickels JE. An evaluation of patients' knowledge about perioperative information for third molar removal. *Journal of oral and maxillofacial surgery* 2012;70:12-18

30. Cunha-Cruz J, Rothen M, Spiekerman C, *et al.* Recommendations for third molar removal: a practice-based cohort study. *American journal of public health* 2014;104:735-43

31. Zhao Q, Wang S-B, Xu G, *et al.* Periodontal health: A national cross-sectional study of knowledge, attitudes and practices for the public oral health strategy in China. *Journal of Clinical Periodontology* 2019;46:406-19.doi:<u>https://doi.org/10.1111/jcpe.13082</u>

32. Liu L, Zhang Y, Wu W, *et al.* Characteristics of dental care-seeking behavior and related sociodemographic factors in a middle-aged and elderly population in northeast China. *BMC Oral Health* 2015;15:66.doi:10.1186/s12903-015-0053-3

Enseignement Superieur (ABES) Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies

33. Pan H-H, Shih H-L, Wu L-F, *et al.* Path modeling of knowledge, attitude and practice toward palliative care consultation service among Taiwanese nursing staff: a cross-sectional study. *BMC Palliative Care* 2017;16:42.doi:10.1186/s12904-017-0228-6

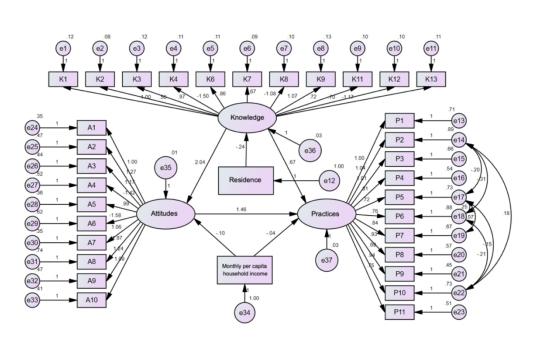
34. Li C, Yao N, Yin A. Disparities in dental healthcare utilization in China. *Community Dentistry and Oral Epidemiology* 2018;46:57685.doi:https://doi.org/10.1111/cdoe.12394

35. Li C, Yao NA. Socio–Economic Disparities in Dental Health and Dental Care Utilisation Among Older Chinese. *International Dental Journal* 2021;71:67-75.doi:https://doi.org/10.1111/idj.12600

R R R R

1 2 3 4 5 6 7 8	Figure Legends Figure 1. The KAP structural equation model
9 10 11 12 13 14 15 16 17 18	
19 20 21 22 23 24 25 26 27 28	
29 30 31 32 33 34 35 36 37	
38 39 40 41 42 43 44 45 46 47	
48 49 50 51 52 53 54 55 56 57 58 59 60	







170x108mm (300 x 300 DPI)

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

d by copyright, includi jopen-2024-087110 on

# Supplemen

# Table S1. Dem

		Knowledge		Attitudes	202. Jnem latec	Practices	
/ariables	N (%)	Mean ± SD	Р	Mean ± SD	er 2024. Dow ignement Su elated to te	Mean ± SD	Р
Total	3467	9.14±1.35		38.01±2.72	wnloa Huperi Aur (بل hyt an Handdat	41.65±8.24	
Gender			< 0.001				< 0.001
Aale	1208 (34.84)	9.47±1.02		39.02±1.97	from (ABE: ta mii	48.55±5.59	
Female	2259 (65.16)	8.97±1.47		37.47±2.91	http:/ S) . ning, .	37.97±6.96	
Age, years			< 0.001		⊲⊒.0		< 0.001
0 and below	1092 (31.50)	9.57±1.03		39.32±2.12	open. ining	48.89±5.41	
51-40	889 (25.64)	9.39±1.19		38.31±2.55	, and	42.46±7.30	
-1-50	1051 (30.31)	8.81±1.53		37.02±2.77	from http://破 jopen.bmj.com/ on June马0, 2025 (ABES). ta mining, Altyaining, and similar techtologies	36.62±6.06	
1 and above	435 (12.55)	8.37±1.36		36.50±2.60	n Jur ır tecl	34.01±4.13	
Residence			< 0.001				< 0.001
Rural	540 (15.58)	9.43±1.01		39.11±1.74	), 2025 ogies.	50.34±4.43	
Jrban	2927 (84.42)	$9.09 \pm 1.40$		37.80±2.82	. 5 at	$40.05 \pm 7.76$	
Education			< 0.001				< 0.001
Aiddle school and below	131 (3.78)	9.21±1.05		38.99±1.57	nce Bibliographique de s.xhtml de	51.73±2.87	

				BMJ Open		ijopen-2( 1 by cop		Page 36 of 50
1 2 3						)24-087110 /right, inclu		
4 5 6 7	High school/Technical secondary school	354 (10.21)	9.44±0.93		39.17±1.77	on 31 Dec uding for u	50.35±4.61	
9 10	Junior college/Undergraduate	2382 (68.70)	9.24±1.33		38.02±2.73	ember 2 Enseigr Ises rela	41.46±7.76	
10 11 12	Postgraduate and above	600 (17.31)	8.56±1.51	< 0.001	37.06±2.97	2024. E nemera nted to	35.08±5.34	<0.001
13 14 15 16	Occupation State Organ and Enterprise Leaders	239 (6.89)	9.40±0.99	<0.001	39.21 ±1.81	Sownloader Superieur √ext and d	51.03±4.51	<0.001
17 18 19	Professional and Technical Personnel (e.g., teachers, doctors, engineers, writers,	976 (28.15)	9.54±1.03		39.04±2.05	d from http (ABES) . ata mining,	47.84±5.90	
20 21 22 23 24	etc.) General Employees and Support Staff	473 (13.64)	9.40±1.15		38.41±2.50	://bmjopen.t	42.44±7.03	
24 25 26 27 28	Commercial and Service Industry Workers	345 (9.95)	9.19±1.43		37.72±2.75	mj.com/ on and similar	39.81±7.22	
29 30 31 32 33 34	Agriculture,Forestry,AnimalHusbandry,Fisheries,andWaterResources WorkersVariant	199 (5.74)	8.89±1.45		37.64±2.58	jopen-2024-087110 on 31 December 2024.	37.77±6.75	
35 36 37 38 39 40 41 42						Agence Bibliographique de		
43 44 45 46		For peer revi	iew only - http://bn	njopen.bmj.con	n/site/about/guidelines	s.xhtml <b>e</b>		

Page 37 of 50				BMJ Open		ijopen- 1 by co		
1 2 3 4 5 6 7 8	Production and Transport Equipment Operators	174 (5.02)	8.81±1.49		36.82±2.83	jopen-2024-087110 on 31 December 3 Enseigr I by copyright, including for uses rela	36.56±94	
8 9 10 11 12 13 14	Military Student Others	48 (1.38) 748 (21.57) 265 (7.64)	8.90±1.74 8.71±1.48 8.61±1.62		37.67±2.91 36.85±3.00 37.15±3.02	nber 2024. Download seignement Superie s related to text and	37.29±6.83 35.66±5.34 35.40±6.45	
15 16	Medical Insurance					oadec erieur and da		
17	No medical insurance	306 (8.83)				ata m		
18 19 20 21	Social medical insurance Social and commercial medical insurance	1283 (37.01) 1878 (54.17)				m http://bn ES) : nining, Al t		
22 23	Monthly per capita household income (CNY)			< 0.001		raie ⊲⊉.0®		< 0.001
24 25	<2,000	218 (6.29)	9.33±0.95		39.30±1.78	n.bmj ıg, an	51.41±3.98	
26 27	2,000-5,000	682 (19.67)	9.58±1.01		39.14±1.84	//bmjo耍n.bmj.com/ on June 10, 20褒 Al traiqing, and similar technologie实	49.18±5.10	
28 29	5,000-10,000	1263 (36.43)	9.35±1.25		38.13±2.71	on Ju Iar tec	41.99±7.28	
30 31	10,000-20,000	831 (23.97)	8.78±1.50		37.28±2.86	ine 10 chnol	36.34±5.96	
32	>20,000 Smoking	473 (13.64)	8.51±1.54	< 0.001	36.74±2.96	), 20⊉ ogie <b>s</b>	34.75±5.03	< 0.001
33 34	Yes	503 (14.51)	9.40±0.99	<0.001	39.18±1.60		50.80±3.47	<0.001
35 36	No	2964 (85.49)	9.10±1.40		37.81±2.82	Ageno	40.10±7.79	
37 38	Alcohol consumption Yes	656 (18.92)	9.44±1.00	< 0.001	39.26±1.78	<0.0 <b>6</b> 1 Bi	50.25±4.43	< 0.001
39 40 41 42 43 44 45 46	103			njopen.bmj.con	n/site/about/guideline	at Agen@I <0.0@Bibliographique de I	JU.25 ±1.13	

			BMJ Open	jopen-2024-08 1 by copyright,	Page 38 of 50
				jopen-2024-087110 on 31 De d by copyright, including for	
No	2811 (81.08)	9.07±1.41	37.72±2.82	<b>lin n</b> <b>31</b> 39.65±7.60	
Frequency of teeth brushing (per day)			< 0.001	orusosi Enise √si	<0.001
1 time	550 (15.86)	9.47±0.99	39.19±1.78	relate 50.02 ±4.79	
2 times	2391 (68.96)	9.22±1.36	38.03±2.72	41.32±7.78	
3 times	469 (13.53)	$8.48 \pm 1.45$	36.71±3.00	te Supple 34.54±4.76	
4 times or more	57 (1.64)	8.35±1.38	36.46±2.47	and during 33.33 ±3.39	
OralDiseaseComplications(multiplechoices)			review on	39.65 $\pm$ 7.60 31 December 2024. 50.02 $\pm$ 4.79 41.32 $\pm$ 7.78 34.54 $\pm$ 4.76 33.33 $\pm$ 3.39 / ing, Al training, and similar technologies.	/
Gum Disease	986 (28.44)			10mjop Al train	
Dental Caries	1536 (44.30)			en.bi	
Pulpitis	689 (19.87)			mj.co and s	
Oral Cancer	450 (12.98)			m/ or imila	
Oral ulcers	700 (20.19)			n Jun r tect	
Dentition defects	348 (10.04)			e 10, 20 mologi	
Irregular teeth alignment	1082 (31.21)				
Loose teeth	279 (8.05)			at Agence	
Other oral diseases	276 (7.96)				
				Bibliographique de	
	For peer rev	iew only - http://bm	njopen.bmj.com/site/about/guidelines.xht	tml e	

Page 39 of 50				BMJ Open		ijopen-2024-08; d by copyright,		
1 2 3 4 5 6 7	No oral conditions as described above <b>Undergone wisdom teeth</b>	215 (6.20)				jopen-2024-087110 on 31 Dece E 1 by copyright, including for us		
8 9	extraction			< 0.001		< B.B.B.B. Feiger		< 0.001
10 11	Yes	1790 (51.63)	9.51±1.08		38.90±2.33	2024. gneme lated t	46.45±6.87	
12 13	No	1677 (48.37)	$8.75 \pm 1.49$		37.05±2.78	nt Sup to text	36.53±6.25	
14 15 16	If have, the age at that time (years old)			<0.001		nloaæd f perieur (∕ an¢data		< 0.001
17 18	20 and below	350 (10.10)	9.29±0.99		39.39±1.91	ABES a mini	51.24±3.55	
19 20 21	21-30 30 and above	855 (24.66) 585 (16.87)	9.55±1.03 9.57±1.19		39.19±2.18 38.19±2.61	ing,	47.72±6.08 41.73±6.68	
22	If have, the reasons were	× ,				raini		/
23 24 25 26	(multiple choices): Recurring painful inflammation	1091 (31.47)		1		http://bmjopen.bmj.com/ on June 10, 2025 S) . ning, Al training, and similar technologies.		7
27 28	Get stuck between the teeth or cheek grinding	903 (26.05)				n/ on J milar t		
29 30 31	Dental caries or periodontal disease	774 (22.32)				- 10,		
32 33 34	Prophylactic extractions or findings on check-ups	912 (26.31)				•.		
35 36 37	Surgical requirements	388 (11.19)				at Agence Bibliographique de s.xhtml		
38 39 40						ibliogra		
41 42						ıphique		
43 44 45		For peer rev	view only - http://br	njopen.bmj.cor	n/site/about/guideline	s.xhtml		

			BMJ Open		ijopen-20 1 by copy			Page 40 of 50
Other Undergone oral therapy other than treatment for wisdom teeth related oral diseases	113 (3.26)		<0.001		jopen-2024-087110 on 31 Dece语ber 2024. Downloaded fro语 E森eignement Superieur (ABE 1 by copyright, including for usጭ related to text and data ң		<0.001	
Yes	1780 (51.34)	9.50±1.07		38.89±2.34	:4. Dov nent S d to te	46.55±6.80		
No	1687 (48.66)	8.76±1.50		37.08±2.78	wnloa Superio ext and	36.49±6.22		
Acceptance of being informed and educated about wisdom teeth during other oral therapies			<0.001		(http: s) · ning,		<0.001	
Yes	2540 (73.26)	9.33±1.24		38.41±2.58	//bmjopen. Al training	43.97±7.86		
No	927 (26.74)	8.63±1.49		36.89±2.79	<u> </u>	35.30±5.41		
					mj.com/ on June 10, 2025 at Agence Bibliographique de and similar technologies. s.xhtml			
	For peer rev	iew only - http://b	mjopen.bmj.con	n/site/about/guideline	s.xhtml e			

			BMJ Open	open-2024 by copyri	
Table S2. Test re	esults of the hypothesis.			jopen-2024-087110 on 31 D J by copyright, including fo	
	Hypothesized paths			path coefficient	P va
Hypothesis 1	Knowledge	<	Residence	; relation	<0.0
Hypothesis 2	Attitudes	<	Knowledge	)24.20 )mest edrto	<0.0
Hypothesis 3	Attitudes	/ <	Monthly per capita househol income	d	<0.0
Hypothesis 4	Practices	<	Attitudes	a min	<0.0
Hypothesis 5	Practices	<	Knowledge	ing:600	0.1
Hypothesis 6	Practices	<	Monthly per capita househol	n∰Al train048, a	0.0
				j.com/ on June 10, 2025 at Agence Bibliographique de nd similar technologies.	
	For p	beer review only - h	ttp://bmjopen.bmj.com/site/about/guideline	s.xhtml	

	BMJ Open	ıjopen-2024-087110 on 31 E 1 by copyright, including fo	Page
		024-08 yyright	
		, inclu	
Table S3. Model fitness indices for the	e KAP structural equation model	on 31 E Iding fo	
Goodness-of-Fit Indices	Ideal standards	ធ្មី <u>អ្</u> ពីន្ទុasurement value	
CMIN/DF	1-3 excellent, 3-5 good	<del>المعالية المعالية المع معالية المعالية المعالية معالية المعالية المعال معالية المعالية معالية معالية معالية معالية معالية المعالية المعالية المعالية معالية معالي</del>	
RMSEA	<0.08 good	te enge de de 1 to n enge	
IFT	>0.8 good		
TLI	>0.8 good	and da	
CFI	>0.8 good ree of freedom; RMSEA, root mean square error of a	ata di ABBEN mi	
		/bmjopen.bmj.com/ on June 10, 2025 at Agence Bibliographique de Al training, and similar technologies.	
	For peer review only - http://bmjopen.bmj.com/site/about/	hi que	

	Jopen-2024-087110 BMJ Open BMJ Open
Questionnaire	BMJ Open BMJ
	Part I Demographic information
1. Gender	a. Male
	b. Female
2. Age, years	
3. Residence	a. Rural
	b. Urban
4. Education	a. Middle school and below
	b. High school/Technical seco
	c. Junior college/Undergraduæ
	d. Postgraduate and above
5. Occupation	a.State Organ and Enterprise Bacers
	b.Professional and Technicag Personnel (e.g., teachers, doctor
	engineers, writers, etc.)
	c.General Employees and Support Staff
	d.Commercial and Service Indestry Workers
	e.Agriculture, Forestry, Aningal Husbandry, Fisheries, and Wate
	Resources Workers
	f.Production and Transport Economic Production
	g.Military
	h.Student 🏨
	I.Others
6. Medical Insurance:	a. No medical insurance
	b. Social medical insurance

phique de l

	BMJ Open BMJ
	024-0 yrigh
	t, inclu
	c. Social and commercial medecal generations contracted and commercial medecal generations and commercial medical generations and commercial medecal generations and commercial medical generations and commercial medecal generations and commercial medecal generations and commercial medecal generations and commercial medical generat
7. Monthly per capita household income (CNY)	
	a. <2,000 9 D b. 2,000-5,000 5 0000 5 0000
	c. 5,000-10,000
	d. 10,000-20,000
	e. >20,000
8. Smoking	a. Yes ố vậ
	b. No are o
9. Alcohol consumption	a. Yes
	b. No ta Afr
10. Frequency of teeth brushing (per day)	a. 1 time
	b. 2 times
	c. 3 times d. 4 times or more
	b. 2 times c. 3 times d. 4 times or more
11. Oral Disease Complications	
	b. Dental Caries
	a. Gum Disease b. Dental Caries c. Pulpitis d. Oral Cancer e. Oral ulcers f. Dentition defects g. Irregular teeth alignment h. Loose teeth
	d. Oral Cancer
	e. Oral ulcers
	f. Dentition defects
	g. Irregular teeth alignment
	g. Irregular teeth alignment 0 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
	i. Other oral diseases
	j. No oral conditions as described bove
12. Undergone wisdom teeth extraction	a. Yes
	b://bmjopen.bmj.com/site/about/guidelines.xhtml <b>d</b>
For neer review only - http	p://bmjopen.bmj.com/site/about/guidelines.xhtml q
To peer review only - http	

Page 44 of 50

Page 45 of 50	BMJ O	ppen copy 20
1 2 3 4		jopen by copyright, includ
5		b. No <u>G</u> ¥
6	12.1 If have, the age at that time (years old)	for De
7 8	12.2 If have, the reasons were:	a. Recurring painful inflamma
9		b. Get stuck between the teeth a grinding
10		c. Dental caries or periodontal
11		d. Prophylactic extractions or $\mathbf{\hat{b}}_{\mathbf{a}}$
12 13		e. Surgical requirements $\vec{b} \vec{c} \vec{e} \vec{s}$
14		e. Surgical requirements f. Other a. Yes defined a. Yes
15	13. Undergone oral therapy other than treatment for wisdom teeth related	a. Yes
16 17	oral diseases	a. Yes da fe b. No a Afr
18	14. Acceptance of being informed and educated about wisdom teeth	a. Yes
19 20	during other oral therapies	a. Yes nig.
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41		Nomjopen.bmj.com/ on June 10, 2025 at Agence Bibliographique de Al training, and similar technologies.
42 43 44 45 46	For peer review only - http://bmjopen.k	omj.com/site/about/guidelines.xhtml

BMJ Open	jopen-2024-087110 on 31 December 2 Enseign 4 by copyright, including for uses rela A.Yes		Pag
	2024 vpyri		
	1-087 ght,		
	7110 incl		
	) on udir		
<b>Part II Knowledge</b> K1 Wisdom teath also known as third molars, are the last and farthest back teath to	31 E Ng fc		
K1. Wisdom teeth, also known as third molars, are the last and farthest-back teeth to emerge in the mouth. They typically surface in adults between the ages of 18 and 25	) vr us		
years.	A Yes T e	B.No	
K2. The primary issues associated with wisdom teeth are insufficient space and	<u> </u>	<b>D</b> .110	-
misalignment.	A.Yes to	B.No	
K3. The emergence of wisdom teeth can lead to pain, inflammation, facial and jaw	e so		-
congestion, edema, and difficulty in swallowing.	A.Yes and the second se	B.No	
K4. In cases where the growth of wisdom teeth leads to a severe infection, fever may	d dec		-
not necessarily be present.	A.Yes a A fro	B.No	_
K5. Wisdom teeth are unlikely to cause damage to neighboring teeth, even if left			-
untreated promptly.	A.Yese	B.No	_
K6. The growth of wisdom teeth can create gaps that allow food debris to enter,	Al train A.Yesin		
resulting in a range of symptoms, including inflammation.	A.Yes	B.No	_
K7. Consuming spicy, hard, and sticky foods can exert pressure on the teeth, leading	ing, and similar A.Yesilar		
to pain and swelling. Additionally, sugars in food and drinks can contribute to plaque	and and		
buildup on teeth, causing dental caries and other oral problems. Thus, it is advisable	A.Yes		
to minimize their intake.	A.Yes a	B.No	_
K8. Not all patients require wisdom teeth extraction, particularly if they are growing	A.Yessol		
normally and not causing any dental problems.	A.Yes 0 1	B.No	_
K9. Various treatment options exist for wisdom teeth, including medications	9, 2025 logies.		
(antibiotics, traditional Chinese medicine, etc.) and surgical procedures (incision and	۵ ۵		
drainage, wisdom teeth extraction, etc.).	A.Yes	B.No	_
K10. Delaying the treatment of wisdom teeth may result in harm to neighboring teeth.	ence		
K10. Delaying the treatment of wisdom teen may result in name to negationing teen.	A.Yes	B.No	
	blio		_
	A.Yes B. bliographique /guidelines.xhtml de		
	hiq		
For peer review only - http://bmjopen.bmj.com/site/about/o	/auidalines vhtml Q		

Page 47 of 50 BMJ Open	d by cop	iopen-2
<ul> <li>1</li> <li>2</li> <li>3</li> <li>4</li> <li>5</li> <li>K11. Wisdom teeth extraction may cause temporary discomfort and swelling, but it generally does not have any long-term effects on the function and appearance of the</li> </ul>	uding	iopen-2024-087110 on 31 De
7 mouth.	A.Yes	B.No
9 K12. Following the wisdom teeth extraction, patients should adhere to the prescribed	s rela	b P
<sup>10</sup> regimen, which may include ice compresses, a specific diet, and proper oral care, to	ated	
12 aneviate pant.	A.Yes	B.No
<ul> <li>13</li> <li>14</li> <li>15</li> <li>K13. Wisdom teeth extraction always leads to a slimmer face.</li> </ul>	A.Yes	B.No
16         17         18         19         20         21         22         23         24         25         26         27         28         29         30         31         32         33         34         35         36         37         38         39         40         41         42         43         For peer review only - http://bmjopen.bmj.com/site/about/gu	ur (ABES) . data mining, Al training, and similar technologies.	led from http://bmiopen.bmi.com/ on June 10. 2025 at Agence Bibliographique de l

			ijopen-2024-087110 1 by copyright, inclu		
			7110 on 31 including		
Part II	I Attitudes		for L		
A1. You are willing to proactively discuss your condition with your doctor and seek professional medical support.	a.Strongly agree	b.Agree	c. Nos reign reign	d.Disagree	e.Strongly Disagree
A2. You are open to discussing your wisdom teeth condition with friends or family and seeking their advice on whether to retain or extract them.	a.Strongly agree	b.Agree	0224. Dowr ement Sup table to text	d.Disagree	e.Strongly Disagree
A3. You are willing to acquire medical knowledge related to the risks and wisdom teeth extraction through concise online videos or books.	a.Strongly agree	b.Agree	nload betteur (ABE N data min c. min	d.Disagree	e.Strongly Disagree
A4. You are concerned about potential hazards posed by wisdom teeth in your daily life, such as inflammation and infection.	a.Strongly agree	b.Agree	c. Neget p	d.Disagree	e.Strongly Disagree
A5. You firmly believe in seeking medical treatment if you experience visible symptoms related to your wisdom teeth.	a.Strongly agree	b.Agree	c. Negutral ini pe	d.Disagree	e.Strongly Disagree
A6. Undergoing wisdom teeth extraction would elicit feelings of fear or anxiety about the surgery.	a.Strongly agree	b.Agree	c. Neutrenj.co	d.Disagree	e.Strongly Disagree
A7. You place trust in your oral surgeon's treatment plan and are receptive to their professional advice.	a.Strongly agree	b.Agree	c. Notilar t	d.Disagree	e.Strongly Disagree
A8. You consider the daily care or extraction of your wisdom teeth to be time-consuming and energy-demanding, hence, you do not prioritize it.	a.Strongly agree	b.Agree	ليليا و 10, 20 د. Nhnologie	d.Disagree	e.Strongly Disagree
A9. You recognize the significance of a good diet and oral hygiene in preventing and managing wisdom teeth issues.	a.Strongly agree	b.Agree	c. Neutral	d.Disagree	e.Strongly Disagree
A10. You acknowledge the importance of regular oral check-ups in preventing wisdom teeth-related diseases.	a.Strongly agree	b.Agree	c. Neutral	d.Disagree	e.Strongly Disagree
			bliographique nes.xhtml de		

Page 49 of 50	BMJ Open Copen-2
1 2 3 4	BMJ Open BMJ Open A11. If the doctor recommends prophylactic wisdom teeth a.Yes b.No b.No
5 6	extraction you would be willing to undergo the surgery $\vec{o}$
7	A12. You prefer medication over surgery as an intervention for wisdom teeth, viewing surgery as a last resort rather than a first- choice approach.
8 9	wisdom teeth, viewing surgery as a last resort rather than a first-
10	A12. You prefer medication over surgery as an intervention for a.Yes b.No wisdom teeth, viewing surgery as a last resort rather than a first-choice approach.
11	
12	4. Downloaded from http://bmjopen.bmj.com/ on June 10, 2025 nent Superieur (ABES). d to text and data mining, Al training, and similar technologies.
13 14	
15	nd eigenstein der State der St
16	
17	
18 19	
20	Ĝ, ĥ
21	
22	aj joj
23	
24 25	
26	
27	
28	
29 30	
31	
32	
33	s. 25 at
34	
35 36	Agence
37	
38	
39	
40 41	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml de
41 42	
43	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml e
44	
45 46	

	BMJ Open BMJ	Page 50 c
	opyri	
	ght, 081	
	including 3	
	udir on	
	Part IV Practice	
P1: You will attend lecture	s on the topic of wisdom teeth and other oral health problems that can arise the grade hout your life, or you can acquire	_
knowledge about the risks	and wisdom teeth extraction through books and online resources.	
a. Very conforming	eigneester 2000 and a to a t	
b. Conforming	ad the rest of the	
c. Neutral		
d. Non-conforming		
e Very non-conforming		
P2: If you are prescribed n	nedication, it is essential to thoroughly read the instructions to comprehend $\frac{1}{3}$ and $\frac{1}{3}$ and potential adverse	_
effects.		
a. Very conforming		
b. Conforming		
c. Neutral	rain 🤤	
d. Non-conforming	ing <u>n</u>	
e. Very non-conforming	<u> </u>	
	ntiously monitor your oral health by visiting the dental clinic.	
a. Very conforming	ntiously monitor your oral health by visiting the dental clinic.	
b. Conforming		
c. Neutral	June 10, 20; technologie	
d. Non-conforming		
e. Very non-conforming ·	<u>s N</u>	
P4: When brushing your te	eth, use a soft toothbrush and pay careful attention to cleaning the back row of windom teeth, neighboring teeth, and	
gums.	Ager	
a. Very conforming	псе	
b. Conforming	B	_
	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml <b>de</b>	
	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml	

e 51 of 50	BMJ Open
	BMJ Open BMJ
	c. Neutral
	d. Non-conforming
	e. Very non-conforming
	P5: To address areas that a toothbrush cannot effectively reach during oral cleaning, utilize dental floss to the crevices.
	a. Very conforming
	b. Conforming
	c. Neutral
	d. Non-conforming
	e. Very non-conforming
	P6: As part of your routine, you regularly rinse your mouth with mouthwash to maintain good oral hygi
	a. Very conforming
	b. Conforming
	c. Neutral
	d. Non-conforming
	e. Very non-conforming
	P7: Regarding your diet, you are conscious of reducing the consumption of sugary or spicy foods, and you promptly clean food debris through
	methods like brushing and flossing.
	a. Very conforming
	b. Conforming
	b. Conforming c. Neutral d. Non-conforming e. Very non-conforming
	d. Non-conforming
	P8: You will inform your family or friends about the hazards of wisdom teeth and remind them to seek medigal attention or promptly have their
	wisdom teeth removed if necessary.
	a. very conforming
	b. Conforming
	b. Conforming
	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml
	—

	BMJ Open BMJ
	ру г.
	2024-087 pyright, i
	in Clud
c. Neutral	ing 31
d. Non-conforming	for De
e. Very non-conforming	use En
P9: You are capable of eval	luating the risks and benefits associated with wisdom teeth extraction and eccepting your doctor's treatmer
recommendations.	late 202
a. Very conforming	d nen to
b. Conforming	tex text
c. Neutral	t an nlos
d. Non-conforming	
e. Very non-conforming	
P10: You remain vigilant for	symptoms such as swollen gums, teeth pain, and a foul taste in the mouth.
a. Very conforming	Ĩ, Î, Î
b. Conforming	A to be
c. Neutral	
d. Non-conforming	ling en
e. Very non-conforming	
P11: You have the ability to	evaluate issues and make adjustments gradually based on your experies with wisdom teeth prevention of
treatment.	
a. Very conforming	in the second se
b. Conforming	Ch Ine
c. Neutral	
d. Non-conforming	June 10, 2025 technologies.
e. Very non-conforming	· 이
	> ge
	Ag en ce
	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml <b>d</b>
	h ig
	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml