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Diabetes knowledge, attitudes and practices among Chinese primary care physicians: a cross-sectional study

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Abstract

Background Type 2 diabetes mellitus (T2DM) is a public health crisis that requires adequate knowledge, attitudes, and practices (KAP) by health care providers to prevent or delay the progression of the disease. This study aimed to assess the KAP regarding T2DM among primary care providers (PCPs) in Central China.

Methods This multicenter cross-sectional study was conducted among 971 PCPs using self-employed KAP questionnaires. Questionnaires were designed to evaluate KAP regarding T2DM among PCPs, and was measured with SPSS software. Descriptive statistics, the Pearson correlation coefficients and multiple regression models used to analyze the data.70%, 80% and 70% of total values were considered as the cut-off point for defining good knowledge, positive attitude and correct practice.

Results A total of 971 PCPs with a mean age of 44.0 ± 10.2 years were evaluated. 620 (63.9%) PCPs worked at village clinic and 605 (62.3%) PCPs have been working more than 20 years. Only 26.3% of the respondents participated in Continued Medical Education (CME) programs regarding diabetes in the past year due to Covid-19 pandemic. Overall, despite positive attitudes toward diabetes, there were substantial gaps in knowledge and practices. The PCPs scored 7.25 out of 14 points on the knowledge subscales, 7.13 out of 8 on the attitude subscales, and 4.85 out of 11 on the practice subscales. Gender, age, practice setting, professional titles, duration of practice and CME attendance were significant predictors of knowledge; Age, practice setting and duration of practice were significant predictors of attitudes; and family history of diabetes affected PCP practices.

Conclusions Despite positive attitudes toward diabetes, there were substantial gaps in knowledge and practices. These findings call for action from relevant health authorities and policy makers to improve PCPs' KAP regarding diabetes in Central China.

Keywords KAP, Type 2 diabetes mellitus, Primary care providers, Cross-sectional, China

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Introduction

Diabetes mellitus is a prevalent and slowly progressive disease characterized by hyperglycemia and hyperglycemia-related chronic complications. It is a major public health crisis worldwide. It is estimated that the prevalence of diabetes is 537 million among individuals aged 20–79 years and is projected to increase to 643 million by 2030 [1]. Diabetes is also associated with enormous health care costs, which places a heavy burden on the health care system [1]. Due to the westernization of lifestyle and aging of the population, China has become the country most affected by the epidemic, affecting approximately 12.8% of the adult population, representing up to 129.8 million citizens [2]. Timely diagnosis and effective management of diabetes can delay/prevent complications of the disease and improve health outcomes [3–6].

In China, diabetes is managed by both primary care physicians (PCPs) and specialists. According to the National Basic Public Health Services (BPHS), PCPs play a crucial role in the management of diabetes. They offer blood glucose tests, blood pressure measurements, prescription of medicines and nutrition, and lifestyle consultations for people with diabetes [7]. Despite enormous advances in the diagnosis and management of diabetes, the achievement of guideline-recommended targets in Chinese adults remains low [8]. A previous study indicated that lack of up-to-date knowledge, incorrect attitudes and malpractice regarding diabetes among healthcare workers may play an important role during unsuccessful management of diabetes [9].

Due to the crucial roles of PCPs in the diagnosis and management of patients with diabetes, numerous studies have investigated family physicians' and general practitioners' knowledge, attitudes, and practices (KAP) regarding diabetes, and substantial gaps were observed in their knowledge and practices [10–12].Our previous study indicated that substantial gaps were observed in PCPs' knowledge and practices regarding prediabetes in China [13]. To the best of our knowledge, PCPs' KAP related to diabetes among Chinese primary care physicians has not been described to date. The present study aimed to identify the current KAP gap by assessing the KAP and barriers to T2DM screening and management among Chinese PCPs. Understanding the gaps and issues would aid in making proposals to policymakers to prioritize diabetes care in primary care settings.

Methods

Study design and subjects

A cross-sectional study was conducted on a convenience sample of PCPs from township hospitals and village doctors in the cities of Huaihua, Yueyang and Yongzhou in Hunan Province, Central South China, from 1 May and 31 August 2022. In most other rural areas in China, the primary healthcare system consists of two levels: village clinics and town health centers. Doctors who work in village clinics are usually called "village doctors"; they receive basic medical and paramedical training and provide basic clinical care. Town health centers have multidisciplinary professional teams composed of doctors, pharmacists, nurses and other health workers. They provide outpatient and inpatient care. Doctors regularly receive continued medical education (CME) regarding diabetes, and they can prescribe medication independently. Residents can seek care in the primary care system when most expenses are covered by medical insurance.The questionnaire were accessed through an online platform in China, which provided functions equivalent to Amazon Mechanical Turk, such as online questionnaire survey, examination, assessment, voting. We shared our link by message text, PCPs who willing to participate the survey can click link, and result return to us automatically when they finished.

The questionnaire

After an extensive literature review, we developed a self-employed questionnaire to assess KAP on diabetes screening and management. Two experts in endocrinology evaluated the questionnaire items for difficulty and clarity A pretest was conducted among 10 PCPs to test the reliability and improve the clarity and interpretability of the questionnaire. The questionnaire consisted of two parts. The first part included questions on sociodemographic characteristics, practice setting, highest degree earned, physician seniority level, time since graduation in general medicine, history of diabetes in a first-degree relative, and participation in continuing medical education (CME) programs related to diabetes in the past year. The second part was designed according to the latest American Diabetes Association criteria [14] and standards of medical care for type 2 diabetes in China 2019 [15]. It was composed of 33 questions assessing the participants' knowledge (14 questions), attitudes (8 questions) and practices (11 questions). Questions related to knowledge and practices were evaluated using a two-point scale (1 = correct, 0 = false, and not sure). The questions related to attitude used a five-point Likert scale (1 = positive attitude, 0 = negative practice, or uncertain). The scores were added together to give a total score that ranges from 0 to 14, 0 to 8 and 0 to 11 for knowledge, attitude and practice respectively, where a higher score indicates better knowledge, attitude and practice. 70%, 80% and 70% of total values were considered as the cut-off point for defining good knowledge, positive attitude and correct practice. Reliability of the instrument was also assessed through internal consistency method after it was completed by 20

physicians.The reliability of the instrument was approved (the overall Cronbach's alpha was 0.832 and 0.789, 0.867 and 0.846 for the knowledge, 8attitudes and practices, respectively).

Statistical analyses

Data were extracted from the questionnaires and analyzed using SPSS version 25.0 (IBM Corporation, Chicago, IL, USA). Descriptive data were calculated as numbers, percentages, and means ± standard deviations. The Kolmogorov–Smirnov test was performed to examine the normal distribution of quantitative variables before the data analysis. The association between PCP characteristics and KAP was evaluated by t tests, Mann–Whitney U tests or chi-square tests as appropriate. Correlation between KAP scores were assessed by calculating the Pearson's correlation coefficient "r". Multiple regression models were used to examine the association between the participants' characteristics and the KAP scores. $P < 0.05$ was considered statistically significant.

Results

Characteristics of the participants

In total, 2697 PCPs from the three cities in Hunan Province, Central China, were were approached to and 971 PCPs completed the questionnaire. Among the participants, 60.0% were males. The mean age was 44.0 ± 10.2 years. A total of 351 and 620 physicians worked in township hospitals and village clinics, respectively. The participants involved in this study included 833 resident physicians, 122 attending physicians, and 16 senior physicians. Among them, nearly two-thirds (62.3%) of participants had 20 years or more professional experience, and 17.4% and 20.3% had 10 to 20 years of experience and less than 10 years, respectively. The majority (73.7%) of respondents did not participate in CME programs regarding diabetes in the past year, and 131 physicians had a family history of diabetes.The characteristics of the participants are presented in Table 1.

Table 1 Characteristics of the participants ($N = 971$)

Provider characteristics	Mean ± SD	Number (*n*)	Percentage (%)
Sex			
Male		583	60.0%
Female		388	40.0%
Age (years)	44.0 ± 10.2		
≤ 40		332	34.2%
> 40		639	65.8%
Practice setting			
Township hospital		351	36.1%
Village clinic		620	63.9%
Professional titles			
Resident physicians		833	85.8%
Attending physicians		122	12.6%
Senior physicians		16	1.6%
Duration of practice (years)	21.6 ± 12.0		
<10 ears		197	20.3%
10–20 years		169	17.4%
≥ 20 years		605	62.3%
CME attendance during the past year			
No		716	73.7%
Yes		255	26.3%
Positive family history of diabetes			
Yes		131	13.5%
No		840	86.5%

PCPs' knowledge regarding diabetes

It was observed that more than 90% knew the classical symptoms of type 2 diabetes mellitus, approximately 50% knew the risk factors for T2DM and 60% knew the glucose cutoff value to diagnose T2DM. Less than 50% knew the HbA1c cutoff value to diagnose T2DM. Approximately 3 out of 10 respondents knew the glucose and HbA1c goals of the treatment of T2DM, while nearly 4 out of 10 respondents knew the hypertension and LDL goals of the treatment of T2DM. Regarding chronic diabetic complications, 45.3% knew the correct time to the initial nephropathy screen; 79.7% knew the most common type of diabetic neuropathy. The majority of respondents knew that the most common side effect of insulin treatment is hypoglycemia; however, only 43.9% could correctly identify the sign of hypoglycemia, and 34.7% did not know the time to use rapid-acting insulin analogs that may cause hypoglycemia .The overall correct rate of knowledge is 51.8%. (Table 2).

PCPs' attitudes regarding diabetes

A total of 66.7% of the participants stated that T2DMis associated with an increased risk of premature mortality. More than 90% thought T2DM management should be comprehensive, and some diabetic patients could achieve "diabetes remission". Timely diagnosis and treatment of T2DM could prevent or delay the progression of diabetic complications. Meanwhile, more than 90% considered weight management, regular outpatient visits, and sufficient explanations of diabetic complications to be vital during the management of T2DM. Regarding patients with proliferative diabetic

Table 2 Knowledge of PCPs regarding T2DM

Item	Correct choice *n* (%)	Score (0–1) Mean ± SD
Q1. Which is not a classical symptom of type 2 diabetes?	891 (91.8%)	0.92 ± 0.28
Q2. Which of the following is not a risk factor for diabetes?	444 (45.7%)	0.46 ± 0.50
Q3.Which of the following is the diagnostic criteria for diabetes using venous blood glucose?	581 (59.8%)	0.60 ± 0.49
Q4.Which of the following is the diagnostic criteria for diabetes using HbA1c?	400 (41.2%)	0.41 ± 0.49
Q5. Which of the following the glucose goal of treatment for type 2 diabetic patients?	319 (32.9%)	0.33 ± 0.47
Q6. Which of the following is the hypertension goal of treatment for type 2 diabetic patients?	446 (45.9%)	0.46 ± 0.50
Q7. Which of the following is the LDL goal of treatment for type 2 diabetic patients without cardiac problems?	360 (37.1%)	0.37 ± 0.48
Q8. Which of the following is the HbA1c goal of treatment for type 2 diabetic patients?	277 (28.5%)	0.29 ± 0.45
Q9. When should diabetic nephropathy screening begin for patients with type 2 diabetes?	440 (45.3%)	0.45 ± 0.50
Q10. Which of the following is the most common diabetic neuropathy type?	774 (79.7%)	0.80 ± 0.40
Q11. How many minutes of moderate-intensity aerobic exercise should adults with type 2 diabetes engage in per week?	494 (50.9%)	0.51 ± 0.50
Q12. Which of the following is most common side effect of insulin treatment?	854 (88.0%)	0.88 ± 0.33
Q13. Which of the following is not a sign of hypoglycemia?	426 (43.9%)	0.44 ± 0.50
Q14. Which of the following is the correct time to use rapid-acting insulin analogs?	337 (34.7%)	0.5 ± 0.48
Overall	7043 (51.8%)	7.25 ± 2.15

Table 3 Attitudes of PCPs regarding T2DM

Item	Correct choice *n* (%)	Score (0–1) Mean ± SD
Q1. Diabetes can reduce a patient's quality of life or shorten their lifespan	648 (66.7%)	0.67 ± 0.47
Q2. Timely diagnosis and treatment of type 2 diabetes could prevent or delay the progress of diabetic complications.	935 (96.3%)	0.96 ± 0.19
Q3. Weight management is an impactful component of diabetes management.	905 (93.2%)	0.93 ± 0.25
Q4. Patients should receive sufficient explanations about diabetic complications, and how to prevent complications at each visit.	957 (98.6%)	0.99 ± 0.12
Q5. It is recommended that diabetic patients have a regular outpatient follow-up every 3–6 months.	833 (85.8%)	0.85 ± 0.35
Q6. Some diabetic patients could achieve "diabetes remission" through lifestyle modification or pharmacologic approach.	940 (96.8%)	0.97 ± 0.18
Q7. The treatment strategy for type 2 diabetes should be comprehensive, including the control of blood glucose, blood pressure, blood lipids, and body weight.	951 (97.9%)	0.98 ± 0.14
Q8. Moderate aerobic exercise is forbidden for diabetic patients with proliferative diabetic retinopathy.	758 (78.1%)	0.78 ± 0.41
Overall	6927 (89.2%)	7.13 ± 1.08

retinopathy, 78.1% of respondents thought moderate aerobic exercise was forbidden (Table 3).

PCPs' practice regarding diabetes

The overall score of practice regarding T2DM was low. Only 26.1% chose the oral glucose tolerance test (OGTT) as a continued test to screen for diabetes in patients with elevated fasting blood sugar (FBS). More than 90% of respondents were familiar with the first-line hypoglycemic drugs, but only 18.6% of respondents would take kidney function into consideration when prescribing metformin and knew the contraindication; 70.8% knew the recommended lipid-lowering drugs, and approximately half of respondents prescribed recommended drugs for T2DM patients with hypertension. Only 12.6% prescribed glucagon-like peptide-1 receptor agonists (GLP-1RAs) or sodium-dependent glucose transporters 2 (SGLT-2) for T2DM patients with atherosclerotic cardiovascular disease (CVD). Less than 50% had adequate practices regarding outpatient visits, foot checks, lipid prolife checks, and insulin use (Table 4).

Table 4 Practices of PCPs regarding T2DM

Item	Correct choice *n* (%)	Score (0–1) Mean ± SD
Q1. Male, 40 years old, found to have a fasting blood glucose of 6.4 mmol/L during a physical examination. Which test should be chosen to confirm the diagnosis?	253 (26.1%)	0.26 ± 0.44
Q2. Which of the following medications is recommended as first-line therapy for type 2 diabetic patients in your routinely work?	92.6 (95.4%)	0.95 ± 0.21
Q3. Which of the following is recommended for type 2 diabetic patients regular outpatient visits in your routinely work?	395 (40.7%)	0.41 ± 0.49
Q4. A male patient, 66 years old, with a 30-year history of hypertension and a 1-year history of diabetes, has irregular use of hypoglycemic drugs. He is 164 cm tall, weighs 72 kg, and has a serum creatinine of 164 μmol/L and a fasting blood glucose of 8.5 mmol/L. Which treatment option should not be taken?	181 (18.6%)	0.19 ± 0.39
Q5. A female patient, 29 years old, 5 months pregnant, with a fasting blood glucose of 8.9 mmol/L, Which of the following medications is recommended in your routinely work?	337 (34.7%)	0.35 ± 0.48
Q6. How many times do you check the foot for type 2 diabetic patients in your routinely work ?	610 (62.8%)	0.63 ± 0.48
Q7. How many times do you check the lipid profile for type 2 diabetic patients in your routinely work?	298 (30.7%)	0.31 ± 0.46
Q8. Which of the following medications is recommended for controlling dyslipidemia in type 2 diabetic patients in your routinely work?	687 (70.8%)	0.71 ± 0.46
Q9.Which of the following is considered not an indication for insulin in your routinely work?	380 (39.1%)	0.39 ± 0.49
Q10. Which of the following medications is recommended for controlling hypertension in type 2 diabetic patients in your routinely work?	517 (53.2%)	0.52 ± 0.50
Q11. Which of the following medications is recommended for type 2 diabetic patients with atherosclerotic cardiovascular disease in your routinely work?	122 (12.6%)	0.13 ± 0.33
Overall	4706 (44.1%)	4.85 ± 1.70

Correlations among KAP scores

Based on the above results, the PCPs scored 7.25 out of 14 points on the knowledge subscales, 7.13 out of 8 on the attitude subscales, and 4.85 out of 11 on the practice subscales. There was a weak positive correlation between the overall knowledge scores and practice scores ($r=0.333$) as well as knowledge scores and attitude scores ($r=0.194$). This indicates that only a tiny fraction of the variations in diabetes attitude and practice can be explained by knowledge.

Factors associated with the overall KAP scores

The results of univariate analysis of the KAP and association with various variables are presented in Table 5. Female, age less than 40 years old, working in a township hospital, higher professional titles, duration of practice less than 10 years and CME attendance were significant predictors of better diabetes knowledge among the study participants. Similarly, age less than 40 years old, working in a township hospital and duration of practice between 10 and 20 years were significant predictors of better diabetes attitudes. While family history of diabetes was positively correlated with PCP practice scores.

Multiple regression analysis was used to investigate the joint effect of PCP characteristics on diabetes KAP scores. The results demonstrated that working in a township hospital and higher professional titles were significant predictors of better diabetes knowledge among the study participants. Working in a township hospital were significant predictors of better diabetes attitudes. While family history of diabetes was positively correlated with PCP practice scores.

Discussion

Primary care is a fundamental component of the health care system and can address patients' preventive, treatment and management care needs [16, 17], especially in resource-limited areas [18]. Previous studies have indicated that PCPs play an important role during the management of diabetes, and PCP characteristics affect the quality of diabetes care [19–21]. In China, according to the BPHS, PCPs play a crucial role in the management of diabetes. To our knowledge, the present study is the first KAP evaluation regarding diabetes among Chinese PCPs. Insight into the KAP among PCPs of an important problem such as T2DM would be a guide for policymakers seeking to devise effective management strategies in the primary care setting.

There is a substantial deficiency of knowledge among PCPs in this part of China. The PCPs scored 7.25 out of 14 points on the knowledge subscales. PCPs work at the forefront of the healthcare delivery system. The substantial deficiency of knowledge is a matter of grave concern given that China has the largest population of persons with diabetes [1].It was observed that more than 90% of study participants knew the classical

Table 5 Overall KAP scores and provider characteristics

Provider characteristics		Knowledge score		Attitude score		Practice score	
	n	Mean (SD)	*p*	Mean (SD)	*p*	Mean (SD)	*p*
Sex							
Male	583	7.02 ± 2.04	< 0.001	7.10 ± 1.09	0.202	4.80 ± 1.78	0.272
Female	388	7.60 ± 2.26		7.19 ± 1.06		4.92 ± 1.74	
Age (years)							
≤40	332	7.80 ± 2.21	< 0.001	7.36 ± 1.09	< 0.001	4.81 ± 1.94	0.616
>40	639	6.97 ± 2.05		7.01 ± 1.06		4.86 ± 1.66	
Practice setting							
Township hospital	351	6.96 ± 2.12	< 0.001	7.41 ± 0.95	< 0.001	4.82 ± 1.66	0.563
Village clinic	620	7.77 ± 2.10		6.98 ± 1.12		4.88 ± 1.94	
Professional titles							
Resident physicians	833	7.16 ± 2.13	0.03	7.10 ± 1.10	0.101	4.80 ± 1.72	0.071
Attending physicians	122	7.76 ± 2.19		7.32 ± 0.88		5.04 ± 1.97	
Senior physicians	16	8.25 ± 2.05		7.18 ± 1.08		5.63 ± 1.82	
Duration of practice (years)							
<10 years	197	7.88 ± 2.24	< 0.001	7.29 ± 1.21	< 0.001	4.79 ± 1.90	0.794
10–20 years	169	7.59 ± 2.05		7.43 ± 0.86		4.92 ± 1.85	
≥20 years	605	6.95 ± 2.09		7.00 ± 1.07		4.84 ± 1.69	
CME attendance							
No	716	7.16 ± 2.16	0.029	7.11 ± 1.07	0.203	4.90 ± 1.75	0.108
Yes	255	7.51 ± 2.10		7.21 ± 1.10		4.69 ± 1.79	
Positive family history of diabetes							
No	840	7.25 ± 2.19	0.868	7.14 ± 1.14	0.630	4.77 ± 1.74	0.001
Yes	131	7.28 ± 1.88		7.09 ± 1.14		5.31 ± 1.83	

symptoms of T2DM, but only approximately 50% knew the risk factors for T2DM. Knowing the risk factors and classical symptoms are critical because they will inform screening decisions. Physicians may choose different screening methods, such as FPG, 2-h PG during the 75-g OGTT, and HA1C, based on their own experience. The results indicated that 60% of participants knew the glucose cutoff value and 40% knew the HbA1c cutoff value to diagnose T2DM, which means the existence of a high ratio of diabetes misdiagnosis. Our findings are similar to those of other studies conducted in Cameroon [22], Southeast Nigeria [23] and Sri Lanka [24]. Meanwhile, a recent study revealed that the achievement of guideline-recommended hemoglobin A1c (HbA1c), blood pressure (BP), and low-density lipoprotein cholesterol (LDL-C) (namely, referred to as "ABC" targets) was exceedingly low [8]. This echoed our results, and we found that approximately 3–4 out of 10 respondents knew the guideline-recommended "ABC" targets of T2DM. This finding is worrisome, as it suggests that many PCPs do not even know the specific target, which may cause confusion for patients. A previous study indicated that one of the major challenges to PCPs in treating T2DM is the initiation and titration of insulin therapy [25]. The present study showed that more than one-third of PCPs do not know how to use insulin properly and cannot recognize hypoglycemic symptoms. Moreover, we found that the suboptimal level of diabetes knowledge in this study could be attributed partly to older age, working at village clinics, lower professional title and lack of CME. These factors have been proven to affect physicians' diabetes knowledge [10, 23, 26, 27], and appropriate measures should be taken to improve the knowledge of PCPs.

Moreover, the results revealed that most participants agreed that they had a positive attitude toward T2DM. T2DM can be prevented or delayed through comprehensive management, including physical activity, nutrition, and pharmacologic approaches, and some diabetic patients can even achieve "diabetes remission" [28]. This is consistent with our results; more than 90% of respondents agreed that timely diagnosis and treatment of T2DM could prevent or delay the progression of diabetic complications. Because of the pathophysiological link between T2DM and obesity, weight management is becoming increasingly important [29]. The majority of respondents realized that weight management is an impactful component of diabetes management, which is

encouraging, as it suggests that many PCPs keep abreast of the current guidelines.

Most participants agreed that T2DM is an important health issue; however, this sentiment is not reflected in actual practice, as the PCPs scored 4.85 out of 11 points on the practice subscales. The overall score on practices regarding diabetes was low. Only 26.1% of our participants chose the OGTT as a continued test to screen for diabetes among patients with elevated fasting blood sugar (FBS), mainly because the OGTT has poor reproducibility and is a cumbersome procedure. Metformin is still the first choice of PCPs for T2DM patients, which is consistent with the prescribing pattern of PCPs from the United Kingdom [30], but only 18.6% of respondents considered kidney function when prescribing metformin and knew the contraindication. The latest guidelines recommended that both drug classes could be used as first-line therapy in specific patients (with atherosclerotic CVD, heart failure, and CKD) with type 2 diabetes [31, 32], but only 12.6% prescribed GLP-1Ras or sodium-dependent glucose SGLT-2 for type 2 diabetic patients with atherosclerotic CVD. It is obvious that it still needs time for these new drugs to be implemented in daily practice, which is similar to an online study that indicated that there are substantial gaps among PCPs regarding the treatment of patients with T2DM and CVD. Moreover, we found that the suboptimal level of diabetes practice in this study could be attributed partly to family history of diabetes. The low overall score on practices may due to a number of factors including poor knowledge related to diabetes [9], lack training programs of diabetes management as well as financial incentives of the PCPs [33].

The present study had several limitations. First, due to variations in geography across China and the limited number of PCPs, the results of this study are insufficient to generalize to the rest of the country. Second, the self-report survey may introduce recall and social desirability biases, with more respondents reporting positive attitudes toward prediabetes. Third, the convenience sample method may incur selection bias is one of the obvious limitations of this study, therefore, further studies with random sample are suggested to be conducted.

Conclusion

Despite positive attitudes toward diabetes, there were substantial gaps in diabetes knowledge and practice. These findings call for action from relevant health authorities and policy makers to improve PCPs' knowledge, attitudes and practices regarding diabetes. The results also indicated underutilization of the diabetes CME program by PCPs. A structured health program for diabetes is proposed to update PCPs' knowledge and practices related to diabetes, such as screening, diagnosis and management.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12875-024-02600-4.

Supplementary Material 1.

Authors' contributions

XS designed the study. LP, BH and DF collected the data. LP conducted the data analysis and drafted the manuscript. XS and ZZ revised the manuscript. All authors reviewed and approved the submitted version of the manuscript.

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Availability of data and materials

The data underlying this article will be shared on reasonable request to the corresponding author.

Declarations

Ethics approval and consent to participate

This study was approved by the Ethics Committee of the Second Xiangya Hospital of Central South University. Online informed consent was obtained from each participant before completing the study questionnaire.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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