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## ARTICLE TITLE

Does Traditional Chinese Medicine Matter? Medical Choices of Rural Diabetic Patients in Changsha, China

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All authors have nothing to disclose.

**ABSTRACT**

*Introduction:* With an aging, urbanizing population, China is home to the world's largest number of adult diabetics. Although more diabetic patients currently live in cities, the prevalence of pre-diabetes is greater in the rural population due to changing dietary and physical habits, as well as the relative poverty. This demographic is thus an important target for public health intervention. As Traditional Chinese Medicine (TCM) is viewed in China as useful for treating chronic diseases and widely accepted, we sought to explore its use for rural diabetic patients.

*Methods:* The study population included 63 diabetic patients and two village doctors from four rural villages near Changsha, China. An initial survey was orally conducted with all 63 participants to collect demographics, financial situation, health-seeking behaviors, treatment beliefs, and medical expenditure. Three focus groups of six rural patients each were subsequently held at village health centers. For analysis, questionnaire data was summarized using means and standard deviations or medians and quartiles. Focus group sessions were voice-recorded and transcripts were coded for thematic analysis.

*Results/Conclusions:* Questionnaire data revealed that for the majority of participants, seeing a doctor is costly in terms of time and money. Patients often do not have the luxury of choosing their medical provider. Despite the benefits of TCM, its slow speed and cumbersome preparation methods do not fit a need for immediate results. Furthermore, TCM doctors are not as available or accessible as Western medicine doctors. As such, although 20% of rural patients rated higher trust in TCM than WM, no patient solely used TCM for their treatment. Instead, almost 40% of patients try to use both TCM and WM. Village practitioners similarly believed that although diabetes treatment should go towards integrative treatment, TCM's development is hindered by

its slow onset and inconvenience coupled with a more systemic lack of TCM infrastructure and research in China. In summary, the continued trust that rural patients place in TCM supports further research for better understanding the true economic, social, and health benefits of having combined TCM-WM treatment be part of diabetes standard of care.

## INTRODUCTION

Almost half of the health care in China is based on Traditional Chinese Medicine (TCM).<sup>1</sup> To understand the depth of TCM in the Chinese mentality, one needs to understand its 3000-year history. Rooted in Taoist philosophy, the goal of TCM is to maintain balance and harmony in the bodily forces. Just as no person is separate from her relationship with society, no symptom can be analyzed separate from its relationship with the body.<sup>2</sup> By considering the multi-system effect of disease, TCM treatment often focuses on behavioral and preventative interventions that make it particularly relevant for chronic, and undiagnosed illnesses. Western medicine (WM), in contrast, is viewed as more effective for treating acute and etiologically-understood diseases. With traditional and Western medicine practiced and accepted side-by-side, China is perfectly situated to address the intersection of both practices.<sup>1</sup>

Diabetes mellitus, a hallmark example of chronic disease, is a good model with which to explore the role of TCM in China. Patients with chronic diseases often turn towards TCM because of perceived quality, lower cost with better safety profiles, and cultural and historical trust.<sup>3,4</sup> China has the world's largest number of adult diabetics: over 92 million (9.7% of the population) were believed to have diabetes in 2010, with 60.7% of these cases undiagnosed.<sup>5</sup> The exact reason for this sharp increase is multifaceted, involving a dynamic interaction between the social and behavioral facets of an aging and urbanizing population experiencing changing diet and physical activity habits. Prompt public health and policy responses in sparking lifestyle modifications are thus needed not only because of the heavy disease burden on the individual, but the large economic weight on society; it was estimated that the direct medical cost of treating type 2 diabetes and its complications was more than 18% of China's total health expenditures in 2007.<sup>6</sup>

There are a handful of articles on the treatment of diabetes with Chinese herbs<sup>2,7</sup> and acupuncture. Systematic review of 66 randomized trials for herbal treatment of type 2 diabetes showed general favorable hypoglycemic results, despite low methodological quality of the trials.<sup>8</sup> In TCM, diabetes is attributed to *yin-yang* imbalance and treatment relies on replenishing both *yin* and *yang* by promoting blood circulation and invigorating the organs to strengthen the body.<sup>9</sup> TCM focuses on treating and preventing diabetes complications in addition to lowering blood glucose with a combination of ingredients tailored to the particular symptoms and clinical presentation of the patient.<sup>10</sup>

In often overlooked, resource-poor communities of rural China, mortality rates are particularly high from non-communicable diseases such as diabetes.<sup>11</sup> Since one of TCM's largest benefits to the population is its relative low cost to efficacy,<sup>4,12,13</sup> it is particularly relevant for the rural population as medical expenditures and lack of insurance coverage are main causes of impoverishment.<sup>14</sup> As many rural patients neglect seeing doctors until their disease progresses to far costlier stages,<sup>15</sup> prevention thus becomes a keystone in improving welfare. Although there are presently more diabetic patients in cities than the countryside, the higher prevalence of pre-diabetes in the rural population makes this demographic an important target for public health intervention.<sup>5</sup>

To date, there are no patient-centered studies asking why individuals with diabetes pursue TCM for treatment. This project endeavors to understand what factors influence the medical care diabetic patients in rural China choose. In addition, we interviewed rural village doctors, who typically receive rudimentary Western medicine training from local institutions. Despite the paucity in evidence for TCM treatments for diabetes, it is not the intent of this study to judge efficacy but rather determine the motivations of rural patients in using TCM. With patient-

centered interviews and focus groups, we elucidate the extent to which TCM is used by rural diabetic patients, and describe the reasons behind their choices for treatment.

## **METHODS**

This study was approved by the Human Investigation Committee of Yale University (HIC protocol # 1204010079) and the Independent Ethics Committee Institute of Clinical Pharmacology of Central South University (Project # CTXY-120028).

### *Selection and Description of Participants*

98 diabetic individuals were previously identified using a novel screening instrument from three villages in the Xingcheng and Qiaoyi Townships of Wangcheng District in Hunan, China,<sup>16</sup> 10 of whom had passed away. The 88 remaining individuals were contacted by telephone; 13 individuals denied being diabetic and 30 either refused to participate or could not be reached after two phone calls on separate days. 18 additional subjects were recruited with the assistance of a Xingcheng Township village doctor. A final total of 63 subjects were interviewed from four villages (Supplementary Figure 1).

### *Survey Collection*

Interviews were conducted in Mandarin and the local Changsha dialect by two graduate students (LQ and XG) who introduced themselves as researchers from the Xiangya School of Public Health.

For the initial interview, subjects were contacted by telephone for individual meetings at their respective village health centers. A 39-question survey was given orally by XG and LQ to collect demographics (age, sex, education level, marital status), financial situation (average

yearly family/individual income), health-seeking behaviors (symptoms at diagnosis, duration, therapies used), treatment beliefs (belief in Western Medicine or Chinese Medicine on a scale of 1 to 10 with 1 being complete trust in WM and 10 being complete trust in TCM), and medical expenditure (amount spent on treatment and therapies). The survey was created by XG with content validated by five professors in the Social Medicine department of Xiangya School of Public Health. A pilot interview was performed on six inpatient rural diabetic patients in Xiangya Hospital to monitor flow and understanding of the questionnaire as well as to gauge length. This initial survey collection period took approximately one hour per person.

### *Interviews*

After the initial survey collection, XG contacted subjects from each village to participate in a focus group interview located at their village health center. Three focus groups of six subjects each were conducted within three villages (18 participants total), lasting approximately 30 to 45 minutes. All subjects consented at the onset of the interview to be voice recorded; each subject was further informed of the anonymity and confidentiality of their answers and told that they can skip any question or withdraw from the interview at any time. Individual interviews were also conducted by XG and LQ with one village doctor each from Xingcheng and Qiaoyi Townships (Table 1). Similar procedures of informed consent were performed with the doctors; interviews were voice recorded and lasted 20 minutes each.

Questions for each focus group were adapted from questions used by Xu et al (2006), who explored patient perspectives on TCM use in cancer care. XG and LQ conducted interviews in Chinese and the local Changsha dialect using a list of open-ended questions for guidance (Table 1). Discussion was not limited to the listed topics and participants were allowed to freely

discuss their experiences with the illness. Although both researchers took notes about the behaviors of the group, no effort was made to connect responses to specific respondents.

Table 1. Questions for patient focus group interviews (A) and one-on-one interviews with village doctors (B)

**A. Regarding treatment for patient focus groups**

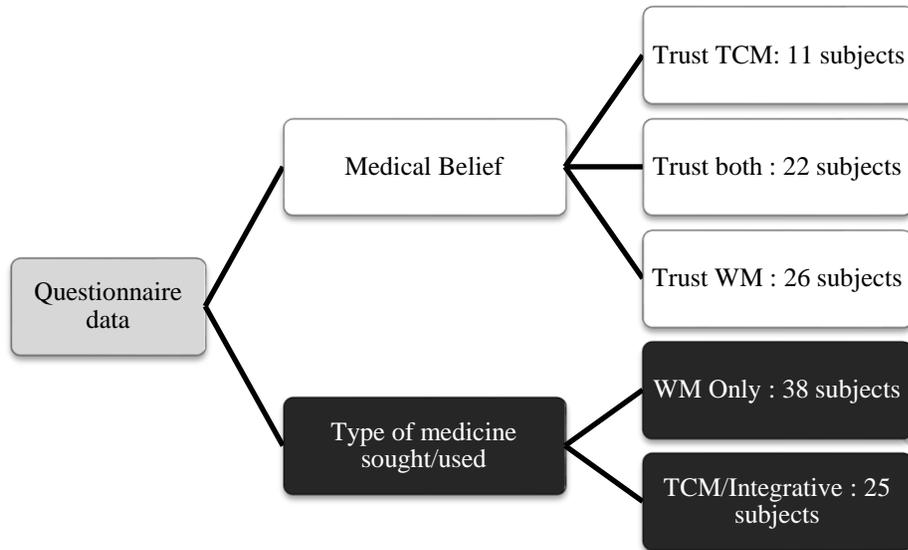
1. Why and when did you seek TCM or Western medicine?
2. What did you expect of your chosen treatment?
3. What type of treatment did you seek and receive?
4. What are the strengths and weaknesses (what do you like and dislike) regarding the chosen treatment?
5. Are there any barriers or facilitators for you to seek/receive your chosen treatment?
6. How much do you spend per month on either TCM or Western medicine?
7. How much do you spend per month on your diabetes treatments as a whole?
8. What is your monthly income?

**B. Regarding treatment for village doctors**

1. What is the place of TCM in diabetes care in China?
2. Under what situations will patients seek TCM or Western therapy?
3. What type of TCM or Western therapies do you propose? Why?
4. Potential benefits and risks to patients, or advantage and disadvantage of using TCM or Western medicine?
5. Are there any barriers or facilitators to the use of TCM or Western therapy?
6. What do you see being the trend of use for diabetes treatment?
7. Potential collaboration on clinical research between the two types of medicine?

*Data Analysis*

Paper questionnaire data were entered into Excel with no participant identifying information and summarized using means and standard deviations or medians and quartiles. Data was analyzed via medical belief (measured on a scale of 1 to 10, with 1 being full trust in WM and 10 being full trust in TCM ) and type of medical care sought/used (a score of >6.5 was considered as trusting TCM, 4.5 to 6.5 as trusting both, and <4.5 as trusting WM; see Figure 1). These groups were compared with regards to age, sex, education, duration of illness, family income, expenditure (both lifetime and three-month), and medical belief. Categorical data was analyzed using chi-squared or Fisher's exact as appropriate, while continuous data was analyzed using one way ANOVA or unpaired two-tailed t-tests. Significance was set at  $p < 0.05$ .



**Figure 1.** Delineation of questionnaire data from all interviewed subjects into medical belief and type of medicine sought/used.

Focus group and village doctor interviews were transcribed verbatim and translated by XG (bilingual native English speaker) and LQ (bilingual native Chinese speaker), then back-translated for accuracy by SYX, a professor of Social Medicine. Thematic analysis was conducted with each focus group interview by examining the translated text for themes and trends while using the interview questions and notes for guidance. After creating several thematic categories, transcripts were subsequently coded. The categories for the patient focus groups included: reasons for seeking care; expectations of care; strengths, weaknesses, and differences between TCM and WM; barriers or obstacles to seeking care; and rural patient's special needs. The categories for the village doctor interview included: recommendation for diabetes care; factors hindering TCM development; and trend for future diabetes care.

**RESULTS***Demographics*

Of the 63 diabetic subjects, 24% (15) were male and 76% (48) were female (Age range 37-79, average 58±8.3). The duration of patient's diabetes diagnoses ranged from one month to 36 years, with a median duration of 5 years. 87% (55) were married and 63% (40) had the equivalent of a primary school education or less. The annual family income ranged from 840 RMB (134 USD) to 160,000 RMB (25,575 USD) with a median of 15,000 RMB (2,398 USD), while mean 3-month expenditure on medical care (including medications) ranged from 0 to 9000 RMB (1,438 USD), with a median of 600 RMB (96 USD) [Supplementary Table A]. The 18 subjects who participated in the focus groups were representative of the subject pool [Supplementary Table B].

**Table 2.** Demographics of participants by medical belief.

		TCM (n=11)	WM (n=26)	Combined (n=22)	$\chi^2$ (p)
<b>Sex</b>	Male	2	5	6	0.656 (0.754)
	Female	9	21	16	
<b>Education level</b>	Elementary or below	5	17	16	2.534 (0.2816)
	Middle school or above	6	8	6	
<b>Continuous variable: mean (SD)</b>					<b>F (p)</b>
<b>Age in Years</b>		54.4 (8.9)	60.0 (7.3)	58.4 (7.6)	0.3350 (0.8001)
<b>Duration in Years</b>		3.8 (2.3)	6.0 (5.0)	7.2 (4.4)	1.945 (0.1534)
<b>Family Income in RMB</b>		19500 (10583)	16225 (14180)	28424 (43107)	0.5059 (0.6793)
<b>3mo Expenditure in RMB</b>		373.6 (529.4)	1879 (2385)	1364 (1868)	1.4676 (0.2252)

*Health-Seeking Behavior*

59 subject ranked their medical belief of WM and TCM; 11 (18.6%) trust TCM more than WM, 26 (44%) trust WM more than TCM, and 22 (37.2%) trust both equally (Table 2). There were no significant differences between the groups in any demographic variable, including age, sex, education, or duration of disease (Table 2). Of the 63 subjects, 38 (60.3%) used only WM while 25 (39.6%) used both TCM and WM. Users of combined TCM and WM have had diabetes for a significantly longer duration (9.0 years  $\pm$  7.8 years compared to 5.3 years  $\pm$  4.0;  $p=0.02$ ), and have greater relative believe in TCM compared to WM (Table 3).

**Table 3.** Demographics of participants by type of therapy used

		Combined (n=25)	WM Only (n = 38)	P-value or X <sup>2</sup> (p)
<b>Sex</b>	Male	3	12	0.1291
	Female	22	26	
<b>Education level</b>	Below elementary	6	11	2.428 (0.657)
	Elementary	8	15	
	Middle school	9	8	
	High school and above	2	3	
<b>Continuous variable: mean (SD)</b>				<b>P-value</b>
<b>Age in Years</b>		55.1 (13.3)	58.9 (7.1)	0.1594
<b>Duration in Years</b>		9.0 (7.8)	5.3 (4.0)	0.0206
<b>Family Income in RMB</b>		20661 (24568)	23428 (30704)	0.7569
<b>3mo Expenditure in RMB</b>		1781 (2720)	1039 (1099)	0.1579
<b>Belief in TCM vs WM<sup>†</sup></b>		5.1 (2.3)	7.1 (2.2)	0.001

<sup>†</sup>Lower score connotes greater belief in TCM

**Reasons for seeking care**

The most commonly stated reason by the 18 interviewed rural subjects for initially seeking care was lack of energy. 15 of the 18 interviewees stated that they saw a doctor because they did not have enough *jin* (“劲”), loosely translated as energy, vigor, or strength.

*I had no energy to walk, and was walking slower than others and needed to be carried. I had no jin for a while.*

*My diabetes isn't the same as theirs. No dry mouth or a large need for urination. Just that I had no jin...I didn't have other obvious diabetes symptoms.*

*I really liked to eat, and had a severe lack of jin. Other people realized I lost a lot of weight and suggested I undergo a checkup for diabetes.*

For four subjects, diabetes was diagnosed during routine checkups or as an incidental finding during a doctor's visit for a separate problem.

*I went with my loved one together for checkup...My body was itchy. I was uncomfortable. Eyes were swollen in the morning.*

*I was just losing weight, and my husband told me to go get a checkup.*

*I was working, every time I ate a meal, I had to go to the bathroom four times. So I thought that was a problem.*

### **Expectations for care**

When asked about expectations from treatment(s) they were receiving, all interviewees unanimously agreed that the overarching goal was to control or lower blood sugar. The conversation often regressed to solely about numbers, where subjects exchanged the fluctuations of their blood glucose readings (stated in mmol/L) as an indication of suffering.

*In the morning on an empty stomach, it is 9-point-something. Two hours after meals, it is 11-point-something. Last time I checked blood sugar it was 14.5...Basically, it is never been 5- or 6-point-something.*

When asked to explain the disease in their own words, no subject was able to provide an explanation beyond that of symptomology.

*I know everything, I just do not remember, do not know how to explain. If others say it I would know. I just know in my heart.*

*I know it's "three more one less" [Hypertension, hyperglycemia, hypercholesteremia, and hypoinsulinemia] ... Otherwise, no memories at all.*

*It's that you cannot eat much. If you see anything you want to eat, you cannot eat it.*

*When a person gets old, you want to eat some good stuff sometimes. But then you have to control yourself, and think: Even though I'm old I cannot enjoy the good stuff, only the bad stuff.*

Three subjects compared diabetes to an entity ingrained into their individual identities.

*It cannot be cured, only controlled. A cancerous type of disease, you cannot do what you want to, cannot eat what you want to. Your health is not as good as [the health of] others.*

*I do not know what type of disease diabetes is. It only represents myself.*

In all four focus groups, the conversation regarding the nature of diabetes inevitably led to a discussion about the immense cost of medication.

*Diabetes is not a good disease. Medication...is unaffordable. If you start with good medication, you cannot go to cheap medication later. I just think: What can I do? I have no more money.*

### **Beliefs and Attitudes towards TCM and WM**

Focus group members agreed that WM's main benefit is its speed and convenience, while its major drawbacks include numerous side effects and an ability to only address the symptomology rather than the cause of a disease.

*WM comes to effect quickly. But it only treats symptoms and not the root problem.*

[Regarding side effects of WM:] *Sometimes I feel psychologically uncomfortable.*

*Anxious.*

Conversely, while participants said that TCM would treat their diabetes in a balanced, holistic manner without hurting their internal organs, its slow onset and cumbersome preparation methods are immense drawbacks.

*TCM medication is better than WM medication. Everyone's disease is different, so you need to treat it differently.*

*TCM does not simply treat diabetes...it is whole-body oriented. TCM treats the root of the problem.*

*When I take WM, my blood sugar drops faster. Taking TCM, it's slower and the effects are not very evident.*

Moreover, a particular drawback noted by a few participants against TCM use was its unclear etiology and mechanism.

*Even though I have used TCM medications, I do not know if [they] are good or not.*

*Sometimes you do not know what exactly goes into a concoction. They might use other herbs instead.*

When asked about the defining differences between TCM and WM, participants evoked the end-goals of each class of medication: WM controls blood sugar; TCM balances the body. Thus, the general consensus was for integrative WM-TCM use when possible to balance the positives and negatives of each style of medicine.

*I believe it still should be TCM-WM treatment together...because WM has too many side effects. WM can control blood sugar, but it cannot adjust the balance of the body.*

*Everyone says it is good to use TCM [even though] you cannot really tell what's good about it. But it does not hurt your internal organs... And no side effects...But you cannot take TCM for a long time.*

*TCM helps heal the damage done by WM.*

### **Barriers/obstacles to seeking care**

All participants were eager to discuss China's medical care issues. At every site, the discussion would cover basic problems with Chinese healthcare, such as physician bribery and long wait times.

*In China, there is influence when you know people. Some people, if they know people, won't need to stand in line, and even cut the line to see a doctor.*

Finance was also a huge concern. Many interviewees self-prescribe cheaper medications from local pharmacies and would only see a doctor when their symptoms became overwhelming.

[On whether the interviewee knew diabetic patients in her village] *Many older individuals, above 60, but they do not see doctors. It is basically an economic problem.*

[Their diabetes] *cannot be treated, so the older you get, the sicker you get. You need to take very good medication to achieve an effect. And you cannot get reimbursement for any medication.*

*These medicines are all about the same, so I just bought medicine by myself to take. I had two types of medicine, and when I felt my body was fine I stopped taking them.*

Although the national government offers rural residents financial assistance, the consensus was that despite a theoretical benefit, the programs are impractical in use. Many interviewees also believe that city residents have a better quality of life due to preferential governmental policies.

*Rural areas have economic difficulties. At the health center, the medications that can be reimbursed are not good medications. Good drugs you cannot reimburse.*

*In the city, medical conditions are better, doctor skills are high, and they have specialized diabetic divisions. In the countryside, it is even hard to buy medications.*

*When you come from the countryside and they [doctors in the city hospitals] give you medicine, you take what you are given.*

When asked about barriers to seeing WM or TCM doctors, interviewees described a lack of availability to TCM practitioners. In both village health centers and city hospitals, WM predominates and skilled TCM doctors are difficult to find.

*Those from rural areas cannot just pick up and go to Changsha to see a doctor. Village health centers only have WM doctors, so everyone goes to WM doctors.*

*I asked [the doctor] to prescribe me TCM but he would not.*

*There is a lack of TCM around.... In the countryside, you cannot wait for that long. You want something simple. You do not even take side effects into consideration.*

Finally, all focus group members stated they would see a TCM doctor if given the choice to do so.

*Of course, if there was the option of course we would go...But there are no TCM doctors. No choice.*

*I just listen to what others say to take... For rural people, there's not much choice.*

### **Perspectives of the Village Doctors**

In the experience of the two village doctors we interviewed, the majority of diabetic patients use WM, particularly those newly diagnosed and those with higher blood sugars. However, a significant minority of patients—those with lower blood sugars or those for whom WM's side effects are too overwhelming—will use TCM.

*When patients first discover their diabetes, most use WM because WM acts quickly. After buying the medicine, they can just take it, without the hassle of TCM. You need to*

*personally cook TCM and spend a lot of time. However, WM has side effects. TCM is more expensive than WM. Some patients cannot tolerate the side effects of WM so use TCM, with certain effect.*

Both doctors recommended integrative medical care. In general, TCM conditions the whole body and has fewer side effects, but is inconvenient, slow, and has unclear scientific evidence; on the other hand, WM is fast in effect and has good theoretical support, but also has adverse side effects and only addresses symptomology.

*If blood glucose levels are high, they first use WM to control blood glucose to normal levels, and then use TCM to condition. If blood glucose levels are not too high, they can use effective TCM prescriptions to control their blood sugar. In general, TCM-WM combined treatment is the best for treating diabetes.*

Factors hindering the use and development of TCM are threefold: patients cannot wait for TCM to come into effect, TCM has limited research and inadequate scientific foundation, and WM is more pervasive than TCM, especially in large hospitals. However, both doctors believe that there is an eventual place for TCM in diabetes care in China:

*WM will still continue for a long period of time as being the mainstream treatment of diabetes, but there will be progression towards integrative care, finally reaching a balance between WM and TCM.*

## DISCUSSION

This patient-centered study is one of the first to explore the health-seeking behaviors of rural diabetic patients in China. Although our dataset was not powered to reliably determine

quantitative interactions between medical beliefs and expenditures, we obtained a myriad of information via interviews on rural patients' perceptions of TCM use in their diabetes management. Focus group findings revealed that for most rural individuals, doctor visits are too expensive and time consuming; thus, patients only seek help when they absolutely must and will travel directly to the large city hospitals run by predominantly WM-trained doctors. Although patients agreed on the many benefits of TCM, they also concurred that its slow onset of therapeutic activity and inconvenience in preparation do not fit a need for immediate results. Furthermore, patients stated that TCM doctors are not as available nor accessible as WM doctors.

Given that the nearest hospital is between three and 30 kilometers away from all four villages we visited, village doctors serve as the first line of medical care for the majority of the interviewed rural residents. Interviews with the two village doctors mirrored those of the patients and with literature on the beliefs of Chinese doctors: the crux of diabetes treatment should go towards integrative treatment rather than pure blood glucose control.<sup>9</sup> Our interviews highlighted the village doctors' belief that TCM's development is hindered by its innate drawbacks coupled with a more systemic loss of TCM personnel, infrastructure, and research. They further explained that finance plays an important factor in what their patients can choose. Although more than 90% of rural individuals are currently covered under China's National Cooperative Medical Scheme (NCMS) through their local governments, disease and financial burden may have increased rather than decreased due to high deductibles; moreover, as the NCMS does not cover folk medications, it follows that rural citizens have been decreasing their utilization of TCM.<sup>17</sup>

Although diabetes is a chronic disease with a complex standard of care, it is well documented that appropriate monitoring, treatment, and lifestyle changes can improve morbidity.

However, the high costs of medications and the unfortunate fact that diabetes commonly arises amidst a myriad of other diseases like hyperlipidemia, hypertension, obesity and heart disease, maintaining patients' quality-of-life remains a difficult issue. In our sample, although almost 20% of the subjects placed higher trust in TCM than WM, none of those interviewed uniquely sought TCM care. This is consistent with findings from a recent national sample of diagnosed diabetic individuals, where less than 15% used lifestyle interventions that are major components of holistic TCM.<sup>5</sup> The question of whether TCM is still important for rural diabetic patients in China is difficult to answer and highly multi-faceted. From one perspective, it is not, as we had hypothesized, that TCM will decrease financial burden was unsupported. Not only is TCM often more expensive than WM, but it is unavailable to most of the rural patients we interviewed. On the other hand, TCM is still widely regarded as a bridge towards overall health and well-being. Deeply ingrained in Chinese culture and mentality, TCM is consistently viewed as positive. It is favoured by both rural patients and village doctors given its holistic approach to care and fewer side effects. In fact, every person we spoke to felt that an integrative approach would be their medicine of choice.

There are several limitations to this study that preclude a full generalization of the results. In addition to a relatively small sample size, not all participants answered all questions, leading to an even smaller dataset. We also did not have information on the type of diabetes each patient had, although Type II (adult-onset) is more likely due to the common etiological risk factor of poor lifestyle and diet. Moreover, our focus groups did not include any participants who lacked formal education even though this cohort composed more than a quarter of our study pool; this was an unintentional outcome and future studies should increase efforts for outreach to this potentially more underserved population. Finally, our results may not apply to patients living in

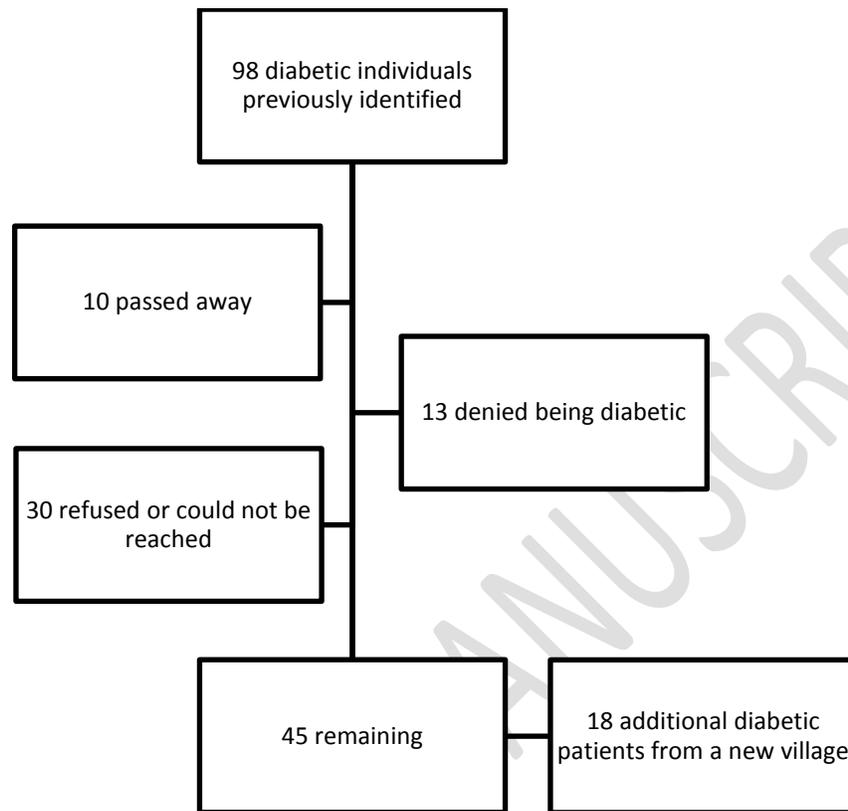
urban or suburban areas. It would be interesting to replicate this study in other provinces or administrative regions in China to fully elucidate how health-seeking behaviors are similar or different depending on geographical and cultural influences.

Doctor visits are costly in terms of time and money and rural patients often do not have the luxury of choosing their medical provider. As long as research and development of TCM and WM are unequal, it will be difficult to gauge the full benefit and influence of TCM. This study serves as an initial foray into the perspectives of a rising proportion of China's ill: rural diabetic patients. Sino-Western collaborations are beginning to emerge for the evaluation of TCM-WM combination in the treatment of diabetes, such as the Beijing Chaoying Diabetes Hospital, a joint venture by China and Britain.<sup>10</sup> Cross-sectional studies are further showing that integrative medicine use leads to better glycemic control in diabetics.<sup>18</sup> Coupled with the trust that rural patients continue to place in TCM, further research using larger data sets are important for exploring the true economic, social, and health benefits of having combined TCM-WM treatment be part of diabetes standard of care.

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## Supplementary Figures and Tables.



Supplimentary Figure 1. Initial patient recruitment scheme.

Supplementary Table A. Demographics of all participants interviewed

Characteristic	N (n = 63)	%	Mean $\pm$ SD [Range]	Quartiles: 1, 2, 3 (mean) [range]
<b>Age (years)</b>			57.9 $\pm$ 8.3 [37 – 76]	
<b>Gender</b>				
Male	15	23.8		
Female	48	76.2		
<b>Race</b>				
Han	62	98.4		
Other	1	1.6		
<b>Marital Status</b>				
Married	55	87.3		
Divorced	1	1.6		
Widowed	6	9.5		
No answer	1	1.6		
<b>Education Level</b>				
No formal education	17	27.0		
Primary	23	36.5		
Middle	17	27.0		
Secondary	4	6.3		
College/university	1	1.6		
No answer	1	1.6		
<b>Mean family income (RMB) (n = 43)</b>				7000, 15000, 27500 (22334) [840 – 160,000]
<b>Mean 3-month expenditure (RMB) (n = 56)</b>				300, 600, 1500 (1362) [0 – 9000]
<b>Mean number of years after diagnosis (n = 57)</b>				3, 5, 9.7 (6.6) [0 – 36]

Supplementary Table B. Demographics of focus group participants

Characteristic	N (n = 18)	%	Mean $\pm$ SD [Range]	Quartiles: 1, 2, 3 (mean) [range]
<b>Age (years)</b>			57.6 $\pm$ 7.2 [48 – 71]	
<b>Gender</b>				
Male	5	22.2		
Female	13	72.2		
<b>Race</b>				
Han	18	100		
Other	0	0		
<b>Marital Status</b>				
Married	15	83.3		
Divorced	0	0		
Widowed	3	16.7		
<b>Education Level</b>				
No formal education	0	0		
Primary	12	66.7		
Middle	6	33.3		
Secondary	0	0		
College/university	0	0		
Mean family income (RMB) (n = 11)				9000, 15000, 22500 (16800) [2400 – 40000]
Mean 3-month expenditure (RMB) (n = 13)				300, 600, 2000 (2361) [0 – 9000]
Mean number of years after diagnosis				4.5, 6, 13 (8.1) [0 – 17]