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Qualitative study on health self-management of patients with metabolic syndrome among bereaved population after earthquake

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The study explore the influencing factors and healthy self-management of MS patients with bereaved relatives after Wenchuan and Yushu Earthquake of their real life; explore difficulties and challenges in the process of self-management; and supply information that could not be sought in quantitative studies. Purposive sampling was used to recruit 36 MS patients who are bereavement population in two earthquakes, and those patients met the inclusion criteria for semi-structured focus group interview. The Nvivo11 software was used to collate and analyze the transcribed data. The main influencing factors of health self-management behavior for MS patients are as follows: the degree of understanding of disease prevention knowledge, emotion management induced by earthquake trauma, the source of disease-related information, access and identification are very limited; ethnic traditional culture, religious beliefs, and production activities and routines before and after the earthquake is an important factor in their healthy self-management behavior. The lack of health beliefs and self-efficacy of MS patients among bereaved families after Wenchuan and Yushu earthquake are key obstacle in their self-management. The overall level of the knowledge of patients' MS prevention, self-efficacy and self-management behaviors are still low. Some positive factors that can be changed including MS prevention knowledge, self-efficacy, social support, and family function. Some negative factors which can be improved afterwards, including negative coping style, traumatic life experiences from earthquake and smoking.

Keywords Metabolic syndrome, Earthquake, Bereaved population, Self-management, Qualitative study

China is one of the countries with frequent earthquake disasters and the most casualties[1]. The Wenchuan and Yushu earthquake, the most destructive earthquakes, caused a total of approximately 820,000 people worldwide to experience bereavement in the first decade of the new century[2]. The bereavement experiences include much earthquake-related stress, such as property loss, witnessed burial, injury, disability or even death, interruption of medical and health services, changes in living environment, and loss of relatives and family structure and function due to the destruction[3]. If the population is in a prolonged state of sustained stress, it often causes a series of neuroendocrine responses. The main manifestations are sympathetic nerve excitation and increased secretion of the hypothalamus-pituitary-adrenal cortex (HPA), which elevates the levels of corticotropin-releasing hormone (CRH), adrenocorticotropic hormone (ACTH) and adrenocortical hormone. The increase in these hormones is closely related to obesity, blood glucose, blood pressure and blood lipids, thus increasing the risk of metabolic syndrome (MS)[4]. Current studies have shown that the influencing factors of MS include demographic and genetic factors, stress factors, geographical environment, social culture, eating habits, lifestyle and many other aspects[5–8]. With a serious stress event, how to understand their health self-managements in real

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life should be further discussed after the Wenchuan and Yushu earthquake. In order to provide the basis for the next targeted intervention. Through the preliminary quantitative research, we have preliminarily understood the occurrence and influencing factors of MS among bereaved families in Wenchuan earthquake. In view of the particularities of the population in this study, such as earthquake bereavement trauma experience, high proportion of remarried/reborn families, interruption of medical and health service system during the two-year transition period, changes in living environment before and after the earthquake, changes in production activities and lifestyle, and multi-ethnic mixed living, there has been no research on the status quo of long-term chronic health self-management of bereaved relatives after the earthquake. Focus group interviews are suitable for exploring complex issues that people know little about. They can help researchers dig deeper into the rich data information behind the phenomenon by accurately presenting mutual support group members' cognition, behavior and experience of common problems, so that researchers can get closer to the real information describing the phenomenon and reveal the nature of the phenomenon. Therefore, this part uses semi-structured focus group interview to explore the status quo, influencing factors and needs of health self-management of bereaved MS patients 12 years after the earthquake.

Objective and method

Objective

To understand the status quo, difficulties and needs of MS patients in health self-management 12 years after the Wenchuan earthquake; To analyze the influencing factors of health self-management of MS patients with bereaved relatives in Wenchuan earthquake, so as to make up for the information that could not be explored in quantitative studies; To provide an empirical basis for constructing an adaptive health self-management intervention plan for MS patients with bereaved relatives in Wenchuan earthquake among Han, Qiang and Tibetan ethnic groups.

Methods

General information

From May to August 2023, objective sampling method was used to recruit 9 MS patients in each study site (Yiwanshui Village, yulong Community of Beichuan new County, Jiegu town and Longbao town), and a qualitative interview group was formed in each study site, with a total of 4 groups and 36 patients.

Inclusion criteria: ① Experienced Wenchuan earthquake and Permanent residents (living for at least 6 months per year); ②Parents (including parents-in-law, parents-in-law), brothers and sisters, spouses, children, grandfather/grandfather, grandmother/grandmother, son-in-law, grandson/daughter are dead or missing in Wenchuan and Yushu earthquake; ③ MS patients diagnosed by Chinese Guidelines for the Prevention and Treatment of Type 2 Diabetes (2017); Aged 18 years and above; ④ Good communication and clear language expression; ⑤ Informed consent and Voluntary participation in this study.

Exclusion criteria: ① Pregnant women; ② Those with hearing impairment who cannot communicate and communicate effectively; ③ Those with other serious chronic diseases; ④ Those with past history of mental illness or cognitive impairment.

Data collection methods

Field investigation method was adopted to collect data. the Outline of the interview about the understanding of MS disease-related knowledge and the way of obtaining information, daily life and behavior habits, the psychological status, self-monitoring and medical consultation, stress coping and self-management difficulties and needs of MS patients in the bereaved population in the earthquake. When researchers enter the field, they learn about the field through descriptive observation Field overview, communicate with survey subjects about MS self-management.

The main means of this research is field investigation, with the purpose of in-depth field investigation and experience of the cultural life of specific bereaved groups such as Tibetan and Qiang, collecting a large amount of first-hand information, and then revealing the cultural characteristics and life rules of this group. Through the previous quantitative research, we have preliminarily understood the occurrence and influencing factors of MS in the bereaved population of Wenchuan and Yushu earthquakes.

The interview venues were in each committee meeting room of each survey site.

(1) The general information and earthquake experience of the patients, see the cross-sectional study. This paper adopts the method of purposiveness sampling, assuming that the data reaches saturation and no new information appears.
(2) Formulation of interview outline: According to the research purpose and the characteristics of the interviewees, on the basis of literature review and current situation investigation, the "chronic disease self-management project" and the "stress theoretical model" were used as the theoretical framework to initially draw up the interview outline[9]. The interview outline will be guided by the doctoral tutor of chronic disease management nursing, psychologists and endocrine clinical medicine experts. Before the official interview on August 6,2022, 36 local MS patients who have experienced earthquake bereavement will be selected for simulated pre-interview, and a formal interview will be finally formed. The outline is as follows, see (Tables 1, 2, 3, 4 and 5).
(3) Audio recording: After obtaining the informed consent of the interviewees, a digital voice recorder (model: Aigo R6811) was used to record the whole process.
(4) Members of the interview group: The interview group consisted the researcher himself, one doctor from each village/community, and two local senior medical students (one was a psychology major student). The researcher himself, as the interview host, was responsible for hosting and guiding the whole interview.

① Do you know what is Metabolic Syndrome? What are the health hazards of metabolic syndrome?
② Where do you usually get information about metabolic syndrome?
③ What do you do after getting information about metabolic syndrome?
④ What difficulties and needs do you have in understanding knowledge and access to metabolic syndrome?

Table 1. Outline of the interview about the understanding of MS disease-related knowledge and the way of obtaining information.

① What dietary habits do you think are important in the treatment of MS? What are your daily eating habits?
② Do you think leisure time activity or exercise is important in the treatment of metabolic syndrome? What are your daily production methods? What activities or exercises do you do outside of labor or work hours each day?
③ Do you drink alcohol? Do you think drinking alcohol affects your health? If so, what are the impacts?
④ do you smoke? Do you think smoking affects your body? If so, what are the impacts?
⑤ Do you think the quality of sleep is important in the treatment of metabolic syndrome? What time do you sleep every day? What time do you get up? How do you regulate your sleep Are the methods used effective?
⑥ What difficulties and needs do you have in developing good behavior habits?

Table 2. Outline of the interview on daily life and behavior habits of MS patients.

① Did you think a stressful life or a bad mood would affect your physical health? If so, what is the impact? How do you manage your stress/emotions? How's the effect? Are you satisfied?
② After losing a loved one in the earthquake, what changes have happened to your family relationship? What stress/problem/difficulty bothers you the most? Are you satisfied with the way your family members discuss and share these issues with you?
③ In what ways have you grown after the earthquake trauma?
④ What difficulties and needs do you have in stress coping/emotion regulation?

Table 3. Outline of the interview on the psychological status of MS patients in the bereaved population in the earthquake.

① Did you actively monitor your health (waist circumference, blood pressure, blood sugar and blood lipids)? Do you know how to measure it? How often should you monitor?
② Did you take the initiative to communicate with medical staff to discuss your health problems?
③ What difficulties and needs do you have in self-monitoring of metabolic syndrome?

Table 4. Outline of self-monitoring and medical consultation interviews for MS patients.

① What other difficulties or problems do you have in stress coping/self-health management?
② What help do you need from your medical staff in coping with stress/managing your own health?

Table 5. Outline of MS stress coping and self-management difficulties and needs interviews.

The doctor was responsible for the interview record (including the interviewee's tone, speech rate, pauses, and facial expressions, etc.), and the medical student was responsible for the recording, possible incidents during the interview and interpretation of the local dialect; another psychology student is responsible for unexpected events such as psychological stress that may occur during the interview.

(5) Rules of interview and discussion: In order to carry out the interview smoothly and ensure that each interviewee can fully express his views on each topic and conduct effective discussions.

(6) Formal interviews: in the mornings of August 12 and 21, 2022, focus group interviews were conducted in the village committee conference rooms of each survey site. After conducting 4 groups of interviews, the information has basically reached saturation, and no new viewpoints have emerged. Finally, 4 groups of patients were interviewed, with a total of 36 people.

Data sorting and analysis

Data sorting: In order to systematically and accurately grasp the interview data and provide a focus basis for the next round of interviews. After the interview, the recorded data will be transcribed within 24 h of the end of the interview, and recorded sentence pauses, body language and other information. Data analysis: transcript data were checked, corrected, coded and classified by two researchers, and then sorted and analyzed by NVivo11

software. Take a seven-step analysis: organize the data, immerse yourself in the data, propose categories and topics, encode the data, propose explanations in the analysis memorandum, and find alternatives In the process of data analysis, the researcher shall remain objective. In case of disagreement, the research team shall discuss and confirm it together, and finally return to the department for verification the accuracy of the results.

Quality control

(1) Interviewer: The researcher is female, doctoral degree majoring in nursing, engaged in clinical front-line work in endocrinology for more than 12 years, a second-level psychological counselor, in-depth review and research of a large number of domestic and foreign related literature and research.
(2) Gaining trust: In view of the complex social environment in the post-disaster reconstruction and recovery process, as well as the survey on the incidence of metabolic syndrome among bereaved people, the researcher herself was stationed in Yingxiu Town for a cross-sectional survey for more than 5 months. We build a harmonious relationship with the local residents, and gaining the trust and welcome of the villagers' friends.
(3) One day before the interview, confirm the interview time with the interviewee and the person in charge of the interview site, arrange the interview site, and ensure that the interview is carried out on time and smoothly.
(4) During the interview, the group members have a clear division of labor, the interviews were conducted in an orderly manner according to the outline, and the interviewees did not drop out in the middle of the interview.
(5) After the interview, the on-site recording would be sorted and analyzed by two people in time, and the final text data will be fed back to the interviewee for verification and confirmation, so as to ensure the authenticity and reliability of the data.

Research ethics

This study was approved by the Biomedical Ethics Committee of the first hospital of Lanzhou University [approval number: LDYYLL2022-278]. After obtaining the patient's consent and signing a written informed consent form, the researchers inform the patients that they can withdraw from the study at any time during the study process. Before the study, introduce the purpose and significance of this topic to patients who meet the sampling criteria, and their withdrawal will not have any impact. At the same time, we promise the patients participating in this research project that their personal information will strictly adhere to confidentiality measures, and the data will be used only for this project and not for any other purposes. During entering and analyzing data, data entry and analysts personnel use numbers instead of names. Patient information shall not be disclosed to anyone without the patient's consent.

Results

Basic characteristics of focus group interviewees

A total of 36 interviewees were included in this study, including 17 males and 19 females, aged from 34 to 78 years old with an average age of 54.56 ± 12.34 years old. All the interview subjects were MS patients who lost their relatives in Wenchuan and Yushu earthquake. Among interviewees, 12 patients enjoy the national basic medical insurance for urban residents and 24 ones enjoy the rural residents/cooperative medical insurance; 10 patients (27.8%) suffered chronic diseases, 5 patients (13.9%) of them with rheumatoid arthritis and 7 patients (19.4%) with cardiovascular and cerebrovascular diseases. The basic sociodemographic information of the interviewees is shown in Table 6.

Understanding and access to MS-related knowledge

MS-related knowledge

All of the interviewees said that they had never heard of MS, but asked "Have you heard of metabolic diseases?". Some people said that they may be related to chronic diseases such as obesity, hyperlipidemia, diabetes, polycystic ovary syndrome, gout or hypertension. Therefore, the definition of MS and adverse health outcomes need to be further clarified in the construction of health self-management programs.

> *P1: "I have never heard of metabolic syndrome. They may be related to gout and hyperlipidemia, and they should not be cured."*
>
> *P34: "It may be high blood pressure. …".*
>
> *P26: "Maybe it's diabetes?"*
>
> *P19: "It may have something to do with his weight…. This disease is hereditary, and I also have high blood pressure. Recently, I feel that my eyes are getting blurry."*
>
> *P17: "It may have something to do with uric acid. Some time ago, my feet hurt."*

Access to MS-related knowledge

Most of the interviewees obtained health information mainly through lectures by doctors in local county hospitals. With the rapid development of Internet information technology, young and middle-aged people say that they can obtain health-related knowledge through WeChat and online medical Apps on mobile phones; most of the rural elderly over 65 have never attended school, except from family members and relatives, friends who obtained information, and also purchased some health care products (containing unknown drug ingredients) through TV advertisements instead of medicines. Hypoglycemia was ignorant, and the patient

basically accepted the information obtained. The medical and sanitation conditions in Xinbeichuan County are much better than those in Yingxiu and Yushu Town. There is a more convenient community health service center, and the community is closer to the Beichuan County People's Hospital. The way for local patients to acquire knowledge is mainly through community/county hospital medical staff.

P35: "…, in the TV commercial, a doctor from a hospital of integrated traditional Chinese and Western medicine said: Xiaoke Pill can treat diabetes, and it can be delivered to home after paying for it. It's very convenient. Many people in our village bought it. I drank 2 Over the years, I have felt dizzy, trembling, flustered, and sweaty palms several times…".

P20: "It's more convenient now. My home is just two or three minutes' walk from the health service center. Blood pressure is measured for free…. If you don't know anything, just ask the doctor…".

P30: "Our doctor from County Hospital will give a class. After class, we will send out some promotional materials, and some friends in the circle of friends will also send some related knowledge…".

P2: "We elderly people don't even recognize a few words. We just listen to Dr. Murakami and close friends who have the same disease tell us how to eat and exercise for this disease."

P23: "…, every year (Beichuan) county hospital doctor will give us a lecture, we can also check some health knowledge through the mobile app, and we can also ask relatives and friends around who have the same disease,…".

Daily life and behavior habits

Diet

(1) High salt intake: Interviewees who are inconvenient to purchase raw materials (fresh meat) in remote mountainous areas. Cured smoked/bacon is easy to store and durable, and has become an indispensable dish for them all year round.
(2) Changes in dietary structure before and after the earthquake: Some farmers mainly used coarse grains grown in their own fields before the earthquake. Retain land residents and county residents, and the dietary structure has not changed much. Patients with a history of diabetes have misunderstandings about eating staple foods, fruits, and porridge.
(3) Disruption of dietary patterns in summer, winter and festivals: Most of the interviewees eat meat products, rice and hot pot as the main diets, and also eat a little vegetable when they eat hot pot. Tibetans like to eat noodles, butter tea, beef and mutton, etc., and eat less vegetarian food, vegetables and fruits. Important festivals such as the Qiang calendar year and the Spring Festival are all in winter. Everyone follows the local customs and celebrates the festival. In winter, the Qiang people pay special attention to medicated diets and health care, but often ignore the balance of oil intake.

P2: "We live in a relatively remote area. It is inconvenient to go to the town to buy meat. The slaughter of pigs starts from the Qiang calendar year to the twelfth lunar month. The first process is to pickle and press with a lot of salt, and then smoke it with miscellaneous wood. The bacon is stored for a long time, and it can be eaten for half a year. It is not bad, …, in the New Year, festivals, and happy events, the whole lamb and dam are roasted in the evening."

P7: "Now it's close to the town, and living conditions are better. I go there now and then and have some barbecue and hot pot."

P10: "Before the earthquake, our village basically ate corn noodle soup, steamed buns, corn stir-fries, and sauerkraut and now they are bought from the town and pickled by themselves."

P15: "When we were on the Rimai Festival, we celebrated the "Great Harvest" deluxe soup pot for dinner. ….At the bottom, only Chinese pepper, sea pepper, ginger and other spices are added. … Many ingredients are boiled together."

P36: "Before the earthquake, most of the people in our village had two meals a day…".

P28: "We Tibetans eat more tsampa, beef, mutton and amdo noodles, drink butter tea every day… and eat less vegetables and fruits."

P21: "Recently, we have eaten less of the staple food. I heard people say that fruits with high blood sugar can't be eaten, and the sugar content is high."

P14: "In winter, Qiang people also prefer medicated diets, such as mutton with sliced soup, plus a few taels of stewed pork, Cordyceps stewed duck, etc.".

Daily work and physical activity

Activity or Exercise: Interviewees generally believe that physical activity or exercise is good for health. The daily activities of the elderly who lost their land after the earthquake, such as daily work and raising livestock, were significantly less than those before the earthquake. Most of the elderly live with their children or grandchildren. They usually focus on housework, cooking, and taking care of their grandchildren or children. They wander around the village or play mahjong in their spare time. Elderly people who live alone do not go out and spend more time at home after eating. The middle-aged and young people basically work nearby (go to the town to build an inn, go to dry masonry). After the earthquake, each village in Yingxiu Town will have conscript soldiers. They conduct military training on a regular basis, with a large amount of daily activities/training.

No.	Gender	Age	Educational level	Marital status	Ethnic	Comorbidities	Genetic	Buried himself	Hurt himself	Disabled	Bereavement	Witnessing others being buried	Witnessing others get hurt	Witnessing others die	Property loss	MS component
P1	Female	78	Illiteracy	Widowed	Han	CVD	CVD	Y	Y	N	2	Y	Y	Y	Severe	WC, SBP, DBP, TG
P2	Male	42	Illiteracy	Married	Qiang	None	None	N	N	N	1	Y	Y	N	Moderate	WC, SBP, DBP, TG
P3	Male	56	Junior high school	Married	Han	None	None	N	N	N	2	N	Y	N	Moderate	WC,2hPG, HDL-C
P4	Female	61	Primary school	Married	Tibetan	RA	None	N	N	N	3	N	N	N	Severe	WC, SBP, DBP, TG
P5	Female	41	Illiteracy	Married	Han	None	None	N	N	N	2	Y	Y	Y	Moderate	WC, FPG, TG
P6	Male	71	Illiteracy	Married	Han	None	None	N	N	N	3	Y	Y	Y	Severe	WC,2hPG, HDL-C
P7	Female	34	College	Unmarried	Han	None	None	Y	Y	N	3	N	Y	N	Severe	WC, TG, HDL-C
P8	Male	40	Junior high school	Married	Han	None	None	N	N	N	1	Y	Y	N	Moderate	WC, SBP, DBP, TG
P9	Male	56	Primary school	Remarry	Tibetan	None	None	N	N	N	1	N	Y	Y	Moderate	WC, SBP, DBP, FPG
P10	Female	72	Illiteracy	Married	Han	CVD	None	N	N	N	1	N	Y	Y	Severe	WC, SBP, DBP, FPG
P11	Female	70	Illiteracy	Widowed	Han	CVD	CVD	N	N	N	1	Y	Y	N	Moderate	WC, SBP, DBP, TG
P12	Male	51	High school	Widowed	Han	None	None	N	N	N	1	Y	Y	Y	Severe	SBP, DBP, TG, HDL-C
P13	Female	67	Illiteracy	Married	Han	RA	None	N	N	N	1	Y	Y	N	Moderate	WC, TG, HDL-C
P14	Female	38	Junior high school	Married	Qiang	None	None	N	N	N	1	N	Y	Y	Mild	WC, SBP, DBP, TG
P15	Male	63	Primary school	Married	Qiang	CVD	None	Y	Y	N	3	Y	Y	N	Moderate	WC, FPG,2hPG, TG
P16	Female	58	Primary school	Married	Han	RA	None	Y	Y	N	3	N	Y	N	Severe	WC, FPG, TG
P17	Male	52	Undergraduate	Remarry	Han	None	None	N	N	N	2	Y	Y	Y	Moderate	WC, SBP, DBP, TG
P18	Female	37	High school	Married	Han	None	None	N	N	N	2	Y	Y	Y	Moderate	WC, SBP, DBP, FPG
P19	Female	75	High school	Widowed	Tibetan	CVD	None	N	Y	N	2	N	Y	N	Severe	WC, TG, HDL-C
P20	Male	44	High school	Remarry	Han	None	None	N	N	N	3	N	Y	Y	Severe	WC,2hPG, HDL-C
P21	Male	48	Undergraduate	Married	Han	None	None	N	N	N	1	Y	Y	N	Moderate	SBP, DBP, TG, HDL-C
P22	Male	66	Technical secondary school	Married	Qiang	None	None	Y	Y	Y	1	N	Y	Y	Severe	WC, TG, HDL-C
P23	Female	50	Technical secondary school	Married	Han	None	None	N	Y	N	2	N	Y	Y	Moderate	WC, SBP, DBP, FPG
P24	Male	51	College degree	Remarry	Qiang	None	None	Y	Y	N	3	Y	Y	Y	Severe	WC, SBP, DBP, TG
P15	Male	63	Primary school	Married	Qiang	CVD	None	Y	Y	N	3	Y	Y	N	Moderate	WC, FPG,2hPG, TG
P16	Female	58	Primary school	Married	Han	RA	None	Y	Y	N	3	N	Y	N	Severe	WC, FPG, TG
P17	Male	52	Undergraduate	Remarry	Han	None	None	N	N	N	2	Y	Y	Y	Moderate	WC, SBP, DBP, TG
P18	Female	37	High school	Married	Han	None	None	N	N	N	2	Y	Y	Y	Moderate	WC, SBP, DBP, FPG
P19	Female	75	High school	Widowed	Tibetan	CVD	None	N	Y	N	2	N	Y	N	Severe	WC, TG, HDL-C
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P23	Female	50	Technical secondary school	Married	Han	None	None	N	Y	N	2	N	Y	Y	Moderate	WC, SBP, DBP, FPG
P24	Male	51	College degree	Remarry	Qiang	None	None	Y	Y	N	3	Y	Y	Y	Severe	WC, SBP, DBP, TG
P15	Male	63	Primary school	Married	Qiang	CVD	None	Y	Y	N	3	Y	Y	N	Moderate	WC, FPG,2hPG, TG
P16	Female	58	Primary school	Married	Han	RA	None	Y	Y	N	3	N	Y	N	Severe	WC, FPG, TG
P17	Male	52	Undergraduate	Remarry	Han	None	None	N	N	N	2	Y	Y	Y	Moderate	WC, SBP, DBP, TG
P18	Female	37	High school	Married	Han	None	None	N	N	N	2	Y	Y	Y	Moderate	WC, SBP, DBP, FPG
P19	Female	75	High school	Widowed	Tibetan	CVD	None	N	Y	N	2	N	Y	N	Severe	WC, TG, HDL-C
P20	Male	44	High school	Remarry	Han	None	None	N	N	N	3	N	Y	Y	Severe	WC,2hPG, HDL-C

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No.	Gender	Age	Educational level	Marital status	Ethnic	Comorbidities	Genetic	Buried himself	Hurt himself	Disabled	Bereavement	Witnessing others being buried	Witnessing others get hurt	Witnessing others die	Property loss	MS component
P21	Male	48	Undergraduate	Married	Han	None	None	N	N	N	1	Y	Y	N	Moderate	SBP, DBP, TG, HDL-C
P22	Male	66	Technical secondary school	Married	Qiang	None	None	Y	Y	Y	1	N	Y	Y	Severe	WC, TG, HDL-C
P23	Female	50	Technical secondary school	Married	Han	None	None	N	Y	N	2	N	Y	Y	Moderate	WC, SBP, DBP, FPG
P24	Male	51	College degree	Remarry	Qiang	None	None	Y	Y	N	3	Y	Y	Y	Severe	WC, SBP, DBP, TG

Table 6. Basic information of focus group interviewees ($n=36$).

Exercise confusion: some chronic patients have misunderstandings about physical exercise, especially the elderly with diabetes and high blood pressure, who are psychologically timid about exercise and worry about acute complications such as stroke due to hypoglycemia or high blood pressure during exercise; Some patients believe that the greater the amount of exercise, the better, there are exercise misunderstandings and do not understand the precautions of exercise. For villagers who have not lost their land and people working in county towns, their daily work and physical activities have not changed much compared to before the earthquake.

P15: "I used to go to work in the fields after breakfast, and hit the ground at noon. I don't have any land to grow. I walk around the village all day…".

P11: "I live alone. I'm not used to moving to this village. I feel tired all day, my legs don't work, and I don't want to move."

P33: "I mainly take my grandson at home, do some housework, cook, and his parents go to the town to work as masons."

P3: "My family has several acres of land, growing vegetables and crops. I feel uncomfortable without working one day. I have to go to the fields to do farm work every day."

P8: "Our militiamen are not idle all the year round, and they often have to train. Forest fire prevention in winter and spring, flood control in summer, and during this year's epidemic, they have to be on duty and have night shifts."

P29: "My blood sugar is high, I walk for half an hour after getting up early (on an empty stomach) every day. I feel dizzy, and I almost fell several times, I sat on the road for a while before I came back."

P5: "…, I'm so tired that I can't walk at all. I've lost a lot of weight recently, and the resident nurse told me to eat less. I'll be hungry in a while, and I have to come back after a short walk. I just went out a few times."

P24: "I don't have time to exercise during the week, so I go to the park on weekends…".

P4: "My old man was hospitalized for a high blood pressure stroke while exercising a month ago. I also suffered high blood pressure, and now I don't dare to exercise…".

Smoking and drinking

Some interviewees believe that smoking and drinking are not good for health. However, some people think that smoking can regulate depressed mood and is necessary etiquette for interpersonal communication; drinking can promote sleep, but there is a misunderstanding that drinking can lower blood sugar. Since the Han, Qiang and Tibetan people lived together after the earthquake, during festivals, ceremonies, weddings, funerals, hospitality, or au pair labor, in addition to a sumptuous meal, wine is also necessary. Generally, the elderly are basically the elderly, and they are heavy drinkers. In villages close to Tibetan villages or mixed living villages, generally old men and women smoke snuff.

P12: "Smoking is not good for health. My lungs are not good. The doctor won't let me smoke."

P20: "My blood sugar is not good. I drank with my friends a few times at night. I checked my blood sugar early the next morning, but it went down.…".

P21: "I can't quit smoking, I work in the government. If you don't smoke, others are embarrassed to smoke, but I have high uric acid and try not to drink alcohol. I can control myself.…"

P29: "If I don't drink one glass or two at night, I won't be able to fall asleep."

P6: "Tobacco and alcohol can't be too much, it's not good for health. Some people's lungs are blackened by smoking on TV."

P4: "…, (snuff) I can't quit. When I'm in a bad mood, smoking can relieve my boredom. People in our village used to smoke snuff more…".

Sleep

Interviewees generally believed that poor sleep quality would affect health, but lacked knowledge about regulating sleep disorders. Sleep quality adjustment methods: Some interviewers believe that increasing physical activity during the day, drinking a little wine before going to bed at night, or watching news on mobile phones and other distractions can improve sleep quality, but taking sleeping pills is not effective.

P27: "The quality of sleep (poor) definitely has an impact on my body(health). I can't sleep at night. I have to urinate several times. After I urinate, I can't sleep for a long time. I took some sleeping pills, but the effect was not very good, and then I stopped."

P13: "I don't dare to sleep too hard at night, my grandson has to go to school the next day, and I'm afraid of being late for cooking…".

P3: "I can't sleep, drink two glasses (wine), watch TV, mobile news, circle of friends. I'm sleepy after a while, and then I fall asleep".

P18: "I'm sick all over, worry about me, what should I do? When I turn over, my whole body hurts and I can't sleep well. I don't know if there is any special medicine to cure my disease."

Psychological condition

Impact on health

The interviewees generally said that high life pressure or bad mood will affect their physical health. Some interviewees described that like a stone was pressed against their chests. Some interviewees expressed palpitation, shortness of breath, nightmares, dizziness, loss of appetite. Internal medicine and other non-psychiatric departments were finally diagnosed as psychological disorders, resulting in a waste of medical resources.

Sources of stress

The general bereaved people mainly have the pressure of their own and family life, the economic burden caused by the disease, and the care of the deceased parents and children of the spouse, the new spouse and children have increased the burden of life, etc.; some reorganized/remarriage families have unsatisfactory family relationships; some middle-aged and elderly people living alone have not yet fully recovered from the disaster at that time, they cannot have a correct understanding of the disaster, and they are still miserable when they talk about the past.

Ways to regulate emotions

Some families have rebirths, and their family functions are perfect. Family members share the difficulties they face and continue to learn to grow after trauma; most of the interviewees believe that they mainly rely on themselves to regulate their emotions, and psychological counseling and other auxiliary methods may be useful, but they will not take the initiative to seek help from a psychiatrist; some interviewees adjust emotions through the following methods, such as dancing(Guozhuang, Sharon dance, etc.), singing, playing cards, diverting attention (time is the best medicine to relieve pain), venting (crying), religious beliefs (Qiang people believe that the deceased relatives have gone to a distant heaven, and Tibetan compatriots express their condolences to the deceased through chanting scriptures and prayers), establish their own communication methods with the deceased (worship, write letters), increase family intimacy (strengthen communication and express each other), strengthening social support (activity center for the elderly, talking to friends), psychological counseling, relaxation training (deep breathing) and other adjustment methods; know how to reconstruct, face optimistically, and accomplish things that can bring you a sense of accomplishment).

Difficulty regulating emotions

There are still some interviewees who lack rational cognition of psychological counseling, and think that they are just exposing their own scars or rubbing salt on their wounds, which may be different from the level of psychological counselors and their counseling experience and methods. It is related to the fact that some people lack professional ethics under the guise of doing scientific research; there are also residents in mountainous areas who report that they have never seen a psychological counselor or contacted psychological counseling.

> *P10: "When I'm in a bad mood, I dance the sarong with everyone. The whole dance will make me more energetic, and I can also communicate with everyone when I dance."*
>
> *P27: "Our Tibetan buddhism believes that the death of a loved one in an earthquake is inevitable and unpredictable, not a punishment. … We often express our condolences to the deceased by reciting scriptures and praying for blessings, and help the deceased to accumulate good karma and have a good life."*
>
> *P24: "Life is stressful, which will definitely have an impact on my health, but I don't like the psychiatrist to reopen my wounds. I say time is the best Medicines. People help you on the surface, and you still have to rely on yourself. You're annoyed if you can't get out on your own."*
>
> *P11: "When my daughter was alive, our family was very happy, and we were full of energy in everything we did, unlike now, (crying)…, now I am What's the point of living alone (an elderly person living alone), I really want to die… In our mountainous areas, no one (psychiatrist) comes. Psychological problems can only be adjusted by themselves…."*
>
> *P22: "Sometimes I think of my deceased relatives and my disabled foot, my heart hurts. Sometimes it likes a stone pressed against my heart. I can't breathe, and I wake up from nightmares at night. I went to the hospital to see a doctor, and after a bunch of tests were done, they said that my heart was fine, so I went to the neurology department again, but nothing was found. After two years, I was advised to register psychology department. Doctor ask all kinds of questions. When you have no feet, does it still hurt, and so on, and they ask me to do questionnaires, which I hate the most…".*
>
> *P24: " Sometimes I cry loudly, and my mood can be better, after all I don't dare to chat with others, and the people around me don't feel the same emotions. So I can only hold it in my heart for a long time. After chatting with those psychologists, my sadness has been released. … Now my husband is my classmates from the same high school, who have experienced the same thing. They don't care about my arm injury. They care about my daily life every day.… I'm working very well now, I work in an Senior Citizen activity center. As they spend their days happily, my work is meaningful and my mind is comforted."*
>
> *P20: "Soon after the earthquake, it was very torturous that the memory and guilt of my wife and son would flood into my heart every day as long as I opened my eyes, and sometimes it even became an obsessive-compulsive disorder. …, I went to work in Guangzhou., I feel that there is no rush in life, how much I earn, how much I spend. I think I can forget a lot outside, but I find that after the earthquake, I want to be closer to my relatives. Later, I met my current wife on the Internet, and gave birth to a baby in less than a year., My daughter is 6 years old this year, and that is to go to heaven (grinning).Every year my current wife will definitely accompany me back to the old county town to pay homage to my ex-wife and son.*

P24: "In that earthquake, a total of 10 people in our family were dead. The youngest was 3 years old. When I was living in a prefabricated house, I couldn't sleep at night, so I got up and wrote a letter to my wife. I just write about her past. Now my wife takes the initiative to find someone to marry me. She tells me, look at the children, grandchildren, and since she survives, she must be well I'm alive…. I'm very satisfied with my current life. I haven't participated in psychological counseling, but I just use time to resist the pain. For a small city like ours, psychological counseling is a new thing, and we ordinary people can't accept it."

P17: "Although my current wife is young and beautiful, she doesn't work. I have to support the 3 children she brought. My daughter has reached the legal working age, and the trustee found her a job, and she came back after a long time. In the end, she simply stayed at home and stopped working. If she was my own child, I would scold her for going to work..... My ex-wife is virtuous, smart, capable and hard-working. If she was alive, I wouldn't be under so much pressure. I'm afraid there should have been hundreds of thousands. Now that she's gone, my father-in-law and mother-in-law will also have to worry about it. I'll visit often…. I'm more than fifty years old, and I don't want to leave anymore, people always have to have a company, and it won't be much better to find another one."

P15: "After Qiang people die, we will firmly believe that they have gone to a distant kingdom of heaven."

Disease self-monitoring and medical consultation

Measurement method and monitoring frequency

Most of the interviewees do not have relevant testing equipment at home, nor do they know the specific operation steps. County residents go to the hospital/community for a physical examination about once a year or when they feel uncomfortable. There are more convenient conditions for medical examination than in rural areas.

Medical consultation

Most rural patients do not take the initiative to monitor, and communication with medical staff or measurement of relevant indicators only occurs when symptoms are severe. For patients diagnosed for the first time, the monitoring and consultation of MS patients are more active than that of old patients, and they are willing to seek more urgent management.

Misunderstandings or difficulties

Most of the rural patients have misunderstandings such as waste of money and inability to cure the disease due to examinations, stopping medication at will, adjusting the dosage of drugs, and using drugs for chronic diseases and chronic diseases are life-threatening according to the values of metabolic indicators. Seeing a doctor in a big hospital has some difficulties (difficulty in registration), expensive medical treatment, and long distances, and unable to return to the doctor on time. They think the doctor's prescription can be permanently valid.

P27: "Now that the policy is good, the county hospital will come to give us a physical examination once a year. I haven't seen the report. I want to go to a big hospital for medical examination. It cost more than 700 yuan for the last inspection, and no disease was found, and the money wasted…".

P15: "I feel dizzy and uncomfortable. Measure blood pressure is free. Blood sugar costs 10 yuan each. I can go there once or twice a year, but we can't measure blood lipids."

P1: "I don't have a blood pressure monitor or a blood sugar tester at home. I went to a big hospital to prescribe some medicine, and I always take the doctor's prescription. It has not changed. If you register, you will have to do a lot of examinations. The examination fee is much higher than the drug fee, which is not worthwhile."

P6: "My son bought me a blood glucose meter, but I don't know how to measure it. My wife gave me to inject insulin. I checked my blood sugar, and it was high. I adjusted it myself (insulin dose), plus two units of insulin, it came down, and I haven't been to the hospital for two years for examination, which is inconvenient, and I was hospitalized, and the reimbursement was not much."

P15: "If I don't feel dizzy, I will not take the medicine. I am afraid of becoming dependent."

P21: "My home is only two or three minutes' walk away from the health service center. Blood pressure is tested for free, and blood sugar is tested three times a year for free. Whenever I feel uncomfortable, I come to test it at any time. …. Every year, I go to the county hospital for a comprehensive check-up."

P18: "This is the first time I know I suffered MS. I also consulted the relevant doctors, made a memo, and returned to visit doctor on time."

Difficulties and needs of health self-management

Difficulties in health self-management: the low level of efficacy and the serious lack of knowledge and skills of MS health self-management make it frequently give up halfway in the process of health self-management. As a small branch of poverty alleviation and rural revitalization, the medical industry plays an indelible role. However, there is a shortage of medical equipment in local hospitals, and the types of drugs are limited. Patients cannot undergo routine examinations, resulting in the poor role of higher-level hospitals. The efforts to alleviate the problems of difficult and expensive medical treatment are relatively limited.

The needs for self-management of health: residents generally expressed their eagerness to receive regular professional guidance from medical staff in tertiary hospitals to help them improve their health. Limited by their knowledge level and language communication barriers, they prefer to receive MS health self-management explanations and counseling from medical professionals. The auxiliary teaching materials are easy-to-understand

and well-illustrated educational manuals. There is a shortage of psychological counselors, and some people are even doing scientific research under the guise of psychological counseling.

P4: "Every meal is inseparable from bacon. Bacon has a lot of salt for working hard, eating less is definitely good for your health, but I'm used to it…".

P9: "…, our village is too far from the hospital, and the family's economy(income) is not good… The village health-center can't provide the basic cold medication, and I can't make an appointment in big hospitals …."

P27: "Our town has doctors who come to the tertiary hospital for targeted poverty alleviation every year, but there is no medicine in the town hospital, and if you feel uncomfortable, you can't check…. It would be great if doctors from big hospitals could come to give lectures on a regular basis, and distribute some brochures, preferably with pictures. My parents have high blood pressure and are old and illiterate. We (Qiang people) have difficulty understanding the professional language of doctors."

P2: "We haven't seen a psychiatrist in this small place. We can only adjust by ourselves if we're in a bad mood…".

P17: "Psychiatrists came here, but some of them will make patients fill out useless questionnaires for a long time… We feel useless."

Discussion

Access to knowledge and information about metabolic syndrome

The results showed patients with metabolic syndrome in the Wenchuan earthquake bereaved population with low educational level and low economic status, changing the correct cognition of the disease (disease etiology, diagnosis, treatment and influencing factors) is an important prerequisite for changing the unhealthy lifestyle.

During the interview, patients reported that it was difficult and expensive to seek doctor, and they were not clear about medical resources and procedures, which limited their access to medical resources. This is basically consistent with the survey results of Tang et al.[10] on medical services for chronic disease patients in rural residents of western China. It is difficult to understand the terminology and written health care information, and the ability to distinguish health care products. Effective ways and powerful measures for disease-related knowledge.

Specific manifestations and influencing factors of health self-management

According to the standard of less than 6 g per day for adults, according to literature reports, the daily salt intake of local adults is 48–72 g, which seriously exceeds the daily salt intake of normal adults[11]. Long-term life experience and dietary taste make residents inherently believe that only by eating more salt can they have physical strength. The Qiang people also spread "medicated beef and mutton", focusing on health preservation, but ignoring the balance of oil intake. In addition, traditional culture and religious beliefs have many requirements on the diet of residents. They like to drink highland barley and barley home-brewed sip wine. When drinking, general elderly are drinkers of strong alcohol, who are those with a high incidence of chronic diseases. Under this unique custom and culture, the people of Wenchuan have a deep-rooted health concept and behavior. A high-fat, high-carbohydrate diet and a long-term alcohol-drinking lifestyle foster the further development of metabolic syndrome.

Most of the interviewees in rural areas still lack a rational understanding of psychological counseling, and believe that psychological counselors are just exposing their scars or rubbing salt on their wounds. Combining the above weak links such as MS stressors, stress coping strategies, and misunderstandings of residents, the intervention plan is formulated in a targeted manner, respecting the wishes and preferences of patients, and helping patients to develop scientific and reasonable plans to the greatest extent possible.

Conclusion

Wenchuan earthquake bereaved people with MS are affected by stress events such as earthquake bereavement and restricted by their own deep-rooted knowledge, beliefs, traditional culture and religious beliefs and other objective conditions. The interviews found that the health self-management behavior is not optimistic, the disease-related knowledge is relatively lacking, the low perception of disease susceptibility and severity, the lack of self-confidence in self-management, and the limitation of medical information and service utilization, etc. In view of the above factors, it is extremely necessary to formulate a targeted health self-management intervention with good ethnic cultural adaptability based on the core elements and needs of the health self-management.

Data availability

Data is provided within the manuscript. The data that support the findings of this study are available from the corresponding author upon request.

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Author contributions
Sun Yanyan and Yuan Wei are responsible for the conception of the study, as well as the searching of the relevant literature and the collection of the data. Yang Juandong and Ma Lihua perform most statistical work and text writing. Ma Lihua and Sun Yanyan participated by revising the draft critically. All authors have consented the submitted version and its publication.

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Declarations

Competing interests
The authors declare no competing interests.

Ethical issues
This research followed strict biomedical ethics rules. The research proposal was submitted to the Ethics Committee of the First Hospital of Lanzhou University for approval (No: LDYYLL2022-278). After obtaining the consent of the patient and signing the written informed consent, which is formulated in accordance with the Declaration of Helsinki. It mainly includes the responsibilities and obligations of medical researchers and the rights due to the subjects, involving the priority of the patient's health, safeguarding the patient's privacy and dignity, and protecting the vulnerable groups. And the subject should be clearly aware of the purpose of the study, study procedures, and the right to participate in or withdraw from the study at their own discretion. At the same time, we promise that patients participating in this research will strictly implement confidentiality measures, and the data will only be used for this research, not for other purposes. For data entry and analysis, use numbers instead of names. No patient information shall be disclosed to anyone without the patient's consent. When research results are published, aggregate data is used rather than individual data to ensure that the personal information of patients participating in the study is not exposed.

Additional information

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