





## EMPIRICAL RESEARCH QUALITATIVE

# Acquisition behaviours for nutrition-related information based on a health promotion model for older adults in a long-term care facility

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## Abstract

**Aim:** To explore the acquisition behaviours for nutrition-related information of older adults in a long-term care facility.

**Design:** A qualitative descriptive design was used in this study.

**Methods:** Sixteen older adults in a long-term care facility were recruited using purposive sampling between March and May 2021. Data were collected via face-to-face semi-structured interviews, based on open questions regarding acquisition behaviours for nutrition-related information and flexible question formulation, and the data were analysed using an inductive–deductive method. A health promotion model was used as a conceptual framework to regulate the refinement of themes.

**Results:** Three themes were identified in this study. The first theme discussed the individual characteristics and experiences of older adults that contributed to their acquisition behaviours for nutrition-related information. The second theme described behaviour-specific cognitions of and the effects on the participants regarding the influencing factors involving various internal individual elements and external physical environment. The third theme explored the positive behavioural outcomes of the participants resulting from these acquisition behaviours.

**Conclusion:** Acquisition behaviours for nutrition-related information of older adults in long-term care facilities were affected by both individual characteristics and external physical environment factors. Access to nutritional information can help older adults cultivate a healthy diet. Although they exhibited a significant interest in nutrition, the participants still encountered several difficulties. Based on the actual care needs of the older people, appropriate nutritional information interventions should be provided by healthcare providers working in long-term care facilities so as to improve the ability of the older people to acquire information independently.

**Patient or public contribution:** All 16 participants actively participated in the interview process and the preliminary preparation of the article.

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## KEYWORDS

acquisition, behaviours, long-term care facility, nutritional information, older adults

## 1 | INTRODUCTION

Population ageing has become a global challenge (United Nations on ageing, 2022), and malnutrition is one of the most concerning issues worldwide (Corcoran et al., 2019; Maeda et al., 2020). Older adults who live in long-term care facilities have more severe malnutrition than those living in homes or communities (Cereda et al., 2016; Donini et al., 2020). In China, long-term care facilities provide multiple services, such as nursing care, rehabilitation and living care, for older adults, benefiting physically or mentally disabled individuals and healthy older adults who can take care of themselves (Department of Ageing Health, National Health Commission of the People's Republic China, 2020). With the increased awareness and cognition of older adults in recent years, institutional pensions are being provided in modern society for older adults to enjoy their later years (Wang et al., 2020); these are characterized as large-scale pension modes different from traditional home pensions. Therefore, older adults in long-term care facilities should be the primary focus.

Nutritional regulation, as a nondrug treatment for acute or chronic disease management, plays an extremely significant role in preventing and controlling diseases (Bruins et al., 2019; Di Renzo et al., 2019) and in maintaining individual health. Along with the continuous pursuit for high life quality, older adults are keen to acquire nutritional information to regulate their own nutrition intake (Chaudhuri et al., 2013; Mc Grath et al., 2016). Nonetheless, the status of nutrition and health literacy of older adults requires improvement (Arcury et al., 2020; Shi et al., 2021). Providing older adults with precise and planned health education can significantly improve their nutritional knowledge and ameliorate their indulgent eating behaviours (Ahmadzadeh Tori et al., 2019; Ahn et al., 2018). Therefore, effectively seeking nutrition-related information is considered crucial to promote the nutritional capacity of older adults. However, this conclusion is only applicable to a few experimental intervention studies due to the lack of relevant education or training activities and studies on acquisition behaviours for nutrition-related information of older adults across the society (Zhao et al., 2022). The inadequate understanding of the behaviours for information acquisition of older adults hinders nutrition-related information required by older adults from being effectively absorbed, thereby resulting in unfavourable outcomes in cultivating their healthy eating behaviours. Therefore, this study aimed to explore the acquisition behaviours for nutrition-related information of older adults in long-term care facilities to identify the stimulus elements and associated effects resulting from acquisition behaviours.

Most older adults have sufficient free time after retirement. During this stage, learning new skills or consolidating inherent abilities has become the primary routine interest of older adults to enjoy their old age. Among these, the acquisition of health-related

information or seeking behaviours has become the dominant choice for most older adults seeking to acquire new skills (Bujnowska-Fedak & Mastalerz-Migas, 2015; Zhang et al., 2017). A cross-sectional survey in Portugal on the health information-seeking behaviours of older adults has demonstrated that television programmes, online media, print media and interpersonal networks represent the main sources of health information (Oliveira et al., 2021). Owing to the physical distance caused by the coronavirus disease 2019 pandemic and the rapid development of information technology in recent years, Internet technology, serving as an emerging source for acquiring information, has been widely explored (He et al., 2021; Jiang et al., 2021; Li & Zhang, 2021; Oh & Lim, 2021). An analysis of existing literature on acquisition behaviours for health information of older adults revealed that the most searched topics were disease-related health problems (including cancers, mental health and chronic diseases) and nutritional information (Zhao et al., 2022); moreover, the focus points included the quality of widespread information and influencing factors of behaviours for information acquisition (Jiang et al., 2022; Williams et al., 2022). To ensure the accuracy of information dissemination, Lokker et al. (2021) analysed the access of older adults to information with qualitative research using the persona-scenario method, which aims to improve the awareness and usage of reliable health knowledge for older adults by constructing effective strategies for knowledge translation that combine means of evidence-based studies.

Nutrition-related information is a key component of health information that is essential for disease prevention, diagnosis, treatment and rehabilitation (Khor et al., 2022). Compared with other adaptation objects of disease information, nutrition-related information has benefits that are considered universal, involving patient groups diagnosed with diseases and individuals who aim to live a long healthy life (Chen et al., 2022; Yeung et al., 2021). However, there is limited evidence regarding acquisition behaviours for nutritional information (Zhao et al., 2022). In Portugal (Oliveira et al., 2021), a study on the perceived needs and preferences of older adults for information sources of healthy diet found that most participants showed strong interests in information acquisition, and individual needs for acquisition were based on different personalities and characteristics. A quantitative analysis conducted in China, comprising patients with diabetes aged >60 years living in rural areas, explored the acquisition behaviours of older adults for nutritional information and their influencing factors. The analysis concluded that professional medical staff and years of education were the main sources of information acquisition and primary factors of behaviours for information acquisition respectively (Zhu & Xu, 2019). The limited above-mentioned studies used quantitative analysis methods to discuss acquisition behaviours for nutritional information and focused on the stimulating factors of the

behaviour, thereby neglecting the specific process of acquisition behaviours for nutritional information comprehensively. In addition, all participants involved in the aforementioned studies were mainly older adults who lived in the community or at home, and distinct residents in long-term care facilities with senectitude and co-morbidities were not included. Accordingly, this study aimed to explore the nutrition-related information acquisition behaviours of older adults in a long-term care facility using descriptive qualitative research, attempting to provide a reference for optimizing access to nutritional information in an extensive older population.

The health promotion model (HPM), proposed by Nolar J. Pender, an American nursing expert, is the most common model used to explore the development of individual health behaviours (Haghi et al., 2021). Present studies show that providing planned health education based on HPM to obese children (Eren et al., 2017), pregnant women with heart disease complications (Zhang, Yuan, & Dong, 2022) and diabetic patients (Shahabi et al., 2022) can significantly improve poor eating habits and foster an active and healthy lifestyle. Compared with other disease prevention models, such as the health belief model (HBM), HPM is commonly used to study the health behaviours of moderately healthy people, but it cannot measure patients' motivation for behaviour change based on disease threat or fear. This model comprehensively analyses the effect of individual internal factors and external environmental factors on health behavior outcomes (commitment to action plans and health-promoting behaviours) using the following two aspects: individual characteristics and experiences (prior related behaviours and personal factors) and behaviour-specific cognitions and effects (perceived benefits of actions, perceived barriers to actions, perceived self-efficacy, activity-related effect, interpersonal influences and situational influences). In our study, the HPM was used as a framework to guide data categorization, explore behaviours related to acquisition of nutrition-related information by older adults and provide suggestions to improve the experience of acquiring nutrition-related information among the older adults.

## 2 | METHODS

### 2.1 | Design

A descriptive qualitative design with face-to-face interviews was used to explore the nutritional information acquisition behaviours of older adults in a long-term care facility.

### 2.2 | Participants and sampling procedure

In China, older adults are more likely to spend their retired life in their own homes than in long-term care facilities. Usually, older adults are reluctant to leave their familiar environment, where they have lived for several years, until they recognize that they are ageing and require assistance in their daily lives. Therefore, most older

adults in long-term care facilities are at an advanced age (Zhang, Peng, et al., 2022).

REDACTED is a long-term care facility that provides medical services and nursing care. It is also a typical long-term care facility in China, and the quality of care provided to older adults in this facility has been widely praised throughout the country. In this study, older adults at REDACTED were selected as study participants using purposive sampling. After members of the research team communicated with the manager of the facility through a telephone call, they were allowed to enter the facility. There was no prior relationship between the participants and the interviewer. To ensure that the study proceeded smoothly, the respondents included those who were fluent in Mandarin or the local language. With the help of nurses who were on duty and were familiar with the essential conditions of older adults in the facility, researchers drew up a list of older adults who might be eligible for inclusion in this study. Subsequently, the principal investigator visited the older adults on the list one-by-one to identify the participants who consented to participate in this study with the following inclusion criteria: having experiences with acquisition behaviours for nutrition-related information and fluent communication skills. The exclusion criteria included a diagnosis of dementia or a mental disorder, refusal to participate, deterioration of disease condition and discharge from hospital during the study period. Data collection and analysis were performed simultaneously, and participant recruitment was stopped when no new topics emerged. Eighteen participants engaged in interview activities; among them, two withdrew as physical fatigue and family repulse were reported during the interview. In total, 16 participants completed the interviews.

### 2.3 | Data collection

Based on the study aim, topic guides were initially formulated by the main author after reading significant relevant literature. These topics were revised for the first time based on theme decomposition and ranges of the content after a detailed discussion with a dietitian and a geriatric nursing expert. Subsequently, the inquiry formulation was readjusted following a preliminary interview with two older adults. The interview guide is presented in Appendix S1.

This study was conducted by a professionally trained researcher from March to May 2021 with 16 participants. The primary researcher (LJ) was responsible for asking questions and obtaining answers from participants in the form of one-on-one and face-to-face interviews and collecting data by audio recording and field notes. The researcher maintained a neutral and objective position and did not make personal evaluations of the responses and answers of the interviewees. Each conversation lasted 12–48 min. The visiting place was situated in a private room for the respondents' comfort and to enhance the accuracy of the statements provided. To eliminate the concerns of unfamiliarity, the main researcher introduced the theme by familiarizing the interviewees with their sociodemographic data in advance and inquiring about their daily diet. Prior to the interview, the

TABLE 1 The four criteria of rigour.

Criterion	Implementation in our study
Credibility	<p>The research group comprised multidisciplinary members with varied educational levels, covering medicine, nutriology and nursing</p> <p>Team members performed data analysis cooperatively to improve the accuracy of result analysis</p> <p>Considering that mutual trust is more likely to be obtained in familiar surroundings, the interview was scheduled at the second meeting time and was conducted in the apartment where the respondents resided.</p>
Transferability	<p>The same interview outline and data collection methods were used to collect data</p> <p>The participants of this study have different cultural backgrounds, social status and economic status, which is widely representative of the older population living in long-term care facilities</p>
Dependability	<p>Different researchers were assigned to undertake the task of data collection and data analysis</p> <p>The theory of the health promotion model was used as the guide framework, which played an important role in directing theme induction</p>
Confirmability	<p>Preconceptions were recorded during, or immediately after, the interviews.</p> <p>During the interview, respondents understood they were fully respected when interruptions were avoided, and in-depth questions were asked when necessary</p>

purpose of this study was explained to the participants, and written informed consent was obtained. Owing to potential memory issues among older adults, answers to the same questions may be inconsistent, which required researchers to conduct in-depth and precise explorations of the problem. Therefore, even though we used the same interview outline, the interview process for different individuals was flexible. The participants were encouraged to express their opinions sincerely, and the main researcher recorded their nonverbal expressions. Three respondents, who were accompanied by their family members (spouses), participated in the interview. At the end of the interview, the researcher provided a summary on-site as feedback to the respondents to ensure the accuracy of the information obtained. Because all data collected were promised to be confidential, respondents provided information with greater accuracy and credibility. At the end of each interview, participants were given a small well-prepared gift (soap or laundry detergent) as a token of appreciation.

## 2.4 | Ethical considerations

This study was approved by the Ethics Committee of our hospital, and the approval number was 2021-293.

## 2.5 | Data analysis

Directed content analysis, a method used to test or validate existing models or theories in qualitative studies, was used to analyse the interview data. Based on the directed framework of the HPM, we divided the behaviours of nutrition-related information acquisition into the following three main categories:

1. Individual characteristics and experiences—defined as any element contributing to their behaviours of nutrition-related information acquisition, including the perspectives of personal factors and prior related behaviours of older adults.

2. Behaviour-specific cognitions and effects—defined as any stimulating factor perceived by participants during the process of nutrition-related information acquisition, specifically consisting of perceived benefits of actions, perceived barriers to actions, perceived self-efficiency, activity-related effect and interpersonal and situational influences.
3. Behavioural outcomes—defined as any healthy nutritional behaviour after the change of bad eating habits following the acquisition of nutrition-related information behaviours.

Data analysis was performed independently by two professional researchers (XY and LHP) with rich experience in qualitative research who did not engage in the interview process. The discrepancy between the two results was analysed by our team members until all themes and quotations were unified. Our study comprised eight research members, including two nursing graduates, three nurses with a master's degree, two senior professors in geriatric care and a senior nutritionist.

## 2.6 | Trustworthiness

To ensure rigour during the process, four criteria of qualitative research were strictly followed by our researchers throughout the study, as presented in Table 1.

## 3 | RESULTS

Sixteen participants completed the interviews. Their mean age was  $86.19 \pm 2.92$  years, and the educational level of most participants included high school education or above. The demographic data of the respondents are presented in Table 2.

The following three main themes were identified: individual characteristics and experiences, behaviour-specific cognitions and effect, and behavioural outcomes. The themes, subthemes and responses of all respondents are listed in Table 3.

TABLE 2 The demographic data of respondents.

Participant	Age	Education level	Marriage state	Diseases
1	86	University and above	Widowed	Hypertrophy of prostate and chronic bronchitis
2	92	University and above	Widowed	Diabetes and chronic gastritis
3	83	Middle school	Widowed	Pharyngitis and hypertension
4	86	Middle school	Widowed	Hypertension, diabetes, coronary heart disease, cerebral infarction and osteoporosis
5	82	Middle school	Married	Hypertension and diabetes
6	91	University and above	Married	None
7	86	Primary school	Widowed	Coronary heart disease and chronic gastritis
8	84	University and above	Widowed	Hypertension and coronary heart disease
9	87	Primary school	Widowed	Coronary heart disease, cerebral infarction and fatty liver
10	89	Middle school	Widowed	Hypertension, diabetes
11	87	University and above	Married	osteoporosis and chronic obstructive pulmonary disease
12	83	University and above	Married	Hypertension, diabetes, coronary heart disease, osteoporosis, chronic obstructive pulmonary disease and sleep disorders
13	87	University and above	Married	None
14	89	University and above	Married	Hypertension, diabetes and coronary heart disease
15	82	University and above	Widowed	Hypertension and osteoporosis
16	85	University and above	Widowed	Diabetes, hypertension, coronary heart disease and prostatic hyperplasia

### 3.1 | Individual characteristics and experiences

#### 3.1.1 | Prior-related behaviours

This study revealed that older adults had unhealthy eating behaviours; they had unreasonable meal structures and incorrectly used their healthcare products in their daily lives. They preferred fattier dishes over healthy lean meat and consumed supplements optionally, which mainly resulted from the decline of their physiological functions and the insufficient knowledge of nutrition in the early stage.

Realizing their unhealthy nutritional habits, respondents tended to educate themselves on nutrition-related information to compensate for these deficiencies. Our study found that older adults in long-term care facilities obtained nutritional information from traditional media, such as newspapers, TV programmes and magazines. In addition, modern information technology, such as WeChat mini programmes, web information and search engines, was also considered an efficient instrument for information acquisition. More conveniently, conversation between relatives or friends was another important source for older adults to obtain nutritional information.

#### 3.1.2 | Personal factors

Personal factors played a crucial role in nutrition-related information acquisition. Hobbies and health needs were identified as two main factors. In our study, respondents expressed keen interest in learning traditional Chinese medicine diet care due to their dominant advantage of conforming to the natural growth rule. According to the philosophical concept of traditional Chinese medicine, the growth process of a person's life is consistent with the cycle of the four

seasons of nature; hence, people tend to follow this natural law and eat specific food in specific seasons, in which they are considered the healthiest eating habits. However, with the continuous advancement of ageing, maintaining health and avoiding the decline of physical functions with nutritional adjustment have grown into primary pursuits for respondents.

### 3.2 | Behaviour-specific cognitions and effect

#### 3.2.1 | Perceived benefits of actions

The participants described the benefits they perceived after applying the information obtained. These benefits included self-treating slight colds with the knowledge they had learned and prolonging life span by self-regulating dietary structure.

#### 3.2.2 | Perceived barriers to actions

Although information acquisition behaviour had been a routine habit, several obstacles arising from acquisition behaviours for nutritional information were reported in our study. From the perspective of the respondents, a decrease in physical function, such as eyesight, hearing and cognition awareness, could impede obtaining information.

In addition, the lack of official and authoritative information sources was regarded as another confusing obstacle in the age of information deluge. For example, a respondent informed us that she encountered some troubles in retrieving nutritional information because she desired to seek a systematic information education approach rather than only accepting information passively.

TABLE 3 The nutrition-related information acquisition behaviours of older adults.

Theme	Subtheme	statements of participants
Individual characteristics and experiences	Prior related behaviours	'Older adults encountered this phenomenon in meat consumption: due to the limited chewing ability for lean meat, most older adults prefer to eat fatty parts, especially Shaobai (mainly composed of soft and waxy fat)'. (N1)
		'Usually, I take nutrient supplements, such as vitamin B <sub>2</sub> , Centrum, folic acid, etc., sporadically. This supplementation of nutrients only depends on my personal wishes, without any advice from doctors or laboratory indicators as a reference. To me, these supplements are optional'. (N13)
		'《Life Times》 is an authoritative newspaper. It is the main source for me to obtain new information. The writers of the articles are all famous academicians in the medical field. Another information source is the TV program <i>Yang sheng Tang</i> (also called Honyaradoh), which I have been watching habitually for many years. Furthermore, I also read some messages that are automatically sent by the server to my tablet system'. (N1)
		'My daughter-in-law is a nutritionist. When I lived at home, she was in charge of preparing our meals, so I learned a lot from her...'. (N9)
Behaviour-specific cognitions and affect	Personal factors	'I have been obsessed with traditional Chinese medicine since I was a child, so I started to study it on my own as soon as I retired from the army'. (N6)
		'As adults get older, they become more and more mature in considering problems. Physical health plays an extremely crucial role in our lives, and we also should maintain a respectable quality of life. You see those people who are lying in bed or in wheelchairs all day? they require help from healthcare workers for even the slightest tasks; it is awful'. (N15)
	Perceived benefits of actions	'I think what he (grandpa) has learned is quite beneficial to us. Currently, we do not need to visit the doctor anymore if we suffer from slight colds or coughs. Grandpa can solve the problem on his own by purchasing some Chinese herbs from the drugstore and using them to make soup, and the rest we need to do is wait for our body resistance to fight it'. (N5)
		'My health condition has always been weak since I was a child. It is really a miracle for me to live more than 80 years, exceeding what most people around me had imagined. Now, I am cautious of what I eat. I need to take care of my nutritional health because I expect to live even more than 100 years, Ha (laughter)'. (N7)
	Perceived barriers to actions	'With aging, the memories of older adults decline rapidly. Hence, it is difficult for us to remember what we have learned. Compared to when I was young, now it is not convenient to go to the bookstore to read books not only because there are no more seats there but also it's too unreasonable for older adults to stand reading for a long time'. (N6)
		'I don't know where to start (learning information). There are no systematic books or lectures for us to study, so I am only reading randomly. Sometimes when I encounter some interesting information, I take a careful look'. (N3)
	Perceived self-efficacy	'Usually, I like watching TV and reading some newspapers, but I find it hard to believe these things...'. (N2)
		'I just glance over and make a quick impression on it (hesitating). It doesn't matter. It seems that some information can be a little known, but others are less trustworthy (laughter)'. (N11)
	Activity-related affect	'I guess the truth of these news needs to be further judged via experience in order to identify their actual value. If I find some message useful, I'll practice and propagate it on the condition that it's salutary'. (N6)
		'I possess a lot of free time now since I am retired. I consider it necessary to keep a good physical condition because I have decades ahead of me to live'. (N6)
	Activity-related affect	'There is a demand for nutrition information in older adults on how to prevent common diseases in old age, such as fall and dementia, with dietary conditioning, which are two major diseases that most old adults fear'. (N1)
		'It would be great if I have a dietitian to consult one-to-one regarding dish and fruits intake; only then can I have proper nutrition. This would be an effective measure to improve my health'. (N3)
	Interpersonal influences	'These news on the newspaper ( <i>WEN ZHAI ZHOU BAO</i> ) are relatively concentrated, simple, and refined. They are more practical instead of those messy advertising campaigns'. (N9)
		'We bought the healthcare products without any advice from doctors when we resided in a nursing home located in Qingcheng Mountain, the Chengdu city in China. Other adults around us were taking it and told us it is effective. As a result, we also started taking them according to their recommendation. However, we do not take them now. They just stand there at the corner. What a waste of money'. (N12)
	Situational influences	'We just ate what we like when I retired at home, where nobody cared about the nutrition-related health consciousness. However, I began to pay attention to the nutrition information since I entered the nursing home. It was peer communication that prompted me to change my eating habits gradually'. (N15)
		'At present, solving our nutritional problems mainly depends on the cafeteria, because there are no conditions for us to solve this problem. I think the canteen should attach great importance to the meals served for us as we mainly rely on the canteen here to provide us with ready-made food'. (N15)
		'When the standard of living was just enough to live, people would not have the time and energy to concentrate on nutrition and health issues. There was no such idea at that time'. (N15)

TABLE 3 (Continued)

Theme	Subtheme	statements of participants
Behavioural outcome	Commitment to plan of actions	<p>'I still need to acquire more nutritional knowledge. As the saying goes, revolutionary action comes from revolutionary theory. The accumulation of theoretical knowledge is the most important just because only theory can promote action development'. (N10)</p> <p>'I have a small appetite and stomach which potentially result in malnutrition. My previous work experience taught me that older adults, as well as the entire older population, need to take extra nutrient supplements, such as protein and calcium tablets. Since I have worked in the clinical laboratory for many years, that is what I'm supposed to do'. (N7)</p>
	Health-promoting behaviours	<p>'I've learned a new skill now. For older adults, especially those who need to go to the toilet multiple times in the midnight, they should replenish their thirst with warm water several times instead of cold water. I have a prostate disease with polyuria. In order to reduce the trips of bathroom, I dare not drink water before going to bed. The professor in science programs said it is a dangerous behavior because of the higher blood viscosity at night. Hence, I only drink warm water after getting up in the night from now on, which is beneficial to my physical health'. (N1)</p> <p>'In addition, I also read a message that the digestive system function of older adults decreases as they age. They need elaborate and refined food, especially eggs, milk, yogurt, and nuts. So, I consume these daily'. (N1)</p> <p>'If I don't eat enough food at dinner, I will supplement nutrients from other resources, like adding some snacks, fruits, nuts, etc'. (N11)</p>

Respondents also cited the problem of inconsistent information quality from different sources. They concluded that information reported in national authoritative newspapers was more reliable than that disseminated through channels, such as television or the Internet. Sometimes, they just glanced over the information they received but did not seriously consider it because the information was confusing.

### 3.2.3 | Perceived self-efficacy

Self-efficacy is the subjective judgment of an individual with respect to whether he or she can complete a specific behaviour successfully and belongs to a comprehensive review of his or her own ability. In this study, older adults were highly confident in their ability to judge the information quality. In addition, due to the benefits perceived from the practice of obtaining information, the participants had more faith in acquisition behaviours for nutritional information.

### 3.2.4 | Activity-related effect

Combined with their current health status and information quality confusion, the interviewees summarized the experiences of information acquisition behaviours and put forward targeted suggestions to raise the efficiency of nutritional information acquisition. These suggestions included desiring to receive professional guidance from dietitians and dietary advice regarding common chronic disease prevention and control, dependable information through professional reviews and information that is brief and concise in content but detailed in presentation.

### 3.2.5 | Interpersonal influences

Long-term care facilities provide a physical environment for those in a state of social isolation after retirement to reconstruct

their social circle and re-participate in social activities. In this study, respondents reported some positive influences of the individuals in their circle, including cultivation of nutrition and health consciousness among older adults, and some negative influences with respect to following the trend of consuming healthcare products.

### 3.2.6 | Situational influences

Although some respondents were obsessed with obtaining nutritional information, some conditions, such as group living and institutional safety management regulations, limited the possibility of obtaining nutritional knowledge for older adults, which impeded their interest and motivation in seeking nutritional information to a certain extent. Consequently, they also desired institutional canteens to assume a more dominant position in diet structure management.

A minority of the respondents also mentioned the influence of social situational factors on the change in their attitudes towards nutritional health. They considered that the development of society and the in-depth exploration of disciplines had further promoted the pursuit of a high quality of life, consequently increasing their attention to their own nutritional conditions.

## 3.3 | Behavioural outcomes

### 3.3.1 | Commitment to plan of actions

Although the respondents reported the difficulties they encountered in the process of accessing nutritional information, such as limited access to authoritative information and inconsistent information quality, their deteriorating condition and health pursuit in old age prompted them to continuously collect nutritional information.



Naturally, they displayed steadfast confidence in their adherence to nutrition-related information acquisition behaviours.

### 3.3.2 | Health-promoting behaviours

The respondents expressed their recognition of the useful information they had obtained. According to the participants, some reliable information could expand their horizons and correct their inherent false perceptions. For instance, two respondents reported their correction experiences regarding prior misunderstanding after obtaining relevant information, whereas another reported the formation of healthy eating behaviours using the nutritional information she had mastered.

## 4 | DISCUSSION

This qualitative study, based on an HPM, autonomously examined the nutrition-related information acquisition behaviours of older adults in a long-term care facility in China. Consistent with the elements of this model, we identified three themes and their corresponding 10 sub-themes as follows: individual characteristics and experiences (prior related behaviours and personal factors), behaviour-specific cognitions and effect (perceived benefits of actions, perceived barriers to actions, perceived self-efficacy, activity-related affect, interpersonal influences and situational influences) and behavioural outcomes (commitment to plan of action and health-promoting behaviours).

Due to tooth loss and other adverse conditions, older adults are more likely to consume unhealthy fat rather than high-quality proteins, such as fish or lean meat. Long-term unhealthy eating behaviours might accelerate malnutrition and even result in chronic noninfectious diseases in older adults (Hou et al., 2020; Taylor et al., 2019). Therefore, awareness of the negative outcomes of unhealthy eating behaviours is critical, and an increasing number of older adults are set to acquire nutritional information autonomously (Bujnowska-Fedak, 2015; Bujnowska-Fedak & Mastalerz-Migas, 2015). The desire of respondents to stay healthy and decrease the rate of decline in physical functions was the main motivator behind these positive changes, whereas other contributing factors also included the great interest of individuals in nutritional knowledge. Consistent with the findings of previous studies (Chaudhuri et al., 2013; Zhu & Xu, 2019; Craven et al., 2018), this study also found that the most trusted sources of information for older adults were professional healthcare providers (counting medical staff and dietitians). However, the most common channels of information acquisition were the traditional media (including TV programmes and newspapers), modern information technology (WeChat application and search engines) and interpersonal communication. The discrepancy between the desired and actual information sources for older adults was attributed to the serious shortage of professional healthcare workers and insufficient attention to nutritional management of older adults (Adamski

et al., 2020; Håkonsen et al., 2019). Considering the context of continuous ageing and co-morbidity status among older adults, it is necessary to expand the establishment of professional endowment groups, raise their nutritional awareness and provide increased communication opportunities for older adults and healthcare providers.

As adults grow older, learning new skills becomes challenging. First, the functional decline in eyesight and hearing makes it difficult for older adults to capture key points of information from paper documents and TV programmes. Second, an inadequate understanding of information technology products prevents older adults from obtaining authoritative and effective evidence from the network world (Wilson et al., 2021). Although several older adults reported that they could use mobile smartphones or tablets to obtain nutrition-related information independently, most simply accepted information passively from others rather than actively seeking information themselves (Wu & Li, 2016). This information is widely spread across the Internet, but its source and scientific nature have not been verified effectively, which might potentially mislead older adults regarding their health behaviours. Nevertheless, older adults have favourable self-efficacy in their own information acquisition behaviours and abilities. As the first person responsible for their own health, older adults actively undertake their duties to maintain great health and master the ability to distinguish between correct and incorrect information to adapt to the ever-evolving society. Although the advancement of science and technology in recent years has brought great convenience to our lives and work, it has also brought a huge digital divide for the vulnerable older adults (Liu et al., 2022; Williams et al., 2022). The current situation indicates that digital products for the older people require further development, and the design and development of product functions combined with the actual physiological changes of the older people may be an effective measure to reduce the digital gap among the older people. Long-term care institutions can set up interest classes to guide the older people on relevant information technological products so as to further improve the older people's ability to acquire online information and sense of self-efficacy.

Social development and scientific progress have bolstered the cultivation of the attitudes of people towards nutritional health (Sriram et al., 2018). Only when they can overcome concerns regarding food shortages will people gradually shift their focus from having sufficient food to being healthy. For those living in long-term care facilities, the canteen department is responsible for their reasonable nutrition structure due to their insufficient cooking abilities. In addition, interpersonal communication between older adults also produces an irrefutable and potential impact on the increase in nutritional health awareness (Chaudhuri et al., 2013). Positively affected by disciplined peers who have sufficient information on nutritional health, those who are deficient in nutritional consciousness would review their unhealthy behaviours and make confident changes. However, if the nutritional information spread among them is inaccurate or individualized (if someone happens to be intolerant to the food or regimen), health hazards or even loss of life might occur. This finding indicates that although the progress of society has brought



opportunities for the cultivation of nutrition awareness among the older people, long-term care institutions, as the main suppliers of nutrition for the older people, are responsible for their nutritional health. Moreover, in daily dietary care, healthcare providers should guide the older people to critically identify nutritional information to help them establish correct dietary behaviours.

Previous studies reported that active learning in older adults is helpful in improving their comprehensive health literacy (Uemura et al., 2018; Yeung et al., 2021) and cultivating healthier eating habits (Taylor et al., 2019). Although the action of obtaining information does not guarantee that the recipient will master a healthy diet, acquiring sufficient information is beneficial for motivating positive changes in health practices (Wu & Li, 2016). Despite the difficulties in obtaining the information process identified in this study, respondents also reported some practical benefits, such as the appropriate method to drink water at night for patients with prostate disease and using traditional Chinese medicine to treat minor cold conditions. These clear health outcomes further strengthen the virtuous circle of nutrition-related information acquisition behaviours among older adults. Wu et al. (Wu & Li, 2016) investigated the online health information acquisition behaviours of older adults in China and found that, despite doubting the credibility of this information, older adults appreciated the consulting value and were deeply satisfied with the information-seeking experiences. McGilton et al. (McGilton et al., 2018) demonstrated that older adults with multiple diseases hoped to receive more knowledge and education to take care of themselves better; however, the information they currently acquired was insufficient. Therefore, the managers of long-term care institutions should comprehensively evaluate the disease status and related care needs of the older people in the institutions, and on this basis, regularly educate the institutions to meet the needs of the older people with different diseases to acquire systematic nutrition knowledge and promote their self-health management ability.

Providing conformable information according to the personality characteristics and learning preferences of the acquirers is of immense importance for boosting their receptivity (Brooks et al., 2017). Considering the diverse health needs of disease conditions and behavioural experiences of independent nutritional information acquisition in the early stage, participants in this study indicated that nutritional direction for older adults should focus on the prevention and domination of common chronic diseases, such as Alzheimer's and coronary heart diseases. This finding is in line with the results obtained by Zhao et al. (2022). Illnesses result mainly from unhealthy diet (Kris-Etherton et al., 2022), whereas adequate nutrition or energy intake is helpful in slowing ageing and accelerating recovery (Yeung et al., 2021). Therefore, improving the nutritional knowledge of older adults in long-term care facilities is an effective method for enhancing their quality of life. Except for the matching degree of information supplied and demanded, diverse presentations and brief contents are other decisive factors affecting the efficiency of information received (Lokker et al., 2021; Verma et al., 2022). Impeded by a decline in physical function, older adults prefer short and thematic messages over verbose explanations. Moreover, compared with the

traditional plain text teaching design, an arrangement integrating modern technology and traditional teaching classes helps increase the nutritional knowledge level of participants and makes them feel refreshed and delighted throughout the process (Chiu et al., 2019). Therefore, in terms of nutrition information guidance for the older people, long-term care institutions should focus on nutrition prevention and management of coronary heart disease, diabetes, senile dementia and other common chronic diseases of the older people. At the same time, they must take full advantage of modern information technology (such as large-screen tablet and multimedia) and other tools to explain relevant theoretical and practical knowledge to the older people in combination with pictures, videos, audio and other means to improve their intake and mastery of new knowledge.

## 4.1 | Limitations

This study has some limitations. First, the sample selection is based on the method of objective sampling and is limited to the older people in Chongqing, China. Therefore, the research objects in this study may not widely represent the older people in other countries and provinces. Second, respondents may hope that their answers can conform to social norms or win the favour of the investigators, leading to the occurrence of response bias. Third, the mean age of the respondents in this study was >80 years, leading to lost opportunities in understanding the relevant behaviours of younger older adults. In addition, although the researchers repeatedly confirmed the respondents' answers in the process of data collection, the disorganized thought processes of the older people may have led to inconsistent answers. Finally, this study was conducted during the epidemic of coronavirus disease 2019, which further prevented us from knowing previous related behaviours. Therefore, it is necessary for future studies to expand the sample size and conduct cross-regional and multicentre joint investigations.

## 5 | CONCLUSIONS

Based on Pender's HPM, this study explored the autonomous information acquisition experiences and feelings of older adults in a long-term care facility based on the following 10 factors: prior related behaviours, personal factors, perceived benefits, perceived barriers, self-efficacy perceptions, activity-related effect, interpersonal influences, situational influences, commitment to action plans and health-promoting behaviours. Consequently, our study revealed that older adults actively desired nutritional information acquisition; however, they encountered several difficulties, including limited access to information and confusion in quality concerns. Therefore, it is necessary to organize professional geriatric learning groups and provide appropriate nutritional information guidance combined with modern technology for older adults who have different information needs to cultivate their nutritional knowledge and behaviours.

## AUTHOR CONTRIBUTIONS

This study was conceived by Xiao Ming Zhao, Zhao Qing Hua and Liu Jing. The study design and data collection were performed by Liu Jing and Zhao Yong. Data analyses were performed mainly by Li Hui Ping and Xie Ying. All members were involved in the interpretation of the results. The article was drafted by Liu Jing and revised under the guidance of Wang Jun and Huang Huanhuan. All authors consented to the submission of this article.

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## CONFLICT OF INTEREST STATEMENT

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.