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Research Paper

Demand analysis of health care services for community-dwelling breast cancer survivors based on the Kano model: A cross-sectional study

Maomao Zhang , Liuliu Zhang ^{*} , Xiaoxu Zhi , Fang Cheng , Yufeng Yao , Rong Deng , Chunli Liu , Yan Wang

Jiangsu Cancer Hospital, Jiangsu Institute of Cancer Research, Nanjing Medical University Affiliated Cancer Hospital, Nanjing, China

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ABSTRACT

Objectives: Providing satisfactory healthcare services for breast cancer survivors can effectively reduce their burden and the pressure on medical resources. The aim of this study was to explore health care service demands for community-dwelling breast cancer survivors using the Kano model.

Methods: A cross-sectional survey was conducted from January to March 2023 among breast cancer survivors discharged from a tertiary cancer hospital. Participants were asked to fill out a self-designed questionnaire involving the Kano model, which helped to categorize and prioritize the attributes of healthcare services. The questionnaire included 30 health care services. Additionally, their social demographic characteristics were collected during the survey.

Results: A total of 296 valid questionnaires were collected, and demand attributes of the 30 health care services were evaluated. The findings revealed that one of 30 services was classified as “must-be attributes” (body image management), 13 as “one-dimensional attributes” (focused on medical security support, health management, and health counseling), 3 as “attractive attributes” (focused on communication needs and telehealth services), and 11 as “indifferent attributes” (mainly in the area of psycho-social services).

Conclusions: Breast cancer survivors in the community have different levels of need for various health care services. It's crucial for healthcare providers to identify these needs and devise effective strategies to deliver the appropriate services. Services with must-be and one-dimensional attributes should be given priority, and efforts should be made to provide services with attractive attributes, hence improving the quality of life of breast cancer survivors.

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What is known?

- The number of breast cancer survivors is increasing; these patients need professional assistance and qualified counseling during follow-ups to manage treatment-related symptoms.
- Numerous institutions have shifted care from hospitals to homes and communities. The provision of health care services is widely recognized as a key aspect of meeting the care needs of community-dwelling breast cancer survivors with multiple health problems and complex conditions.

- High-quality health care services are critical to improving well-being and prolonging survival for breast cancer survivors. However, the category, priorities, and structure of health care services for community-dwelling breast cancer survivors remain unclear.
- The Kano model is an effective method used to understand customers' satisfaction with product or service features.

What is new?

- Based on the Kano model, this study explored the demands of community-dwelling breast cancer survivors regarding health care services and proposed optimization schemes. These schemes may improve quality of life, while facilitating health

^{*} Corresponding author.

E-mail address: Zliuliu@163.com (L. Zhang).

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care professionals' identification and provision of health care services.

- Out of 30 health care services, "body image management" was classified as a service with "must-be attributes", while services focusing on medical security support, health management, and health counseling were with "one-dimensional attributes". These findings provide implications for health personnel to develop effective strategies to deliver appropriate services for community-dwelling breast cancer survivors.

1. Introduction

Breast cancer is a prevalent form of cancer globally. The International Agency for Research on Cancer reported that approximately 2.3 million new cases of breast cancer were diagnosed in 2020 [1]. The projected increase in incidence, which is expected to exceed 3 million cases annually by 2040, can be attributed to population growth and aging [2]. Breast cancer exhibits varying 5-year survival rates (ranging from 80% to 92%) among different ethnic groups, with China reporting a rate of 80.9% [3]. As a result, the number of breast cancer survivors is also increasing. The US National Coalition of Cancer Survivors defines an individual as a cancer survivor from the time of diagnosis through the balance of his or her life. This definition is also supported by the National Cancer Institute, the National Comprehensive Cancer Network Survivorship Panel [4]. These endorsements reflect a broad understanding of cancer survivorship and recognize the ongoing journey of individuals diagnosed with cancer.

The growing number of breast cancer survivors may continue to face several non-cancer challenges, such as upper limb dysfunction, lymphedema, hormonal changes, unstable relationships, unemployment, as well as psychological, spiritual, and financial burden [5,6]. As a result of prolonged survival, breast cancer survivors are at a higher risk for cardiovascular disease-related mortality than women without breast cancer [7]. These complications can limit functioning in work and life roles, as well as reduce quality of life. Survivors of breast cancer may face high unmet health care needs that also lead to low quality of life [8]. The process of coping with these treatment-related challenges is arduous for both survivors and their family members, who often lack the knowledge and experience to manage these complications and provide effective care at home [9]. Moreover, due to the shortage of health care resources, care providers do not provide adequate support during follow-ups after treatment, thereby further limiting their ability to effectively address these challenges [10]. Thus, they require professional assistance and qualified counseling to develop self-management strategies for treatment-related symptoms. The limited availability of institutional care beds, in combination with the growing demand for long-term care by survivors, might shift care from hospitals to communities and homes to reduce costs and improve well-being [11,12]. Therefore, a model that prioritizes health care services for community-dwelling survivors is essential to meet their health needs, improve lives, and extend life expectancy, while relieving the burden on health and social care services [13].

Health care encompasses a wide range of services. At present, there is no universally accepted definition of health care services for community-dwelling cancer survivors. In this study, health care services for community-dwelling cancer survivors are widely defined as "a way of providing health care services to survivors at home, with the community as the support, and specialized service organizations as the carrier, through the integration of formal and informal service resources in the community, which includes rehabilitative, health education, supportive and technical nursing

care, domestic aid and personal care for persons with complex needs to care" [14,15]. The aim of these services is to enable survivors to continue living in the community for as long as possible, improve their quality of life and optimal level of function, and ease their burden. In China, such services can be provided by licensed health care professionals, social workers, and other care workers from various institutions, such as home health care organizations, social care organizations, community clinics, private agencies, and general hospitals [15].

Breast cancer survivors undergoing rehabilitation at home have diverse physical and psychological demands [16]. However, the currently available literature on health care services for community-dwelling breast cancer patients is limited. Moreover, the precise definition and scope of health care services for community-dwelling breast cancer survivors, as well as the structure of their specific needs, remain unclear [17]. Consequently, the services that most effectively improve the health outcomes of survivors are currently unknown. Many studies failed to comprehensively analyze the actual needs of survivors or to provide robust design strategies for the development of health care services. The lack of empirical evidence also complicates the formulation of effective social care policies with limited resources. From the perspective of resource providers, prioritizing the specific health needs of survivors and providing convenient and efficient shared community care services is of paramount importance [18]. Accurate identification of the demand for health care services is essential to effectively adapt care services to evolving patient needs and provide individualized medical care [19]. Therefore, a comprehensive understanding of this demand is urgently needed to improve the quality of health care services provided to breast cancer survivors.

The Kano model, developed by Professor Noriaki Kano of the Tokyo Institute of Technology (Tokyo, Japan), is a two-dimensional modeling tool used to classify and prioritize customers' demands [20]. The model is commonly used to accurately deliver services based on customer needs and can help organizations identify the key factors that impact customer satisfaction [21]. The Kano model categorizes services into five types of quality: must-be attributes (M); one-dimensional attributes (O); attractive attributes (A); indifferent attributes (I); and reverse attributes (R) [22]. Researchers have applied the Kano model to assess patient demand for medical services [23]. The Kano model has also been used to improve the quality of tele-nursing for example empty-nest older adults [24].

The aim of this study was to investigate the demand for health care services among community-dwelling breast cancer survivors based on the Kano model to accurately identify survivors' demands, determine the prioritization of various health care services, and improve the quality of life for breast cancer survivors.

2. Methods

2.1. Study design and participants

This cross-sectional study was conducted from January to March 2023 in a tertiary cancer hospital in Nanjing, Jiangsu Province, China. Convenience sampling was used to select the patients. The inclusion criteria for participants were: 1) diagnosis of breast cancer based on pathological confirmation; 2) age ≥ 18 years; 3) expected survival time > 12 months; 4) provision of written informed consent; and 5) voluntary participation in the study. The exclusion criteria were: 1) patients in the acute stage of the disease, with severe cardiopulmonary or renal insufficiency, or at the end stage of the disease; and 2) the presence of communication, cognitive, or mental disorders.

2.2. Questionnaires

2.2.1. Demographic characteristics questionnaire

The demographic characteristics of participants were collected using a questionnaire, including age, education level, marital status, residence, insurance, disease stage, expense payment form, treatment stage, and others.

2.2.2. Demand for health care services questionnaire

A self-designed questionnaire of health care services for community-dwelling breast cancer survivors was developed via a systematic literature review, interview, and expert consultation. Firstly, a literature review was conducted on PubMed, Elsevier, Web of Science, China National Knowledge Infrastructure (CNKI), Wanfang Data, and China Science and Technology Journal Database (VIP) using the following keywords: “breast cancer”, “survivors”, “health care”, “health service”, “community”, “home”, “need”, and “demand”. Of note, the self-designed questionnaire was based on the following references: 1) Information Needs Questionnaire-Breast Cancer (INQ-BC) [25]; 2) Community care services questionnaire, aggregated into four community care services categories (i.e., daily care, medical care, social and recreational, and spiritual comfort services) [26]; and 3) Home health care services questionnaire, divided into “home nursing services” and “health guidance services” [27]. Following further summary and refinement, the initial questionnaire themes and items were formed. Subsequently, to modify the questionnaire, 20 eligible survivors and their family members were interviewed to identify the services they needed in the community. Next, the expert group, consisting of 15 relevant clinical nursing experts with >10 years of work experience, a bachelor’s degree or above, and intermediate and above professional titles, were invited to review and revise the questionnaire. The final version of the questionnaire consisted of 30 items and 7

dimensions (Table 1). The reliability of the questionnaire was assessed using Cronbach’s α coefficient, which was 0.961, indicating good internal consistency. The content validity of the questionnaire was 0.93, demonstrating its validity in assessing the health care service needs of breast cancer survivors.

2.3. The Kano model

2.3.1. Demand attributes

Demand attributes can be classified based on the Kano estimation questionnaire. Two opposing questions were asked for each demand, such as, “If follow-up management services are provided (including clinical symptoms, indicators and examination, etc.), how would you feel?” (Functional question), followed by “If follow-up management services are not provided, how would you feel?” (Dysfunctional question). For each question, the respondent chose the most suitable answer from the following options: “I like it that way”; “It must-be that way”; “I am neutral”; “I can live with it that way”; and “I dislike it that way” [20]. Conflicting responses (e.g., “Like” and “Like” to a pair of opposing questions) denoted a Questionable answer. Pouliot [22,28] suggested that cells (2,2) and (4,4) from the standard Kano evaluation table should also be deemed Questionable. There were 25 possible results (Table 2), each of which corresponded to the slightly revised table. The five categories of demand attribute definitions are shown in Table 3.

2.3.2. The better-worse coefficient

Kano introduced the concept of satisfaction index (SI) and dissatisfaction index (DSI) to compare the importance of different demands classified in the same attribute [29]. Absolute values of the SI and DSI approaching 1 indicate a greater impact of the realization of a design attribute on user satisfaction. A better coefficient is linked to a higher satisfaction, $SI = (A + O)/$

Table 1
Health care services demand questionnaire.

Dimension	Description of health care services demand
Health management services	D1. Provide health file management, including general information, diagnosis and treatment information, medication records, referral records, etc.
	D2. Provide follow-up management services, including examination revisit, symptom guidance, health indicators, follow-up, etc.
	D3. Provide home visit services, including family assessment, family health management, etc.
	D4. Provide health risk factors assessment, including recurrent, lymphedema, obesity, etc.
Health guidance services	D5. Provide health consultation services, including diet, sexual health, drug consultation, etc.
	D6. Provide symptom guidance, including chemotherapy side effects, radiotherapy side effects, endocrine side effects, etc.
	D7. Provide body image management services, including lymphedema prevention, weight management, hair loss care, skin care, etc.
	D8. Provide exercise guidance, including upper limb functional exercise, aerobic exercise, etc.
	D9. Provide pain relief guidance, including pain assessment, pain medication, pain relief, etc.
	D10. Provide medication guidance, including medication methods, drug storage and handling, etc.
	D11. Provide examination guidance, including blood, physical, imaging, etc.
Mental health services	D12. Provide emotional management guidance, including negative release, stress relief, etc.
	D13. Provide emotional disclosure guidance, such as conversing to relieve boredom, etc.
	D14. Provide psychological distress assessment and guidance
	D15. Provide communication guidance, including communication with patients, family, etc.
	D16. Provide stress response methods
	D17. Provide psychological support for caregiver/family
	D18. Provide guidance for returning to work
Social support services	D19. Provide social assistance services, including minimum living allowance, assistance for impoverished households, urban and rural medicaid, etc.
	D20. Provide medical security services, including medicare reimbursement, commercial insurance, serious illness relief service, etc.
	D21. Provide social interaction activities, including community activities, rehabilitation activities, etc.
Special medical services	D22. Provide door-to-door service
	D23. Provide emergency services, including cardiopulmonary resuscitation, emergency transportation, emergency consultation, etc.
	D24. Provide palliative care services
Auxiliary medical services	D25. Accompany the patient during medical visits
	D26. Provide internet-based telehealth services
	D27. Provide medication delivery services
Nursing operations services	D28. Provide basic nursing service, including skin care, oral care, cleaning care, etc.
	D29. Provide specialized nursing service, including PICC/PORT care/skin care/wound care, etc.
	D30. Provide daily life care services (e.g., food, clothing, washing, shopping)

Table 2
The Kano model attribute classification criteria.

Functional (how do you feel if the service provided ?)	Dysfunctional (how do you feel if the service is absent?)				
	I like it	I expect it	I am neutral	I can live with it	I dislike it
I like it	Q	A	A	A	O
I expect it	R	Q	I	I	M
I am neutral	R	I	I	I	M
I can live with it	R	I	I	Q	M
I dislike it	R	R	R	R	Q

Note: A = attractive attributes. I = indifferent attributes. M = must-be attributes. O = one-dimensional attributes. R = reverse attributes. Q = questionable results, which means this questionnaire is invalid. The table is adopted based on resources [22,28].

Table 3
Definitions of demand attributes for health care services.

Demand attributes	Definitions
Must-be attributes (M)	Providing a service can not increase satisfaction, but the absence of this service significantly decreases satisfaction.
One-dimensional attributes (O)	Providing a service can increase satisfaction, while its absence leads to decreased satisfaction.
Attractive attributes (A)	Providing a service can increase satisfaction, while its absence does not affect satisfaction.
Indifferent attributes (I)	Providing the service or not will not change satisfaction.
Reverse attributes (R)	The particular service is likely to decrease the level of satisfaction.

(A + O + M + I), whereas a worse coefficient is associated with a lower satisfaction, $DSI = (-1) \times (O + M) / (A + O + M + I)$. Notably, A, O, M, and I indicate the number of the attribute categories, respectively [22].

2.4. Sample size calculation

Based on Kendall’s approximate sample size estimation method, the sample size for a cross-sectional study should be 5–10 times the number of independent variables [30]. In this study, there were 30 independent variables. Assuming a maximum loss to follow-up rate of 20%, the required sample size was in the range of $(30 \times 5) / 0.8$ to $(30 \times 10) / 0.8$ or 188 to 375 cases.

2.5. Data collection and analysis

Nurses informed eligible breast cancer survivors regarding the study. Following the agreement to participate in the study and provision of written and verbal consent by all participants, the researcher explained the aims and methods of the study and provided instructions on completing the questionnaire. All data were automatically collected by Questionnaire Star (<https://www.wjx.cn>). Participants were required to respond to all questions before submitting the survey; they were informed they had the option to discontinue the survey at any time. To avoid duplicate entries, this survey only allowed one response per phone or computer. Two researchers exported and organized the data to guarantee accuracy. Data were analyzed using IBM SPSS Statistics version 26.0 software (IBM Corp., Armonk, NY, USA). Descriptive statistics, such as frequencies and percentages, were used to describe the demographic characteristics of the participants. The characteristics of the participants’ demand for health care services were categorized and described according to the Kano model.

2.6. Ethical considerations

This study strictly adhered to the principle of voluntary participation and was approved by the Ethics Committee of Nanjing Medical University (2020.No. 166). The study was conducted in accordance with the tenets of the Declaration of Helsinki.

3. Results

3.1. Demographic characteristics of the participants

A total of 336 questionnaires were distributed in this study. However, 20 participants returned incomplete questionnaires, and 20 participants provided questionable answers. As a result, 296 valid questionnaires were included in the analysis, resulting in an effective response rate of 88.1%. The average age of the participants was 50.9 ± 9.74 years. Of the participants, 270 (91.2%) underwent surgical treatment, 188 (63.5%) received more than four rounds of chemotherapy, 159 (53.7%) received radiotherapy, and 8 (2.7%) received psychological treatment. The demographic characteristics of the participants are shown in Table 4.

3.2. Demands analysis

3.2.1. Demand attributes

As shown in Table 5, the demand categories for health care services were classified based on the Kano model. The results indicated that 16 (53.3%) and 14 (46.7%) demands belonged to one-dimensional and attractive attributes, respectively. The importance of health care services was ranked based on the SI and DSI values.

3.2.2. Attributes based on the better-worse coefficient

The results of the analysis showed that the SI values ranged from 0.735 to 0.867, and the absolute values of DSI ranged from 0.309 to 0.660 for each demand. The demand quadrant of the Kano model could be divided by establishing a demand matrix and using the mean values of SI and DSI as the critical line. Thereafter, this information was substituted into the satisfaction coordinates of each facility to create a scatter diagram (Fig. 1). It was possible to discern the final Kano attributes and the importance of all demands from the diagram. For must-be attributes, only body image management belonged to this quadrant, indicating that the maximized satisfaction would be realized by owning a good body image. For one-dimensional attributes, 13 (43.3%) belonged to this quadrant. Among these services, D20 had the highest better value and worse value, suggesting that the provision of medical security service is necessary to increase satisfaction. For attractive attributes, 5 (16.7%) services belonged to this quadrant. Among these services, the satisfaction value of D22 was highest, suggesting that door-to-door

Table 4
The demographic characteristics of the participants (n = 296).

Variables	n (%)	Variables	n (%)
Sex		Metastasis	
Male	7 (2.4)	No	190 (64.2)
Female	289 (97.6)	Yes	106 (35.8)
Education level		Surgical therapy	
Junior school and below	114 (38.5)	No	26 (8.8)
Senior high school	81 (27.4)	Yes	270 (91.2)
Junior college or higher	101 (34.1)	Time since diagnosis	
Residence		<1 year	152 (51.4)
Rural	78 (26.4)	>1 year	144 (48.6)
Town	80 (27.0)	Number of chemotherapy cycles	
City	138 (46.6)	≤4	108 (36.5)
Marital		>4	188 (63.5)
Married	271 (91.6)	Number of radiotherapy cycles	
Others	25 (8.4)	0	137 (46.3)
Insurance		1–20	34 (11.5)
Urban employee medical insurance	224 (75.7)	>20	125 (42.2)
Others	72 (24.3)	Duration of endocrine therapy	
Commercial insurance		0	147 (49.7)
No	249 (84.1)	<1 year	52 (17.6)
Yes	47 (15.9)	1–3 years	56 (18.9)
Cancer stage		4–5 years	29 (9.8)
I	62 (20.9)	>5 years	12 (4.1)
II	159 (53.7)	Receive psychological therapy	
III	66 (22.3)	No	288 (97.3)
IV	9 (3.0)	Yes	8 (2.7)

service will result in greater satisfaction for community-dwelling survivors. For indifferent attributes, 11 (36.7%) services belonged to this quadrant, and did not have significant impact on satisfaction.

3.2.3. Differences in the category results of health care services

Table 5 summarizes the classification results of breast cancer home care service demands based on the Kano model and the demand quadrant according to the better-worse coefficient. Differences in the results may be attributed to two main reasons. Firstly, there was a difference between the calculation methods. The Kano model and the better-worse coefficient analysis use different calculation methods or approaches to evaluate and classify demands. These variations in calculation methods can lead to differences in the classification results. Secondly, the Kano model focuses on the classification of demand attributes without considering the relationship between the data points. In contrast, the better-worse coefficient analysis comprehensively compares all service functions from both horizontal and vertical dimensions, and takes into account the interplay between different attributes.

4. Discussion

The results of this investigation indicate that breast cancer survivors had a higher concentration in the areas of one-dimensional, attractive, or indifferent attributes, while must-be attributes received less attention. There are two possible reasons for these findings. Firstly, breast cancer survivors generally have better physical functioning and self-care ability than others, resulting in reduced reliance on health care services. Previous research has highlighted the importance of self-care ability in determining the care needs of patients [31]. Moreover, the limited supply of health care services specifically tailored to cancer survivors could contribute to their limited understanding and awareness of these services. Previous research on health care services focused on specific populations such as older individuals, disabilities, and chronic diseases [32–34]. Health care services for community-dwelling survivors are relatively underdeveloped and fragmented, with a lack of standardized caregiver skills and standardized

community care models [35]. Thus, there is an urgent need for more targeted research and development of health care services specifically tailored to the needs of cancer patients. Such an approach would ensure that this population receives appropriate care and support.

4.1. Must-be attributes

Must-be attributes address the fundamental rehabilitation needs of survivors [20]. Women may experience complete disruption of their physiological integrity and sexual characteristics following mastectomy [36]. Research studies showed that physical changes (e.g., breast loss, hair loss, skin scarring, pigmentation, and limb dysfunction) can negatively impact the perception of survivors regarding their female identity and attractiveness. These changes can lead to decreased sexual interest, feelings of stigma, and negative emotions, such as anxiety, depression, inferiority complex, and fear [37–39]. Therefore, it is vital to prioritize body image management services for breast cancer survivors. These services may include hair loss management, surgical scar management, and skin pigmentation management, which can help survivors re-establish their role identity, rebuild their sense of self, and accept their new lives.

4.2. One-dimensional attributes

Providing one-dimensional attribute services increases satisfaction, while the absence of such services leads to reduced satisfaction [20]. The study identified 13 (43.3%) one-dimensional services, which are significant for breast cancer survivors. These services mainly focus on medical security support, health management, and health counseling, suggesting that community-dwelling survivors strongly desire economic support and ongoing health services. The long duration of treatment and extensive use of medication often prevent patients from returning to work, resulting in a significant financial burden [40]. Notably, the medical security service was identified as having the highest better and worse values, indicating its paramount importance to survivors. It is

Table 5
Demand attributes based on the Kano model.

Demand	Kano model attribute						Category		Better-worse coefficient		Rank	
	A	O	I	M	R	Q	C1	C2	SI	DSI	SI	DSI
D1	81	156	25	30	1	3	O	O	0.812	-0.637	18	3
D2	108	134	20	27	0	7	O	O	0.837	-0.557	7	11
D3	111	108	52	18	2	5	A	I	0.758	-0.436	27	24
D4	94	149	20	30	1	2	O	O	0.829	-0.611	10	6
D5	98	148	21	24	1	4	O	O	0.845	-0.591	3	9
D6	96	151	16	31	1	1	O	O	0.840	-0.619	4	4
D7	112	124	33	26	0	1	O	M	0.800	-0.508	21	14
D8	113	128	31	23	0	1	O	O	0.817	-0.512	17	13
D9	93	150	24	28	0	1	O	O	0.824	-0.603	13	7
D10	90	153	25	28	0	0	O	O	0.821	-0.611	16	5
D11	87	158	19	30	0	2	O	O	0.833	-0.639	8	2
D12	131	112	33	19	0	1	A	A	0.824	-0.444	14	22
D13	127	110	42	14	1	2	A	I	0.809	-0.423	20	25
D14	124	106	46	15	0	5	A	I	0.790	-0.416	24	26
D15	125	119	32	17	0	3	A	A	0.833	-0.464	9	17
D16	135	97	41	20	1	2	A	I	0.792	-0.399	23	29
D17	126	103	49	18	0	0	A	I	0.774	-0.409	26	28
D18	106	110	57	21	0	2	O	I	0.735	-0.446	30	21
D19	119	111	38	27	0	1	A	I	0.780	-0.468	25	16
D20	87	168	13	26	0	2	O	O	0.867	-0.660	1	1
D21	117	100	53	20	0	6	A	I	0.748	-0.414	28	27
D22	136	117	27	13	0	1	A	A	0.863	-0.444	2	23
D23	100	147	20	27	0	2	O	O	0.840	-0.592	5	8
D24	116	114	43	16	1	6	A	I	0.796	-0.450	22	19
D25	127	115	35	17	0	2	A	A	0.823	-0.449	15	20
D26	120	123	28	22	1	2	O	A	0.829	-0.495	11	15
D27	117	130	26	21	0	2	O	O	0.840	-0.514	6	12
D28	122	116	39	17	0	2	A	I	0.810	-0.452	19	18
D29	98	145	26	25	0	2	O	O	0.827	-0.578	12	10
D30	143	73	58	17	1	4	A	I	0.742	-0.309	29	30

Note: C1, category based on the Kano model. C2, category based on better-worse coefficient. SI = satisfaction index. DSI = dissatisfaction index. A = attractive attributes. I = indifferent attributes. M = must-be attributes. O = one-dimensional attributes. R = reverse attributes. Q = questionable results, which means this questionnaire is invalid.

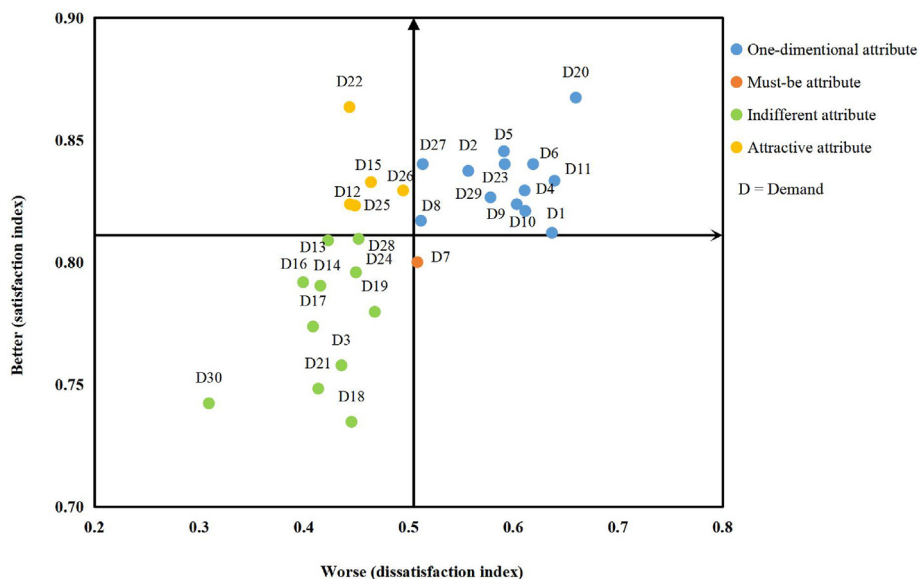


Fig. 1. Demand quadrant scatter diagram based on better-worse.

crucial to provide survivors with information on major disease reimbursement coverage, the reimbursement process in different regions, and related insurance schemes. In addition, enhancing the accessibility of internet-based telehealth services is a strategic approach to reducing transportation expenses and lessening the

economic burden on breast cancer survivors. Moreover, research studies have shown that breast cancer survivors often have multiple comorbidities (e.g., cardiovascular disease, abnormal bone metabolism, osteoporosis) and medication related side effects, which have a significant impact on their survival [41]. Health

management and counseling services are essential to address these challenges. Establishing comprehensive health records for survivors and implementing regular follow-up can help monitor patient health and identify potential problems. Health management addresses immediate physical symptoms, promotes overall well-being, and supports survivors in managing the complexities of their recovery journey.

4.3. Attractive attributes

Attractive attributes are those that survivors may not have expected to receive, but can significantly improve their satisfaction when provided [20]. Neglecting these services may not reduce satisfaction; nevertheless, offering these services may have a significant positive impact. In the present study, breast cancer survivors identified 5 (16.7%) attractive services. These services are mainly centered on social communication and telemedicine. Breast cancer survivors in China often face social communication challenges and tend to avoid interactions with others [42]. They may have difficulty expressing their feelings to family members and experience emotional distress [43]. Therefore, providing social communication platforms, such as organizing doctor-patient meetings or encouraging interactions with families, may help survivors express their feelings and create a supportive atmosphere. Furthermore, door-to-door, telemedicine, and medical accompanying services can provide convenience for remote or elderly patients [44]. By providing these services, survivors can more easily access health care resources and receive the support they need without the burden of travel or additional challenges.

4.4. Indifferent attributes

The term indifferent attributes denotes services that do not affect patient satisfaction [20]. In this study, 11 (36.7%) indifferent services were identified. These services focus primarily on psychosocial services, with the lowest better coefficient associated with the need to return to work. This result may be attributed to the treatment time of the survivors. The study sample consisted mainly of survivors who received radiotherapy and chemotherapy within 3 years from the time of diagnosis, with only 15.8% receiving treatment for >3 years. In the meantime, survivors often experience significant physical symptoms that can affect their ability to return to work, resulting in a lower need for psycho-social support and palliative care. Maslow's hierarchy of needs theory emphasizes that once physiological and safety needs are met, individuals can progress to more advanced and socialized needs such as love/belonging, self-esteem, and self-actualization [45]. However, it is important to recognize that the demand categories in the Kano model change over time, and indifferent attributes may shift to attractive, must-be, or one-dimensional attributes [46]. Therefore, it is crucial to pay attention to the stage of treatment of breast cancer survivors and dynamically monitor changes in their demands for health care services.

4.5. Limitations

There are some limitations to this study. The sample distribution was relatively concentrated, which limits the generalizability of the findings. The demands for health care services and demand attributes can vary greatly among breast cancer survivors from different locations and cultural backgrounds. Additionally, their demands and attributes may change over time. Nevertheless, the study provides a valuable method for assessing their needs.

5. Conclusion

The study assessed community-dwelling breast cancer survivors' demands for health care services based on the Kano model. The results showed different levels of demands for different categories of service, highlighting the importance of addressing must-be services, improving one-dimensional services, and striving to provide attractive services. The study provides valuable insights into health care services for this population. This evidence may assist medical decision-makers in formulating relevant policies and care managers in improving health care services to meet the specific needs of breast cancer survivors. It is recommended that the needs of cancer survivors be evaluated regularly and healthcare services be improved accordingly to meet their changing demands effectively.

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Data availability statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

CRediT authorship contribution statement

Maomao Zhang: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Data curation, Writing – original draft, Writing – review & editing, Project administration. **Liulu Zhang:** Conceptualization, Methodology, Validation, Formal analysis, Funding acquisition, Writing – review & editing, Supervision, Project administration. **Xiaoxu Zhi:** Conceptualization, Methodology, Validation, Formal analysis, Funding acquisition, Investigation, Resources, Data curation, Writing – review & editing. **Fang Cheng:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Writing – review & editing. **Yufeng Yao:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Writing – review & editing. **Rong Deng:** Conceptualization, Methodology, Validation, Formal analysis, Writing – review & editing. **Chunli Liu:** Conceptualization, Methodology, Validation, Formal analysis, Writing – review & editing. **Yan Wang:** Conceptualization, Methodology, Validation, Formal analysis, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijnss.2024.03.015>.

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