

Influences Of Heider Balance On Knowledge, Attitude, Practice And Life Quality In Permanent Urostomy Patients

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Abstract

Objective: To explore the influences of out-hospital intervention based on Heider balance on knowledge, attitude, practice (KAP) and life quality in permanent urostomy patients.

Methods: Totally 124 patients underwent permanent urostomy in our hospital from January 2016 to December 2019 were included into this study. These patients were divided into the observation group (62 cases) and the control group (62 cases) according to the method of out-hospital intervention. The control group received routine out-hospital intervention, meanwhile the observation group received out-hospital intervention based on Heider balance. The standard-reaching rate of KAP, the score of WHO quality of life-100 (WHOQOL-100) and the complications of urostomy before discharge and at 6 months after discharge were compared in the two groups.

Results: Before discharge, there were no significant differences of standard-reaching rate of KAP and WHOQOL-100 score between the two groups ($P>0.05$). At 6 months after discharge, the standard-reaching rates of the 16 items of KAP (including procedure of pouch replacement, methods of connecting and shutting of pouch, dealing with pouch leakage, skin care of stoma, purchase and storage of pouch, etc.) in the observation group were significantly higher than those in the control group; The scores of more than 10 items of WHOQOL-100 (including energy and fatigue, sleep and rest, positive feelings, thinking, learning, memory and concentration, self-esteem, etc.) in the observation group were significantly higher than those in the control group. The rate of complications in the observation group was significantly lower than that in the control group, all these above differences were statistically significant ($P<0.05$).

Conclusion: The out-hospital intervention based on Heider balance can reduce the rate of ostomy complications, improve KAP of urostomy and life quality. These merits make the Heider balance to be an attractive approach in guidance of out-hospital intervention for urostomy patients.

Introduction

Bladder cancer is one of the most common types of urinary cancer, the urinary diversion is routinely performed after radical cystectomy for the muscle-invasive or high risk metastatic bladder cancer^[1]. After urinary diversion, a urostomy is a stoma created to divert urine in the abdominal wall after the bladder has been resected. Thus, functional and physical changes from cancer patients will result in psychological anxiety and sense of inferiority, which may threaten their mental and physical health^[2,3]. There is an agreement that the knowledge, attitude and practice (KAP) of patients play a vital role in the management of chronic diseases after discharge, some studies concluded that the self-care ability and life quality will be improved by means of the strengthening of patients' KAP^[4-6]. However, the age of bladder cancer patients was relatively older, with problems such as poor acceptance, rigid thinking and inflexible behavior styles^[7], which makes it was difficulty for them to achieve satisfying adaptation in psychology and behavior.

The Heider balance was also well known as "P-O-X" model, which was originally proposed by F. Heider in 1946^[8]. The concept of Heider balance mainly involved an equilibrium analysis in terms of positive (friendly or agreement) and negative (hostile or disagreement) relations in triads, and is correlated each other by the connection of the three-body of "P-O-X"^[9]. The Heider balance constructed a new perspective on the epistemological relation among subject, object, and media, and created a new conceptual foundation for psychological and behavioral intervention^[10]. Because conventional out-hospital intervention usually focused on the patients, less attention on the caregiver's influences, it may lead to some negative impacts on out-hospital intervention. In this study, the patients, caregivers, urostomy care were regarded as subject (P), object (O), media (X), respectively. Then, a case-control study was performed to preliminarily investigate the influences of the Heider balance on KAP and life quality in permanent urostomy patients.

Participants And Methods

1.1 Participants

A total of 124 patients who received urostomy in Hunan Provincial People's Hospital from January 2016 to December 2019 were included into this study. According to the method of out-hospital intervention, these patients were divided into the control group and the observation group, and each patient was matched by the observation group by age (± 5 years), gender, education level, the ratio of cases to control of 1:1. Inclusion criteria were set as below: (1) Patients with bladder cancer undergoing radical resection and urinary diversion; (2) Patients without communication disorders and cognitive impairments; (3) Patients who volunteered to participate in this study. Exclusion criteria listed below: (1) Patients with psychiatric disorders or cognitive impairments; (2) Patients with other severe comorbidities; (3) Patients with a life expectancy more than 12 months.

1.2 Intervention procedure

Patients in both groups received radical cystectomy and urinary diversion. After admission, all patients were given with routine treatment and nursing, and health education was carried out to introduce the basic knowledge of disease, perioperative preparation, stoma complications and postoperative rehabilitation methods. Before discharge, all patients were asked to learn the pouch replacement, stoma nursing, precautions in dietaries and bathing, daily activities and other related knowledge and skills through demonstration explanation or session. After discharge, a chat tools named WeChat was set up to reply patients' consultations, the telephone follow-up or return visit was carried out once a week in the first month, and once a month in subsequent months. All patients were followed-up for six months at least. Within six months, the control group received routine out-hospital intervention, while the observation group received out-hospital intervention under the guidance of Heider balance.

1.2.1 Application of Heider balance

According to framework of Heider balance (P-O-X model) ^[11], "the patients, caregivers, urostomy care" was set as "P, O, X", then a triangular unit of Heider balance with "patient (P), caregiver (O) and urostomy care (X)" was established. There was a correlation among "P, O, X" like as: a friend of my friend is my friend, an enemy of my friend is my enemy. Thus, mutual influences were produced in "P-O, O-X, P-X". The cognition and behavior of patients (P) can be adapted by regulating the relationship between caregivers (O) and urostomy care (X). Assigning a positive (friendly or like) or negative (hostile or dislike) sign to a reciprocated relation between each two sides of the triad unit, positive signed with "+", negative signed with "-". If the product of the three edges is "+1", triad unit is balanced. Otherwise, the product is "-1", the triad unit is unbalanced. The "+, +, +" of the three edges denoted everybody has a positive affect with each other, which was considered as the best status of P-O-X ^[12]. As showed in Fig. 1.

After the establishment of P-O-X triad unit, the status of P-O-X was assessed by means of the relationships among patients, caregivers, urostomy care. If the relationships is not in a balanced status of P-O-X, the reasons of unbalanced status should be detected, further improving measures should be adopted subsequently. For example, a caregiver lacks of nutrition knowledge and cooking skills, he/she is tired of preparing proper dietaries for his/her patient, the relationship of P-O was assigned as "-". Then, a healthy education program focused on the nutrition knowledge and cooking skills should be performed. During the out-hospital intervention, the status of patients, caregivers, urostomy care were evaluated per month at least, the unbalanced status is adapted under the supervision of responsible staff. The caregiver was allowed to replace in case of someone who is failed to coordinate.

1.3 Study parameters

Baseline data (age, gender, education status, family income, stage of tumor and urostomy type) were collected at the time of entry into the study. A 30-item questionnaire was used to evaluate the standard-reaching rate of KAP for urostomy patients. This questionnaire includes 12 items of stoma knowledge, 9 items of healthy belief, 9 items of healthy behavioral ^[13]. The life quality of the patients was evaluated by WHO Quality of Life-100 (WHOQOL-100) ^[14]. The WHOQOL-100 includes six domains of quality of life: physical, psychological, level of independence, social relation, environment and spirituality. These six domains contain 24 facets, each facet includes 4 items. The each item scored on a Likert scale ranging from 1 to 5, a higher scores indicating better quality of life.

1.4 Statistical analysis

The data were processed by SPSS25.0 software. The measurement data were presented as mean \pm standard deviation ($\bar{x} \pm s$), using by the *t* test. The counting data were expressed as frequency and percentages (%), using by χ^2 test. The ranked data were tested using by the rank sum test. $P < 0.05$ indicated the difference was significant.

Results

2.1 Baseline data of patients

There were no significant differences in gender, age, education status, Marital status and urostomy type between the two groups ($P > 0.05$). As shown in Table 1.

Table 1 Comparisons of baseline data of patients between two groups [n(%)]

Items	Observation group(n=62)	Control group(n=62)	χ^2/Z	<i>P</i>
Gender				
Male	45(72.58)	45(72.58)	0.000	1.000
Female	17(27.42)	17((27.42)		
Age (years)				
< 44	10(16.13)	9(14.52)	0.154	0.926
44-59	23(37.10)	25(40.32)		
≥ 60	29(46.77)	28(45.16)		
Education level				
Elementary	12(19.35)	12(19.35)	0.000	1.000
Junior/Senior high	32(51.62)	32(51.62)		
College/University	18(29.03)	18(29.03)		
Marital status				
Married	40(64.52)	34(54.84)	1.211	0.546
Divorced	12 (19.35)	15(24.19)		
Widowed	10(16.13)	13(20.97)		
Family income (CNY/month)				
< 10000	12(19.35)	10(16.13)	0.609	0.894
10000-20000	33(53.23)	36(58.06)		
> 20000	14(22.58)	12(19.35)		
Not informed	3(4.84)	4(6.45)		
Caregivers				
Family members	45(72.58)	39(62.90)	1.329	0.249
Employed caregivers	17(25.81)	23(37.10)		
Comorbidities				
Hypertension	22(35.48)	19(30.65)	0.328	0.567
Diabetes	14(22.58)	16(25.81)	0.176	0.675
Others*	11(17.74)	15(24.19)	0.779	0.378
Urostomy type				
Ileal conduit	55(88.71)	54(87.10)	0.652	0.722
Bilateral ureterostomy	3(4.84)	5(8.06)		
Unilateral ureterostomy	4(6.45)	3(4.84)		

Note: *Including common gout, gastrointestinal diseases and pulmonary diseases, etc.

2.2 The standard-reaching rate of KAP

Before discharge, there were no statistically significant differences between the two groups in standard-reaching rate of each item of KAP ($P > 0.05$). At 6 months after discharge, the standard-reaching rate of the 6 items (basic knowledge of disease, procedure of pouch replacement, dealing with pouch leakage, skin care of stoma, purchase and storage of pouch, dealing with stoma complications) in knowledge, 5 items (optimistic mentality for disease, optimistic mentality for stoma, high trust in medical staff, willingness to correct bad habits, confidence in maintaining healthy behavior) in attitude, and 5 items (maintaining in healthy dietary habit, maintaining in healthy behavior, regular learning from relevant books, experienced in pouch replacement, experienced in care of stoma) in behavior of the observation group were significantly higher than those of the control group, the difference was statistically significant ($P < 0.05$). As shown in Table 2.

Table 2 Comparisons of standard-reaching rate of KAP between two groups [n(%)]

2.3 Comparisons of life quality

Before discharge, no significant differences were observed in WHOQOL-100 score between the two groups ($P > 0.05$). At 6 months after discharge, there were significant differences in the scores of 14 items of WHOQOL-100 between the two groups, including energy and fatigue, sleep and rest, positive feelings, thinking, learning, memory and concentration, self-esteem, body image and appearance, negative feelings, mobility, activities of daily living, dependence on medical support, personal relationships, social support, health and social care: availability and quality, quality of life from the view point, and the scores of most items mentioned above in the observation group were higher than those of the control group, the differences were statistically significant ($P < 0.05$). As shown in Table 3.

Table 3 Comparisons of quality of life between two groups ($\bar{x} \pm s$)

2.4 Comparisons of complications

During the out-hospital intervention, 11 cases of stoma complications occurred in the observation group, including 4 cases of dermatitis, 2 cases of stoma infection, 2 cases of skin stripping, 2 cases of stoma retraction and 1 case of fistula. Among them, 2 complications existed in 4 patients, involving 7 patients, accounting for 11.29% (7/62). In the control group, a total of 22 cases of stoma complications occurred, including 7 cases of dermatitis, 4 cases of stoma infection, 3 cases of skin stripping, 3 cases of stoma stenosis, 2 cases of stoma retraction, 2 cases of granulomatosis and 1 cases of fistula. Among them, 5 complications existed in 1 patients, involving 17 patients, accounting for 27.42% (17/62). The complication rate in the observation group was lower than that in the control group, and the difference was statistically significant ($\chi^2 = 5.167$, $P = 0.023$).

Discussion

Radical cystectomy and urinary diversion remain the main treatment procedures for muscle-invasive or high-risk non-muscle invasive bladder cancer [15]. Postoperative urostomy education program is common and necessary, but most of patients were in a struggle to maintain well self-management in practice. The application of KAP is a way to inspect the changes in people's thinking and behavior. Evidence showed that knowledge is the foundation of attitude and behavior changes, while positive attitude may further encourage positive changes in behavior [16, 17]. So, patients' knowledge of disease may influence their attitudes and practices towards the disease. Because urostomy care has a long-lasting burden for patients and their caregivers, patients always lack of professional care support from medical institutions after discharge. Therefore, a urostomy education program for patients and their caregivers should be developed to meet this demand.

Relationships among a focal person (patients, P), another person (caregivers, O), and a media (urostomy care, X) were the main focus of the Heider balance (P-O-X model). There were eight possible component status, including four balanced and four unbalanced [18]: If all three reciprocated relations were positive or two of them were negative, the triad unit were balanced, including "P + O, P + X, O + X", "P + O, P - X, O - X", "P - O, P + X, O - X", "P - O, P - X, O + X"; If two of the three reciprocated relations were positive or all of them were negative, the triad unit were unbalanced, including "P + O, P + X, O - X", "P + O, P - X, O + X", "P - O, P + X,

Items	Before discharge				At 6 months after discharge			
	Observation group(n=62)	Control group(n=62)	χ^2	<i>P</i>	Observation group(n=62)	Control group(n=62)	χ^2	<i>P</i>
Knowledge								
Basic knowledge of disease	27(43.55)	30(48.39)	0.292	0.589	55(88.71)	42(67.74)	8.002	0.005
Importance of stoma operation	48(77.42)	53(85.48)	1.334	0.248	54(87.10)	57(91.94)	0.773	0.379
Observation of stoma	37(59.68)	35(56.45)	0.132	0.716	49(79.03)	47(75.81)	0.185	0.668
Procedure of pouch replacement	41(66.13)	44(70.97)	0.337	0.562	56(90.32)	45(72.583)	6.459	0.011
Emptying of pouch drainage	38(61.29)	32(51.61)	1.181	0.277	59(95.16)	54(87.10)	2.494	0.114
Measuring of stoma size	40(64.52)	40(64.52)	0.000	1.000	54(87.10)	49(79.03)	1.433	0.231
Connecting and shutting of pouch	33(53.23)	31(50.00)	0.129	0.719	52(83.87)	45(72.58)	2.320	0.128
Application of ancillary devices	25(41.67)	26(41.94)	0.033	0.855	50(80.65)	46(74.19)	0.738	0.390
Dealing with pouch leakage	21(33.87)	22(35.48)	0.036	0.850	49(79.03)	36(58.06)	6.322	0.012
Skin care of stoma	31(50.00)	29(46.77)	0.129	0.719	56(90.32)	44(70.97)	7.440	0.006
Purchase and storage of pouch	32(51.61)	36(58.06)	0.521	0.470	51(82.26)	39(62.90)	5.835	0.016
Dealing with stoma complications	23(37.10)	22(35.48)	0.035	0.852	50(80.65)	38(61.29)	5.636	0.018
Attitude								
Optimistic mentality for disease	34(54.84)	31(50.00)	0.291	0.590	52(83.87)	37(59.68)	8.957	0.003
Optimistic mentality for stoma	32(51.61)	27(43.55)	0.808	0.369	49(79.03)	36(58.06)	6.322	0.012
Enthusiasm for rehabilitation plan	39(62.90)	37(59.68)	0.136	0.712	45(72.58)	39(62.90)	1.329	0.249
High trust in medical staff	44(70.97)	47(75.81)	0.372	0.542	57(91.94)	48(77.42)	5.035	0.025
High trust in their caregivers	40(64.52)	41(66.13)	0.036	0.850	53(85.48)	51(82.26)	0.238	0.625
Willingness to correct bad habits	38(61.29)	35(56.45)	0.300	0.584	55(88.71)	40(64.52)	10.127	0.001
Willingness to help others	33(53.23)	34(54.84)	0.032	0.857	47(75.81)	43(69.35)	0.648	0.421
Willingness to correct negative emotion	25(40.32)	29(46.77)	0.525	0.469	50(80.65)	47(75.81)	0.426	0.514
Confidence in maintaining healthy behavior	36(58.06)	34(54.84)	0.131	0.717	56(90.32)	43(69.35)	8.467	0.004
Behavior								

Maintaining in healthy dietary habit	32(46.77)	33(53.23)	0.516	0.472	58 (93.55)	49 (79.03)	5.522	0.019
Maintaining in healthy behavior	31(50.00)	38(61.29)	1.601	0.206	55(88.71)	42(67.74)	8.002	0.005
Regular learning from relevant books	13(20.97)	14(22.58)	0.047	0.828	42(67.74)	30(48.39)	4.769	0.029
Regular learning from relevant videos	20(32.26)	25(40.32)	0.872	0.350	43(69.35)	41(66.13)	0.148	0.701
Experienced in pouch replacement	29(46.77)	27(43.55)	0.130	0.718	58(93.55)	48(77.42)	6.499	0.011
Experienced in care of stoma	28(45.16)	29(46.77)	0.032	0.857	56(90.32)	44(70.97)	7.440	0.006
Regular communicated with other patients	17(27.42)	18(29.03)	0.040	0.842	39(62.90)	38(61.29)	0.034	0.853
Highly complying with doctor's advice	45(72.58)	41(66.13)	0.607	0.436	57(91.94)	50(80.65)	3.340	0.068
Regular return visit	-	-	-	-	59(95.16)	55(88.71)	1.740	0.187

O + X", "P - O, P - X, O - X". In this model, relationships were either positive or negative according to the cognitive perceptions of others. Among these status, the "P + O, P + X, O + X" was considered as the best status of P-O-X model with a positive mutual influence. Any other balance or unbalance status can be turned by reversing anyone's attitude, that can explain the feasibility of out-hospital intervention based on this model^[19]. For example, the triad unit were unbalanced with "P - O, P + X, O + X" status, supposing that the caregiver (O) was disgusted of uncomfortable features of pouch drainage from patients (X). Particularly, more attentions should be paid for "P - O", a healthy education program or kind conversation would be carried out for caregivers and patients, so as to rectified the negative attitude.

After six months out-hospital intervention, the standard-reaching rate of the 6 items in knowledge, 5 items in attitude and 5 items in behavior of the observation group were significantly higher than those of the control group, those differences suggested that the out-hospital intervention based on Heider balance can obviously rectified the knowledge, attitude and practice comparing with the routine out-hospital intervention. A qualitative systematic review considered that^[20] good family support had a positive impact on patients, which can promote positive health outcomes in many chronic diseases. Essentially, this viewpoint was in accordance with the principle of Heider balance, but the application of Heider balance were clearly presented with framework of three-body interactions consisted of patients, disease and caregivers, with the assumption thinking that any edge of triads was equivalent important in the dynamics of network^[21]. In a study on Heider balance and KAP model performed by Lou FL, et al^[22], they also hold the view that the caregivers should be brought into the intervention, which can improve the level of knowledge and attitude towards pain management in cancer patients, and increase the intervention efficacy for them.

In this study, the findings demonstrated that most of items of WHOQOL-100 in the observation group were significant higher than those of the control group, especially in physical health, psychological, independence level, social relations domain. These results indicated that the out-hospital intervention based on Heider balance can obviously improve life quality of patients. No significant differences were observed in environment domain except for "health and social care: availability and quality", the possible explanation may be that environment factors can not be changed within a short time. The WHOQOL-100 were commonly used in chronic diseases of its efficiency in measuring health-related quality of life, a increase or decrease of life quality after urinary diversion plays a important role in an individual's adaption to life with a stoma^[23, 24]. A study reported that^[25] a formal preoperative ostomy education program involved an interactive educational approach can make a promotion in patients' ostomy self-management and post-ostomy life quality. Another study considered that^[26] hospital-based home care teams should be created at least 6 months after discharge, so as to improve the patient's life quality in discharged follow-up care. These findings from above studies were basically consistent with the results in our study. A previous study found that^[27] a ostomy education program can decrease the rate of complication, this result in support of our findings that well out-hospital intervention can reduce the risk of

Domain	Before discharge				At 6 months after discharge			
	Observation group(n=62)	Control group(n=62)	<i>t</i>	<i>P</i>	Observation group(n=62)	Control group(n=62)	<i>t</i>	<i>P</i>
Physical health								
Pain and discomfort	14.01±3.05	13.70±4.23	0.468	0.641	11.32±4.10	12.38±3.76	1.500	0.136
Energy and fatigue	14.62±4.94	14.58±4.16	0.049	0.961	16.67±3.13	14.83±4.06	2.826	0.006
Sleep and rest	12.88±3.10	12.13±3.23	1.319	0.190	15.95±2.02	14.12±3.06	3.930	0.000
Psychological								
Positive feelings	10.16±3.86	9.43±3.41	1.116	0.267	14.76±3.83	13.04±3.74	2.530	0.013
Thinking, learning, memory and concentration	13.57±5.15	13.26±4.37	0.361	0.718	15.60±4.43	13.32±4.21	2.938	0.004
Self-esteem	12.33±4.28	12.56±5.04	0.274	0.785	14.55±5.02	12.73±4.38	2.151	0.033
Body image and appearance	9.07±3.54	8.39±3.24	1.193	0.235	13.86±3.31	12.33±3.75	2.409	0.018
Negative feelings	14.51±4.35	15.26±3.97	1.003	0.318	11.82±3.45	13.34±2.80	2.694	0.008
Independence level								
Mobility	10.83±3.79	10.76±4.11	0.099	0.922	13.86±3.84	12.03±4.23	2.522	0.013
Activities of daily living	11.86±3.56	12.38±3.78	0.789	0.432	14.97±4.26	12.41±3.64	3.597	0.000
Dependence on medical support	15.28±4.03	14.24±4.35	1.381	0.170	11.70±3.79	13.58±4.22	2.610	0.010
Work capacity	12.09±3.67	12.41±3.80	0.477	0.634	11.73±4.02	12.38±4.39	0.860	0.392
Social relations								
Personal relationships	14.13±3.82	13.76±3.14	0.589	0.557	16.74±2.14	15.53±2.93	2.626	0.010
Social support	14.56±3.13	15.09±4.38	0.775	0.440	17.13±3.50	15.14±3.19	3.309	0.001
Sexual activity	12.53±2.98	13.40±3.70	1.445	0.151	8.98±2.38	9.71±2.74	1.584	0.116
Environment								
Physical safety and security	12.83±3.65	13.00±3.45	0.267	0.790	12.04±3.35	11.73±3.88	0.476	0.635
Home environment	12.34±3.80	12.26±3.79	0.117	0.907	12.27±3.77	12.83±3.98	0.804	0.423
Financial resources	13.74±4.11	13.04±3.88	0.975	0.331	13.98±4.03	12.96±4.24	1.373	0.172
Health and social care: availability and quality	11.98±3.53	12.13±4.22	0.215	0.830	14.56±4.46	11.70±3.15	4.124	0.000
Opportunities to get new information /skills	9.65±2.46	10.22±2.83	1.197	0.234	10.85±2.79	11.14±3.15	0.543	0.588
Opportunities for recreation and leisure	11.33±3.54	12.35±3.60	1.591	0.114	12.57±2.96	13.29±3.51	1.235	0.219
Physical environment	10.87±3.17	11.36±2.97	0.888	0.376	12.46±4.38	12.10±4.06	0.475	0.636
Transportation	10.03±2.99	9.89±3.72	0.231	0.818	10.11±3.89	10.35±3.66	0.354	0.724
Appendixes								
Spirituality/religion/personal beliefs	15.46±3.74	15.96±3.36	0.783	0.435	15.62±3.87	16.16±3.68	0.796	0.427
Quality of life from the view point	11.28±3.73	10.91±3.97	0.535	0.594	14.65±4.03	12.42±3.84	3.154	0.002

complication after discharge. Indeed, as others reported [28,29], patients may benefit from more education, and almost half of patients sought the help of an professional ostomy care, especially these patients with permanent urostomy.

In summary, the out-hospital intervention based on Heider balance can help to strengthen patients' understanding and mastering on knowledge, improve attitude and practice, reduce the rate of stoma complications, consequently promote the life quality of patients. These merits make the Heider balance to be an attractive approach in guidance of out-hospital intervention in urostomy patients. However, this study was a preliminary exploration of the out-hospital intervention based on the Heider balance, which still has a certain distance for standardized application in clinical pathway. Therefore, the application procedure of Heider balance in out-hospital intervention needs to be supplemented in further study.

Declarations

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Conflicts of interest/Competing interests: None of the authors have any conflicts of interest to declare.

Availability of data and material: Data and material are available from the corresponding author on reasonable request.

Code availability: N/A.

Authors' contributions: Hao-yu Zou, Liu-yi Zhang, Yue-lan Qin and Ke Yang contributed to the study conception and design. Material preparation, data collection, and analysis were performed by Hao-yu Zou, Ping Li and Li Zhang, Hao-yu Zou and Ke Yang wrote and revised the paper. Liu-yi Zhang and Yue-lan Qin performed the writing-review and editing. All authors read and approved the final manuscript.

Ethics approval: The study was approved by the ethics committee of Hunan Provincial People's Hospital, and the procedures almost were part of the routine care.

Consent to participate: Informed consent was obtained from participants included in the study.

Consent for publication: N/A.

References

1. González Del Alba A, De Velasco G, Lainez N et al (2019) SEOM clinical guideline for treatment of muscle-invasive and metastatic urothelial bladder cancer (2018) [J]. *Clin Transl Oncol* 21(1):64–74
2. Furukawa C, Morioka I. Health-Related Quality of Life and Sleep Disorders in Patients With a Urostomy: Is There a Relationship? [J]. *J Wound Ostomy Continence Nurs*,2017,44(4):358–362
3. Vartolomei L, Vartolomei MD, Shariat SF (2020) Bladder Cancer: Depression, Anxiety, and Suicidality Among the Highest-risk Oncology Patients[J]. *Eur Urol Focus* 6(6):1158–1161
4. Liu MH, Wang CH, Huang YY et al (2014) A correlational study of illness knowledge, self-care behaviors, and quality of life in elderly patients with heart failure[J]. *J Nurs Res* 22(2):136–145
5. Wong FMF. Factors Associated with Knowledge, Attitudes, and Practices Related to Oral Care Among the Elderly in Hong Kong Community[J]. *Int J Environ Res Public Health*,2020,17(1):1–15
6. Stelfson M, Paige SR, Alber JM et al (2019) Association Between Health Literacy, Electronic Health Literacy, Disease-Specific Knowledge, and Health-Related Quality of Life Among Adults With Chronic Obstructive Pulmonary Disease: Cross-Sectional Study[J]. *J Med Internet Res* 21(6):e12165
7. Rozas NS, Sadowsky JM, Jeter CB (2017) Strategies to improve dental health in elderly patients with cognitive impairment: A systematic review[J]. *J Am Dent Assoc* 148(4):236–245
8. Heider F (1946) Attitudes and cognitive organization[J]. *J Psychol* 21(1):107–112
9. Antal T, Krapivsky PL, Redner S (2005) Dynamics of social balance on networks[J]. *Phys Rev E Stat Nonlin Soft Matter Phys* 72(3Pt2):036121

10. Wieser M (2014) Remembering the "lens": visual transformations of a concept from Heider to Brunswik[J]. *Hist Psychol* 17(2):83–104
11. Kulakowski K, Gawronski P, Gronek P (2005) The Heider balance - a continuous approach[J]. *Int J Mod Phys C* 16(5):707–707
12. Kulakowski K (2007) Some Recent Attempts to Simulate the Heider Balance Problem[J]. *Computing in Science Engineering* 9(4):1–14
13. Qiao GM, Zhang XL, Wang YM et al (2014) Development of the health education standards for patients with cystostomy[J]. *Chin J Nurs* 49(9):1058–1061
14. Li L, Young D, Xiao S et al (2004) Psychometric properties of the WHO Quality of Life questionnaire (WHOQOL-100) in patients with chronic diseases and their caregivers in China[J]. *Bull World Health Organ* 82(7):493–502
15. Khan MS, Omar K, Ahmed K et al (2020) Long-term Oncological Outcomes from an Early Phase Randomised Controlled Three-arm Trial of Open, Robotic, and Laparoscopic Radical Cystectomy (CORAL)[J]. *Eur Urol* 77(1):110–118
16. Adebimpe WO (2016) Knowledge, Attitude, and Practice of Use of Safety Precautions Among Health Care Workers in a Nigerian Tertiary Hospital, 1 Year After the Ebola Virus Disease Epidemic[J]. *Ann Glob Health* 82(5):897–902
17. ALBalawi HB, Alali NM (2020) Evaluation of Knowledge, Attitude, and Practices toward the Outbreak Pandemic (COVID-19) Virus Disease among Ophthalmologists: A Cross-Sectional Study[J]. *Middle East Afr J Ophthalmol* 27(3):164–171
18. Molet M, Craddock P, Grassart A. An application of Heider's P-O-X balance model to change evaluative conditioning effects[J]. *Learning & Motivation*, 2015, 51(1):pp 43–49
19. Chiang YS, Chen YW, Chuang WC et al (2020) Triadic balance in the brain: Seeking brain evidence for Heider's structural balance theory[J]. *Social Networks* 63(1):80–90
20. Whitehead L, Jacob E, Towell A et al (2018) The role of the family in supporting the self-management of chronic conditions: A qualitative systematic review[J]. *J Clin Nurs* 27(1–2):22–30
21. Bagherikalhor M, Kargaran A, Shirazi AH et al. Heider balance under disordered triadic interactions[J]. *Phys Rev E*, 2021,103(3 – 1):032305
22. Lou FL, Shang SM. Attitudes to pain management towards cancer patients and its influencing factors based on analysis of theoretical perspectives with "S-O-R" model, Heider balance theory and KAP Model[J]. *Chin J Prac Nur*,2018,34(13):1008–1015
23. Cengiz B, Bahar Z (2017) Perceived Barriers and Home Care Needs When Adapting to a Fecal Ostomy: A Phenomenological Study[J]. *J Wound Ostomy Continence Nurs* 44(1):63–68
24. Lin CY, Lee TY, Sun ZJ et al (2017) Development of diabetes-specific quality of life module to be in conjunction with the World Health Organization quality of life scale brief version (WHOQOL-BREF) [J]. *Health Qual Life Outcomes* 15(1):167–187
25. Wulff-Burchfield EM, Potts M, Glavin K, Mirza M. A qualitative evaluation of a nurse-led pre-operative stoma education program for bladder cancer patients[J]. *Support Care Cancer*, 2021. Epub ahead of print
26. Cengiz B, Bahar Z, Canda AE (2020) The Effects of Patient Care Results of Applied Nursing Intervention to Individuals With Stoma According to the Health Belief Model[J]. *Cancer Nurs* 43(2):87–96
27. Liao JJ, Meng YX, Li JR et al (2017) Evaluation of effect of health education pathway intervention on quality of life, health belief and health behaviors among urostomy patients[J]. *Chin J Heal Educ* 33(8):749–755
28. Su X, Qin F, Zhen L et al (2016) Self-efficacy and associated factors in patients with temporary ostomies: a cross-sectional survey[J]. *J Wound Ostomy Cont Nurs* 43(6):623–629
29. Maydick-Youngberg D (2017) A Descriptive Study to Explore the Effect of Peristomal Skin Complications on Quality of Life of Adults With a Permanent Ostomy[J]. *Ostomy Wound Manage* 63(5):10–23

Figures

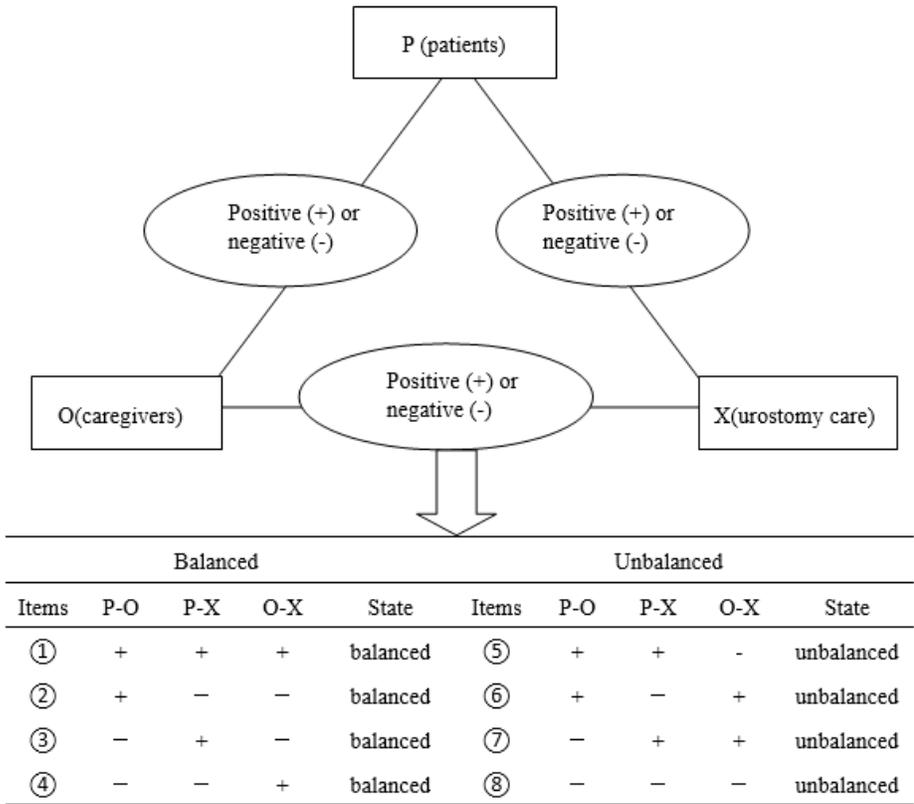


Figure 1

The structure of Heider balance and assessment of status