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Application of quality adjusted survival in nursing health policy decision on heart transplantation

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Application of Quality Adjusted Survival in
Nursing Health Policy Decision on Heart Transplantation

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Heart disease was ranked as the third leading cause of death in Taiwan during the 3-year period from 1995 to 1998, with 52.93 deaths per 100,000 in 1995 and 50.51 deaths per 100,000 in 1998.1,2 Heart transplantation (HT) has been reported to be effective for increasing life expectancy and improving health-related quality of life (HRQoL) in patients with end-stage heart disease. Since the first transplant operation in 1987 in Taiwan, there have been more than 200 recipients and 143 survivors who underwent cardiac transplant surgery at National Taiwan University Hospital. With a first-year survival rate of 95%,3 HT has become the second most common transplant surgery performed in Taiwan. Because a high quality of life suggests that patients are coping effectively with the realities of life, despite healthrelated functional impairment,4 HRQoL can be viewed as a crucial indicator of the recipient's success after transplantation. Western HT recipients have reported enjoying improved physical and social functional capacities, a stronger sense of psychological well being, a decrease in disease and treatment-related disabilities, and an increase in positive psychological perceptions.5–10 However, the recovery experiences of Taiwanese HT recipients have not been systematically investigated.

The importance of resumption of organ transplant recipients' postoperative HRQoL and working competence (WC) has recently been emphasized in Taiwan. WC was found to be an important indicator of self-addressed quality of life in Taiwanese kidney transplant (KT) and orthotopic liver transplant (OLT) recipients.11–13 Because the recovery time for HT patients spans a considerable length,14,15 the recipients' perceptions of physical functions, HRQoL, and WC are highly subject to change. Thorough investigation into the impact of HT on physical competence, HRQoL, and WC of the recipients and the relationship between HRQoL and WC in Taiwanese HT recipients has not been reported. This longitudinal prospective study was done to assess the relationships between the changes in the HRQoL and WC and to determine the changes in various aspects of physical well being related to HRQoL and WC in the first year after HT.

PATIENTS AND METHODOLOGY

Adult HT patients were recruited on the day before transplantation. The inclusion criterion were as follows: (a) at least 16 years old, (b) clear consciousness, (c) no transplant surgeries other than HT, and (d) a willingness to participate in the study for 1 year. The HT recipient's profile and perceived HRQoL and WC before and after surgery were recorded. Each subject was interviewed seven times: once preoperatively and six times postoperatively (the last day in the ICU, the day before discharge from the hospital, and the 1st, 3rd, 6th, and 12th months after discharge). At each interview, the subject was asked to rate the degree of HRQoL and WC on separate visual analogue scales (VASs) and physical competence on related scales. During the first interview, the participants were also asked to rate their perceptions of HRQoL, WC, and physical competence based on the entire 24-hour preoperative period. The VAS is a generic global index that gives researchers the opportunity to access the global impact of disease on patient well being and to compare different programs with disparate endpoints. 16 The VAS

has been used in a variety of investigations and comparisons involving the HRQoL and WC of transplant recipients.[8,12,13,16] The VAS used in this study was a 100-millimeter (mm) vertical line. Questions related to HRQoL or WC were anchored at the bottom with the words "Worst quality of life" or "Unable to work" and at the top by "Optimal quality of life" or "Optimal working competence." The following five scales were also used to measure the subject's physical functional well being related to HRQoL and WC across the seven stages: New York Heart Association Functional Class (NYHAFC), Respiratory Function, Karnofsky. WC-Related Physical Competency, and Fatigue Status. The interrater reliability and content validity of the latter four scales were established and based on established findings for the NYHAFC.

RESULTS

Demographic Data

By the end of the first posttransplant year, 10 HT recipients from various countries in Taiwan who survived were included in this study. They were all married and female with ages ranging from 25 to 75 (mean 53.0 _ 10.0) years old. Two patients were graduates of college, three of senior high school, one of junior high school, and five had elementary school education only. Six of the patients were Buddhists and the other four were Taoists. At the postdischarge-12th month stage, one patient was unemployed and the other nine were employed as office workers, housekeepers, or students or were retired. At the preoperative stage, all 10 patients were incapable of work and self-care and required constant comprehensive care. Data were analyzed with descriptive and inferential statistics with 95% confidence intervals.

Changes in the Perceived Degree of HRQoL

The mean scores (with range) of perceived HRQoL at each of the seven stages were 31% _ 18% (10% to 60%) at the preoperative stage, 60% _ 10% (40% to 80%) at the ICU stage, 64% _ 15% (40% to 85%) at the predischarge stage, 69% _ 15% (40% to 90%) at the postdischarge-1st month stage, 73% _ 7% (60% to 80%) at the 3rd month, 73% _ 12% (60% to 90%) at the 6th month stage, and 71% _ 11% (50% to 80%) at the 12th month stage (Table 1). Significant changes in the perceived HRQoL were found between the preop stage and each of the postop stages. In addition, significant continuous improvement in the perceived HRQoL was found from the preop stage to the postdischarge-1st month stage using one-way ANOVA (P _ .01) (Table 2). The mean scores of perceived HRQoL in the six postoperative stages ranged from 2.1 to 2.4 times those of the preoperative stage and were as follows: 1.94 (60/31%), 2.1 (64/31%), 2.2 (69/31%), 2.4 (73/31%), 2.4 (73/31%), and 2.3 (71/31%), respectively (Table 1).

Changes in the Perceived Degree of WC

The mean WC scores (with range) were 34% _ 17% (10% to 60%) at the preoperative stage, 45% _ 15% (30% to 70%) at the ICU stage, 50% _ 20% (20% to 80%) at the predischarge stage, 63% _ 12% (40% to 80%) at the postdischarge-1st month stage, 71% _ 11% (60% to 90%) at the 3rd month stage, 73% _ 9% (60% to 80%) at the 6th month stage, and 74% _ 7% (60% to 80%) at the 12th month stage (Table 1). Significant changes in the perceived WC were noted between the preoperative and each of the postoperative stages except for the ICU stage. Significant continuous improvement in the perceived HRQoL was found from the preoperative stage to the postdischarge-3rd month stage using one-way *ANOVA* (P _ .01) (Table 2). The mean scores of perceived WC in the six postoperative stages ranged from 1.5 to 2.2 times those of the preoperative stage and were as follows: 1.71 (58/34%), 1.5 (50/34%), 1.9 (63/34%), 2.1 (71/34%), 2.1 (73/34%), and 2.2 (74/34%), respectively (Table 1). The mean ratios of perceived WC/HRQoL in the single pre- and six postoperative stagesranged from 0.78 to 1.10: 1.10 (34/31%), 0.83

(50/60%), 0.78 (50/64%), 0.91 (63/69%), 0.97 (71/73%), 1.00 (73/73%), and 1.04 (74/71%). In other words, the value of HRQoL was appraised to be 0.91 to 1.28 times that of WC (Table 1).

Changes in Physical Functional Well Being (Table 3)

New York Heart Association Functional Class Scale. Onthe day before discharge from the hospital, the subjects considered themselves to have only slight or no limitation in ordinary physical activities. During the postdischarge-6th month stage, all of the subjects reported being able to practice ordinary physical activities without fatigue, palpitation, or dyspnea.

Respiratory Function Scale. Starting from the postoperative ICU stage, all of the subjects reported being free from shortness of breath when they were dressing. Starting from the postdischarge-1st month, none of the subjects needed to rest when walking for 20 to 30 minutes. Meanwhile, by the end of the first postoperative year, none of the subjects complained of walking slower than other people their age.

Karnofsky Scale. Sixty percent, 80%, and 80% of the subjects reported being able to manage easy work and move freely during the postdischarge-3rd month, 6th month, and 12th month stages, respectively.

Physical Competency Scale. Eight questions related to WC were examined. By the postdischarge-12th month, all of the subjects reported having no difficulties reading newspapers and magazines, inspecting commonly encountered items during work, catching or holding goods with fingers, standing for minutes, or walking for 20 minutes. Nevertheless, 20% and 30% of the subjects, respectively, still had difficulties with carrying or moving goods weighing 5 kg and 10 kg, respectively.

Fatigue Status Scale. By the end of the postdischarge-12th month, all of the subjects were free from slow action and low working efficacy. Eighty percent of the subjects reported being free from a sense of weakness or sickness. Seventy percent were free from fatigue and did not need to take a nap during the day time. Finally, 60% of the subjects reported having resumed the desire to take the initiative in managing the circumstances and physical tasks related to daily activities.

DISCUSSION

One of the challenges for HT professionals is to uncover the stage-specific health status and related needs of transplant recipients during the recovery process. As such, the recipients' perspectives of global as well as their multifaceted functional well being, which are framed by their unique cultural and treatment protocols, need to be accurately appraised. By doing so, their fears due to uncertainty about the recovery process can be lessened. Through this process, the recipients' well being can be strengthened and their social roles can also be resumed and further extended. Finally, through adequate support to their physical, psychological, social, and spiritual needs during the critical transition of the first posttransplant year, the recipients can develop a strong foundation for maintaining long-term posttransplant quality of life. This study examined Taiwanese recipients' global appraisals of HRQoL, WC, and related physical functional well-being during the first posttransplant year. VAS scales were applied to allow transplant recipients to give subjective appraisals of their global HRQoL and WC, to strengthen the correlation between patients' and investigator's assessments of HRQoL and WC, as well as to compare the changes of HRQoL and WC across stages and varioustransplant procedures.12,13,16,17

Comparison on the Perceived Degree of HRQoL and WC Between Transplant Procedures

Comparison of the trends in HRQoL and WC across stages and transplant procedures revealed that the mean scores of the perceived HRQoL and WC for HT recipients were consistently higher across stages until the 6th month

and 12th month after discharge, respectively. By the end of the first posttransplant year, the degree of HRQoL was ranked as OLT (88%), KT (83%), HT (71%), and LT (63%). The stage of the highest HRQoL scores perceived by patients who received different transplant procedures were not consistent with postdischarge-1st to 3rd month, being the highest stage for LT, 3rd to 6th month for HT, 6th to 12th month for KT, and 12th month for OLT. The stage with the highest WC scores was inconsistent between various transplant groups, occurring at the postdischarge-3rd months for LT, 6th to 12th month for KT, 12th month for HT and OLT (Table 1).12,13,16,17 The postdischarge-3rd month appears to be a milestone of postdischarge recovery for Taiwanese HT recipients because, from the this time on, the degree of their perceptions of HRQoL and WC improved from 69% to 73% for HRQoL and from 63% to 71% for WC. Additionally, HT recipients' perceptions of HRQoL and WC remained stable from the postdischarge-3rd month stage (Fig 1).

In this study, starting from the postoperative ICU stage, all of the subjects reported being free from shortness ofbreath when they were dressing, and they were able to walkfor 20 to 30 minutes without difficulties from the postdischarge-1st month. During the postdischarge-3rd and 6th months, 60% and 80% of the subjects, respectively, were capable for managing easy work and moving freely. By the postdischarge-12th month, none of the patients had diffi-culties with delicate and gentle motor competency, such as reading, inspecting items during work, catching or holding goods with fingers, or standing for minutes, and walking like the healthy persons did at their age. In addition, a highpercentage of patients was able to participate in activities requiring greater energy expenditure than before the operation, such as carrying or moving items weighing 5 kg (70% of patients) or 10 kg (80% of patients). Finally, 70% of patients did not need to take a day-time nap, and 80% of patients were free from the sense of weakness or sickness but were capable of managing easy work and moving freely. In addition to differences in sample size,12,13 several factors might also have contributed to the variation in the recipients' perceptions of HRQoL and WC across posttransplant stages and transplant procedures. The first factor is related to the different nature of the recovery process for graft organs such as heart, lung, liver, and kidney. The nature of the recovery process includes the improvement in different graft organ function and the possible development of graft rejection and infection as well as the improvement of other types of physical discomfort during the posttransplant period. The second factor is related to differences in the recipient's adaptation to physio-psycho-socio-spiritual challenges from dependency to independency during the recovery process. While the improvement in adaptation level was attributable to medical and nursing care, the role of self-care efficacy and social support in promoting psychological, social, and spiritual well being must also be considered.9,12,13,16,18

QUALITY OF LIFE BEFORE AND AFTER HEART TRANSPLANTATION

In conclusion, this study found a significant correlation in the changes of perceived HRQoL between the preoperative and each postoperative stage as well as between preoperative and each postdischarge stage for WC in Taiwanese HT recipients. The perceived HRQoL and WC scores in the postdischarge-12th month stage reached 2.29 and 2.18 times preoperative scores, respectively. The ratio of improvement in HRQoL and WC were somewhat higher than for those of LT patients but lower than those of OLT and KT patients. Following the recommendations of the previous studies, 8,16 five scales were used to detect the improvement in the various aspects of physical function related to HRQoL and WC in Taiwanese HT recipients. Signs of discomfort decreased and global physical activities improved by the end of the first posttransplant year. Meanwhile, the changes in HRQoL and WC perceived by recipients of different organ transplants in the west and Taiwanese recipients of HT showed differences across

the seven time points in the first posttransplant year. There are several plausible explanations for these findings. Recently, some Taiwanese recipients reported coping difficulties with various health problems after HT, primarily relating to inability to accept the changes in body image, hair overgrowth in particular, and also maladaptation to social roles.4 Thus, in addition to physical dimensions, the facilitating and hindering factors involving psychological and social dimensions unique to each recovery stage that might contribute to the recipients' appraisal of their HRQoL and WC deserve further investigation. In addition, the conceptual framework is suggested to be developed from the empirical data by personal interview and long-term interaction with the recipients who underwent various transplant procedures.

REFERENCES

1. Department of Health: Taiwan Public Health Report. Taiwan, ROC: The Executive Yuan; 2000
2. Department of Health: Taiwan Public Health Report. Taiwan, ROC: The Executive Yuan; 1997
3. Wei G: News Heart Transplant 6:10, 1997
4. Hicks, Ferrans, Larson: Res Nurs Health 15:111, 1992
5. Lin SS: Bio-psychosocial adjustment and social support in patients after heart transplantation surgery. Natl Yang-Ming Univ. Inst Clin Nurs: Master thesis, 2000
6. Gross CR, Savik K, Bolman RM, et al: Chest 108:1587, 1995
7. Limbos MM, Chan CK, Kesten S: Chest 112:1165, 1987
8. Limbos MM, Joyce DP, Chan CK, et al: Chest 118:408, 2000
9. Littlefield C, Abbey S, Fiducia D, et al: Gen Hosp Psychiatr 18(6 suppl):36S, 1996
10. TenVergert EM, Essink-Bot ML, Geertsma A, et al: Chest 113:358, 1998
11. Hu RH, Lee PH, Tsai MK, et al: Transplant Proc 30:3617, 1998
12. Shih FJ, Lee PH, Wang JD, et al: Transplant Proc 31:1981, 1999
13. Shih FJ, Hu RH, Ho MC, et al: Transplant Proc 32:2144, 2000
14. Miller HD: Crit Care Nurse 8(6):19, 1988
15. Shih FJ, Lin MH, Lin HY, et al: Transplant Proc 30:3639, 1998
16. Shih FJ, Tsao CI, Lin MH, et al: Transplant Proc (in press)
17. Witzke O, Becker G, Franke G, et al: Transplant Proc 29:1569, 1997
18. Lanuza DM, Lefaiver C, Cabe MM, et al: Chest 118:115, 2000

Table 1. Comparison Between Quality of Life and Working Capacity After Heart Transplantation by Different Stage Groups (n = 10)

Stage	QOL (%)		WC (%)		*t* value	F value
	Mean±SD (%)	Range (%)	Mean¡SD (%)	Range (%)		
(A) Preop day	31.25±18.08	10-60	33.75±16.85	10-60	-0.28	
(B) Postop ICU transition	60.00±16.04	40-80	45.00±15.12	30-70	2.51*	5.02**
(C) Postop one day before discharge	64.38±14.99	40-85	50.00±20.00	20-80	1.88	5.06**
(D) Postop 1 month after discharge	68.75±14.58	40-90	62.50±11.65	40-80	2.38*	6.29
(E) Postop 3 months after discharge	72.50±7.07	60-80	71.25±11.26	60-90	0.42	8.15
(F) Postop 6 months after discharge	72.50±11.65	60-90	72.50±8.86	60-80	0	8.93
(G) Postop 12 months after discharge	71.25±11.26	50-80	73.75±7.44	60-80	-0.80	9.28

* $p < .05$, ** $p < .01$

Table 2. Changes in HRQoL and WC by stage for Taiwanese HT, LT, OLT, and KT Recipients

Stages	HRQoL								WC							
	HT		LT		OLT		KT		HT		LT		OLT		KT	
	t value	F value	*t* value	F value	*t* value	F value	*t* value	F value	*t* value	F value	*t* value	F value	*t* value	F value	*t* value	F value
Pre-op and postop ICU transition	-4.31*		-7.05**		-4.14**		¡–		-0.88*		-9.44*		-0.31		¡–	
Pre-op and postop 1 day before discharge	-3.19*	9.61**	-7.05**	9.20**	-4.58**	10.62**	-1.75	¡–	-1.52	1.82	-9.87*	29.63	-0.65	0.20	-1.79	¡–
Pre-op and postop 1 month after discharge	-3.99*	9.00**	-21.65	6.99**	-5.33**	8.94**	-4.35**	12.33	-4.00*	4.34*	-8.31*	20.87	-0.42	0.15	-2.99**	1.31
Pre-op and postop 3 month after discharge	-5.38*	10.05	-18.68	5.77**	-5.34**	7.72**	-6.35	16.35	-4.71*	7.37**	-8.00*	14.93	-0.67	0.15	-3.01**	4.57**
Pre-op and postop 6 month after discharge	-4.61*	9.71	-2.61*	4.75**	-5.54**	7.03**	-5.61	16.47	-4.91*	9.18	-4.6*	11.04	-1.54	0.53	-2.67*	5.49
Pre-op and postop 12 month after discharge	-4.07*	9.10	-3.73*	4.27**	-5.34**	9.05	-4.43**	14.71	-5.66*	10.51	-4.30*	8.33	-3.55*	1.52	-3.87**	5.48

* $p < .05$, ** p ¡ .01

HT = Heart Transplantation, LT = Lung Transplantation (ref#16), OLT = Orthotopic Liver Transplantation (ref#13), KT = Kidney Transplantation (ref#15)

Table 3-1. New York Heart Association Functional Class for HT Recipients (N = 10)

	Pre-operative	Post-operative ICU Transition	One Day Before Discharge	1-month After Discharge	3-month After Discharge	6-month After Discharge	12-month After Discharge
Class I	0	3	3	5	5	10	10
Class II	6	5	7	5	5	0	0
Class III	2	2	0	0	0	0	0
Class IV	2	0	0	0	0	0	0

Table 3-2. Respiratory Function for HT Recipients (N = 10)

	Pre-operative		Post-operative ICU transition		Post-operative one day before discharge		1-month after discharge		3-month after discharge		6-month after discharge		12-month after discharge	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
1. Compared to the people with same age, do you experience shortness of breath and then walk slower than others?	8	2	8	2	5	5	4	6	2	8	0	10	0	10
2. Do you need to take a rest when you walk 20-30 mins due to episodes of shortness of breath	8	2	3	7	5	5	0	10	0	10	0	10	0	10
3. Do you need to take a rest when you walk for 10 or fewer minutes?	8	2	4	6	3	7	0	10	0	10	0	10	0	10
4. Do you experience shortness of breath when you are dressing?	3	7	0	10	0	10	0	10	0	10	0	10	0	10

Table 3-3. Karnofsky Scale for HT Recipients (N = 10)

	Pre-operative	Post-operative ICU transition	One day before discharge	1-month after discharge	3-month after discharge	6-month after discharge	12-month after discharge
Level 0	0	3	2	2	6	8	8
Level 1	4	5	6	6	4	2	2
Level 2	4	1	2	2	0	0	0
Level 3	2	1	0	0	0	0	0
Level 4	0	0	0	0	0	0	0

Level 0: being able to move freely. Level 1: being able to manage easy work. Level 2: being able to maintain self-care and walk

Level 3: being able to maintain limited self-care. Level 4: limited to bed activities

Table 3-4. WC Related Physical Competency Scale for HT Recipients (N = 10)

	Pre-operative		Post-operative ICU transition		One day before discharge		1-month after discharge		3-month after discharge		6-month after discharge		12-month after discharge	
	Having difficulty	No difficulty	Having difficulty	No difficulty	Having difficulty	No difficulty	Having difficulty	No difficulty	Having difficulty	No difficulty	Having difficulty	No difficulty	Having difficulty	No difficulty
1. Stretching hands to reach goods	4	6	2	8	0	10	0	10	2	8	0	10	0	10
2. Catching or holding goods with fingers	4	6	2	8	0	10	0	10	3	7	2	8	0	10
3. Inspecting goods during work	4	6	4	6	3	7	3	7	2	8	2	8	0	10
4. Reading magazines and newspapers	5	5	3	7	2	8	2	8	0	10	0	10	0	10
5. Carrying or moving goods weighing 5Kgs	8	2	5	5	3	7	4	6	5	5	2	8	2	8
6. Carrying or moving goods weighing 10Kgs	8	2	8	2	7	3	7	3	7	3	5	5	3	7
7. Standing for minutes	7	3	3	7	0	10	0	10	2	8	3	7	0	10
8. Walking for 20 minutes	7	3	5	5	2	8	0	10	2	8	3	7	0	10

Table 3-5. Fatigue Status for HT Recipients (N = 10)

	Pre-operative		Post-operative ICU transition		One day before discharge		1-month after discharge		3-month after discharge		6-month after discharge		12-month after discharge[a]	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
1. Feeling weakness and sickness	10	0	8	2	7	3	6	4	5	5	6	4	2	8
2. Lacking stamina, do not want to deal with things and can not manage it	10	0	5	5	5	5	5	5	4	6	7	3	4	6
3. Dozing or sleeping during day time	10	0	5	5	5	5	0	10	4	6	4	6	3	7
4. Acting slowly and having low working efficiency	10	0	6	4	5	5	2	8	2	8	0	10	0	10

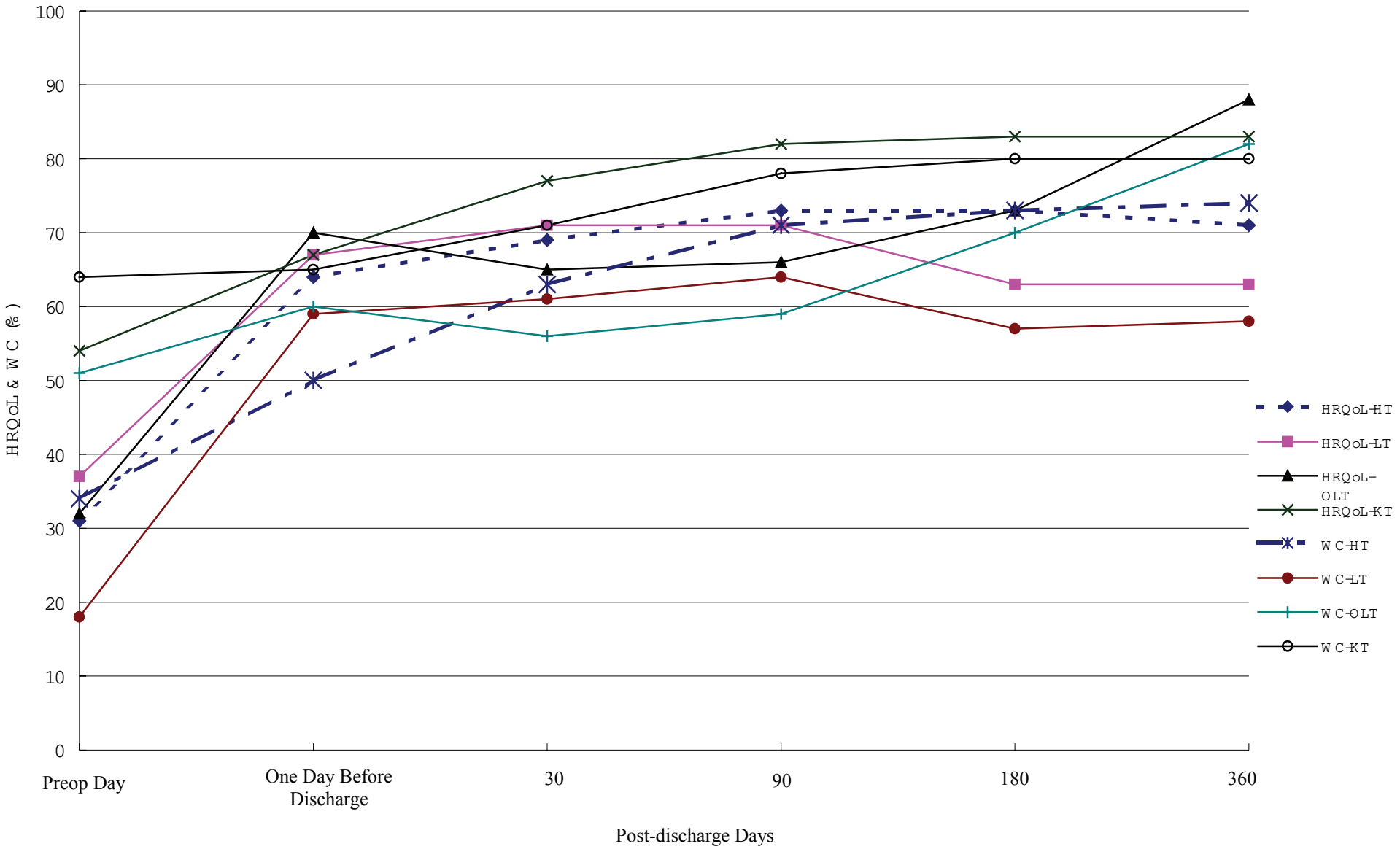

Figure 1. Trends on HRQoL & WC among Taiwanese HT, LT, OLT, and KT Groups (Note. LT = ref#16, OLT = ref#13, KT = ref#15)