Outcome of chemotherapy counseling by pharmacists on psychological effects and self esteem among oncology patients in a Government Hospital in Malaysia

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SUMMARY

Introduction: Chemotherapy is the most common form of treatment among cancer patients. It is also known to cause many physical and psychological side-effects.

Objective: This study developed, implemented and evaluated the outcome of a chemotherapy counseling module among oncology patients by pharmacists based on their psychological effects (depression, anxiety) and self-esteem.

Methods: A randomized, single blind, placebo controlled study was conducted among 162 patients undergoing chemotherapy in a government hospital in Malaysia.

Intervention: Counseling sessions were conducted using the 'Managing Patients on Chemotherapy' module for oncology patients undergoing chemotherapy at each treatment cycle.

Outcome: The outcome of repetitive chemotherapy counseling using the module was determined at baseline, first follow-up, second follow-up and third follow-up.

Results: The findings revealed that there was significant improvement in the intervention group as compared to the control group with large effect size on depression ($p = 0.001$, partial $\eta^2 = 0.394$), anxiety ($p = 0.001$, partial $\eta^2 = 0.232$) and self-esteem ($p = 0.001$, partial $\eta^2 = 0.541$).

Conclusion: Repetitive counseling using the 'Managing Patients on Chemotherapy' module was found to be effective in improving psychological effects and self-esteem among patients undergoing chemotherapy.

KEY WORDS:
Cancer, chemotherapy, psychological effects, self-esteem, counseling, pharmacist

INTRODUCTION

Cancer is a global public health concern. The incidences of cancer are increasing as well as the mortality rate. According to the World Health Organization,[1] by 2020 cancer related deaths will total over 11 million people worldwide. Chemotherapy, used alone or in combination with surgery and / or radiotherapy, plays a major role in the treatment of cancer. Chemotherapy drugs affect cell growth and cell division, and they kill both tumor cells and normal cells with similar biological characteristics.[2,3] Globally, these treatments are known to have damaging psychological effects for people with cancer[4]. These psychological effects include depression, anxiety, deterioration of self-esteem, and poor quality of life. Depression and anxiety are common symptoms in cancer patients, which are difficult to be detected and consequently to be treated. [5,6] It is important for healthcare professionals to focus on identifying signs of depression and anxiety in patients.[7,8]

Psychological stress refers to the emotional and physiological reactions experienced when an individual confronts a situation in which the demands go beyond their coping resources.[4,5] Adding to it, studies have indicated that stress can affect tumor growth and spread.[9] Common psychological disorders namely depression and anxiety worsen during chemotherapy. They persist for a long time after the end of chemotherapy and are also manifested in the recurrence of the disease. Depression and anxiety have been found to be independent prognostic factors for mortality in patients undergoing chemotherapy.[10,11,12] As for self-esteem, it is a personal resource that allows for coping, and acts as a mediator of various psychosocial outcomes. It is well known that, patients undergoing chemotherapy often suffer from loss of self esteem.[12,13,14]

A lot of this suffering is observed by pharmacists who work in the chemotherapy unit. These pharmacists are involved in administering chemotherapy to the patients, and also in counseling the patients' on the chemo drugs and side effects.[15] Currently there is no existing guideline /module for the pharmacists to adhere too. Therefore, they rely on their own knowledge and experience in helping patients to overcome and / or cope with the side effects of chemotherapy. The objectives of this study were to develop, implement and evaluate the outcome of a chemotherapy counseling module by pharmacists among oncology patients based on their psychological effects and self-esteem.

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MATERIALS AND METHODS

Study design and location

A randomized controlled trial was carried out from July to October 2013 at a government hospital in Malaysia. Informed consent was obtained from each patient before data collection. Participants in both groups were single blinded. The intervention group had a baseline evaluation and three consecutive follow-ups depending on the patient's appointment for their next cycle.

Inclusion criteria of study were all cancer patients who were undergoing chemotherapy for their first and second chemotherapy cycle. Patients with any type of cancer and stage of cancer were included. Only patients aged 18 years old and above at the time of informed consent were included because it represents the age of adulthood as defined by World Health Organization16. Exclusion criteria of the study were inability of the patients to communicate well during the study and also those patients not undergoing chemotherapy treatment. Patients undergoing their third cycle of chemotherapy onwards were excluded from the study to standardize the severity of side effects suffered by patient. Patients with severe communication problems such as speech or hearing difficulties, and patients who were too ill to participate were also excluded from the study.

Development of intervention

The 'Managing Patients on Chemotherapy' module was developed through focus group discussion (FGD) and pilot test among a group of twenty cancer patients undergoing chemotherapy (not included in the study). This was followed by an evaluation among pharmacists to determine the need for such a module and also on what information was needed in the module. All feedback from the FGD, pilot test and pharmacists' evaluation were incorporated into this module. Consultations on the module development were also conducted with a group of experts. The panel of experts consisted of consultants and specialists in Pharmacy, Family Medicine, Public Health, Psychology, Oncology, Nutrition and Pharmacology.

The module covers a wide range of areas, which include information on chemotherapy and the side effects, how to prepare for chemotherapy, how to manage common chemotherapy side-effects, emotions associated with chemotherapy (including depression, anxiety and fear of recurrence of cancer), common questions asked by patients and instructions on how to use the module. In addition to the information provided, the module also emphasizes the need for pharmacists to spend more quality time with each patient receiving chemotherapy. The aim of the module is to guide the pharmacists in counseling patients as they undergo each chemotherapy cycle. This is not being practiced currently as most pharmacists do not have any guide to refer to, and have to rely on their own knowledge and experience based on each patient's questions and needs.

Randomization and blinding procedure

The list of all cancer patients who met the inclusion criteria served as the sampling frame of the present study. It was obtained from the cytotoxic drug reconstitution (CDR), Pharmacy Department of the hospital selected for this study. The patients were recruited on a daily basis depending on the number of patients who were registered. The patients' list was obtained daily and each patient was numbered until a total of 162 patients was obtained for both intervention and control groups. Each group had 81 patients.

The selected 162 patients were then randomly assigned into the intervention or control groups using the even and odd numbers selection. The odd numbers were assigned to the intervention group, while the even numbers were assigned to the control group. Patients who came in for chemotherapy according to their appointment date and met the inclusion criteria were numbered from number 1, 2, 3 and subsequently until a total number of 162 patients were recruited. The odd numbers were then assigned to the intervention group, while even numbers were assigned to the control group. The intervention group received chemotherapy counseling based on the "Managing Patients on Chemotherapy' module which was administered by the pharmacist-in-charge of this study. The patients in the control group followed the existing practice; where patients were only counseled to manage side effects when they came for the first time and for the first cycle; whereas patients in the intervention group received repetitive chemotherapy counseling at baseline, 1st follow-up, 2nd follow-up and 3rd follow- up sessions. Figure 1 shows the flow chart for the data collection procedure in the intervention and control groups.

A baseline measurement was performed on both intervention and control groups prior to the introduction of the intervention module using pretested questionnaires such as the Patient Health Questionnaire-9 (PHQ-9), Generalized Anxiety Disorder-7 (GAD-7) and Rosenberg Self-Esteem Scale. The efficacy endpoints were measured for three consecutive chemotherapy cycles; which were at 1st follow-up, 2nd follow-up and 3rd follow- up sessions. The duration between each cycle ranged from 3-6 weeks, depending on the chemotherapy treatment of the patient. It took 12 -18 weeks to complete the data collection for each patient.

Instruments

The questionnaire used in this study included questions on socio-demographic characteristics, depression, anxiety and self-esteem.

Socio-demographic characteristics

Items on the socio-demographic characteristics included age, gender, religion, education level, employment status, marital status, type of cancer, stage of cancer, family history of cancer, and treatment with psychoactive drugs.

Patient Health Questionnaire-9 (PHQ-9)

The Patient Health Questionnaire (PHQ) is an instrument for making criteria-based diagnoses of depressive and other mental disorders commonly encountered in primary care. At 9 items, the PHQ depression scale (PHQ-9) is half the length of many other depression measures, has comparable sensitivity and specificity, and consists of the actual 9 criteria upon which the diagnosis of DSM-IV depressive disorders is based.[17] As a severity measure, the PHQ-9 scores range from 0 to 27, where each of the nine items is scored from 0 (not at all) to 3 (nearly every day). A threshold score of 10 or higher is considered to indicate mild major depression, 15 or higher indicates moderate major depression, and 20 or higher indicates severe major depression.[17] The validated Malay version of (PHQ-9) which was found to have good sensitivity

and specificity was used to determine depression in this study.[18]

Generalized anxiety disorder-7 (GAD-7) Questionnaire
The Generalized Anxiety Disorder-7 (GAD-7) questionnaire was used to determine anxiety encountered by each cancer patient. The GAD-7 consisted of seven items measuring GAD, Post-Traumatic Stress Disorder (PTSD), panic disorder, and social anxiety. Each item had four answers "not at all", "several days", "more than half the days" and "nearly every day". Each of the seven items was scored from 0 (not at all) to 3 (nearly every day). Scores of GAD-7 ranged from 0 to 21; where scores of 5, 10, and 15 represent mild, moderate and severe anxiety symptoms, respectively.[19] The validated Malay version of GAD-7 which was found to have good sensitivity and specificity was used in this study.[20]

Rosenberg Self-Esteem Scale (RSES)
The Rosenberg Self-Esteem Scale (RSES) is used to determine the self-esteem level encountered by each cancer patient. It is a 10-item scale that determines self-esteem by measuring both positive and negative feelings about the self. All items were answered using a 4-point Likert scale format ranging from strongly agree to strongly disagree.[21] The higher the score indicated the higher the self-esteem.[22] The total number of questions was 10. Each question was coded as follows; Strongly Agree (1), Agree (2), Disagree (3) and Strongly Disagree (4). The validated Malay version of the Rosenberg self-esteem scale was used in this study.[23]

Sample size
The sample size calculated for this study was 81 participants in each group; making a total of 162 participants for both intervention and control groups.[24] The prevalence of disease free survival with chemotherapy at 5 years worldwide at 69% was used in the sample size estimation (NCI, 2012).[25]

Calculation of the sample size was based on the following formula;[24]

$n_1 = (Z_{\alpha/2}+Z_{\beta})^2 (A\sigma^2 + B\sigma^2) / d^2$

$Z_{\alpha/2}$ = the critical value of the Normal distribution at $\alpha/2$ (e.g. for a confidence level of 95%, α is 0.05 and the critical value is 1.96)

$Z\beta$ = the critical value of the Normal distribution at β (e.g. for a power of 80%, β is 0.2 and the critical value is 0.84),

σ^2 = is the population variance

d = is the different you would like to detect

Ethics Approval
Prior to the commencement of the study, approval was obtained from the Medical Research Ethics Committee of the Faculty of Medicine and Health Sciences, University Putra Malaysia and the National Medical Research Register (NMRR) of Malaysia. Approval from the Director of the participating hospital was also obtained prior to data collection.

Consent and respondent information sheets were distributed to each patient. The consent and information sheets informed about the study in general but did not mention whether the patients were in the intervention or control groups. This was to maintain the blinding process throughout the study. The patients were also informed of their voluntary participation and their right to withdraw if they refused participation. They were informed that even if they refused participation they were still allowed to ask any question or clarify any doubts anytime they wished but data would not be collected from them. The participants provided written consent to participate in this study. All signed consent forms were collected and the participants kept the information sheets for their reference.

Statistical Analysis
Data were collected and entered manually into the statistical computer software SPSS version 20 (IBM SPSS Statistics 20). Data were analyzed using descriptive and inferential statistics. Two-way repeated measures ANOVA test was employed to look at the main and interaction effects within and between groups for mean scores of psychological effects (depression, anxiety and self-esteem). It used partial eta squared (η^2) as a measure of effect size which represents the variance proportion in the dependent variable (depression, anxiety, self-esteem) that can be explained by the independent variable (received intervention or not). The interpretation of the strength of eta squared values used the guidelines by small effect (0.01), moderate effect (0.06), and large effect (0.14).[26] Confidence interval was set at 95% for the estimation of odds ratio and mean. The level of significance, alpha (α) was set at 0.05. Analysis on group time comparison were conducted using multiple pair wise comparisons. The level of significance, alpha (α) was set at 0.05 (Bonferroni correction) for these comparisons.

RESULTS

Table I shows the distribution of socio-demographic characteristics of the patients in the intervention and control groups. The results revealed that there was no significant difference in the proportion of respondents in the intervention and control groups. The mean age of respondents in the intervention group was 5.11 (SD = 1.38, 95%CI= 4.80 -5.42, standard error of skewness = 0.269) as compared to 4.84 (SD = 1.43, 95%CI = 4.52 – 5.16, standard error of skewness = 0.267) in the control group.

The age proportion of respondents in the intervention group did not differ significantly from the control group (χ^2 = 11.74, p = 0.168). Similarly, gender distribution (χ^2 =1.789, p= 0.181), race (χ^2 = 2.984, p= 0.394), religion (χ^2 = 3.184, p = 0.527), marital status (χ^2 = 4.818, p = 0.306), education level (χ^2 = 2.170, p = 0.538), and working status (χ^2 = 2.803, p = 0.246) in the intervention group did not differ significantly from the control group. In addition, cancer type (χ^2 = 5.216, p = 0.516), cancer stage (χ^2 = 1.037, p = 0.792), family history with cancer (χ^2 = 2.276, p = 0.131) and patients on anti-depression (FET = 1.307, p = 0.253) in the intervention group did not differ significantly from the control group.

Comparison on mean scores of depression, anxiety and self-esteem at baseline between the Intervention and Control groups
At baseline, depression showed overall mean scores of 1.35 (SD =1.05, 95% CI = 1.18- 1.51, standard error of skewness = 0.191), anxiety showed overall mean scores of 2.07 (SD = 0.87, 95% CI = 1.93 – 2.20, standard error of skewness =0.191), and the overall mean score at baseline for self-

esteem was 25.28 (SD= 6.77, 95% CI = 24.22- 26.33, standard error of skewness = 0.191). Table II shows that there was no significant difference in the mean scores for depression, anxiety and self-esteem between intervention and control groups at baseline. Table III shows that there was no significant difference in baseline comparison on depression and anxiety severity between the intervention and control groups.

Evaluation of Intervention on Depression
The main effect of group, time, and group vs. time interaction on Depression
Table IVa shows the comparison of group main effect on depression mean scores from baseline to end of the third follow-up between the intervention and control groups. There was no significant difference in mean scores of depression between the intervention (mean 1.41, SD =1.07, 95% CI = 1.17 – 1.64) and control (mean =1.29, SD = 1.03, 95%CI = 1.06 -1.52) groups at baseline (F (1, 160) = 0.523, p = 0.471). However, the mean depression scores was significantly different between both groups during first follow up (F (1, 160) = 16.031, p = 0.001), second follow-up (F (1, 160) = 36.232, p = 0.001) and third follow-up (F (1, 160) = 38.427, p = 0.001).

Table IVb shows the results of the two way repeated measures ANOVA analysis for depression between both group and time (baseline, first follow-up, second follow-up, and third follow-up), and interaction between groups and time. The assumption of sphericity was violated (Mauchly's test ($\chi 2$) = 99.970, p = 0. 0001), and therefore Greenhouse-Geisser corrected estimates were used in the results interpretation. The results show that there were significant main effects for group (F (1,159) = 14.939, p = 0.001, partial η^2 = 0.086); time (F (1,159) = 41.885, p = 0.001, partial η^2 = 0.209); and interaction between group and time (F (1,159) = 103.400, p = 0.001, partial η^2 = 0.394). Figure 2 shows the interaction between group and time, where depression severity increased in the control group, but decreased in the intervention group with each counseling session.

From the analysis, it is concluded that counseling was effective in reducing depression severity with each follow-up session with a large effect size. The large effect size indicates that the implementation of the intervention would detect an improvement in the severity of depression by a large magnitude of difference.

Evaluation of Intervention on Anxiety
The main effect of group, time, and group vs. time interaction on Anxiety
Table Va shows the comparison of group main effect on anxiety mean scores from baseline to the end of the third follow-up between the intervention and control groups. There was no significant difference in mean scores of anxiety between the intervention (mean 2.15, SD =0.81, 95% CI = 1.78 – 2.32) and control (mean =1.99, SD = 0.93, 95%CI = 1.78-2.20) groups at baseline (F (1, 160) = 1.363, p = 0.245) and first follow up (F (1, 160) = 0.417, p = 0.519). However, the mean anxiety scores were significantly different between both groups during the second follow-up (F (1, 160) = 16.047, p = 0.001) and third follow-up (F (1, 160) = 19.933, p = 0.001).

Table Vb shows the results of the two way repeated measures ANOVA analysis for anxiety on both groups (intervention and control) and time (baseline, first follow-up, second follow-up, and third follow-up) effects, and interaction between groups and time. The assumption of sphericity was violated (Mauchly's test (χ^2) = 42.688, p = 0. 001) and Greenhouse-Geisser corrected estimates were used in the results interpretation. There were significant main effects for group (F (1,159) = 4.940, p = 0.028, partial η^2 = 0.030); time (F (1,159) = 73.090, p = 0.001, partial η^2 = 0.315); and interaction between group and time (F (1,159) = 47.898, p = 0.001, partial η^2 = 0.232). Figure 3 shows the interaction between group and time, where depression severity increased in the control group, but decreased in the intervention group with each counseling session.

From the analysis, it is concluded that counseling was effective in reducing anxiety severity with each follow-up session with a large effect size. The large effect size indicates the implementation of the intervention would detect an improvement in the severity of anxiety by a large magnitude of difference.

Evaluation of Intervention on Self-esteem
The main effect of group, time and group vs. time interaction on Self-esteem
Table VIa shows the comparison of group main effect on self-esteem mean scores from baseline to the end of the third follow-up between the intervention and control groups. There was no significant difference in mean scores of self-esteem between the intervention (mean= 24.41, SD =6.92, 95% CI = 22.88 – 25.94) and control (mean =26.16, SD = 6.46, 95%CI = 24.71- 27.62) groups at baseline (F (1, 160) = 2.734, p = 0.100). However, the mean self-esteem scores was significantly different between both groups for first follow up (F (1, 160) = 13.265, p = 0.001), second follow-up (F (1, 160) = 30.783, p = 0.001) and third follow-up (F (1, 160) = 76.729, p = 0.001).

Table VIb shows the results of the two way repeated measures ANOVA analysis for self-esteem on both groups (intervention and control) and time (baseline, first follow-up, second follow-up, and third follow-up) effects, and interaction between group and time. The assumption of sphericity was violated (Mauchly's test (χ^2) = 184.296, p = 0. 001) and Greenhouse-Geisser corrected estimates were used in the results interpretation. The results showed that there were significant main effects for group (F (1,159) = 15.131, p = 0.001, partial η^2 = 0.087); time (F (1,159) = 2.955, p = 0.041, partial η^2 = 0.018); and interaction between group and time (F (1,159) = 187.196, p = 0.001, partial η^2 = 0.541). Figure 4 shows the interaction between group and time, where self-esteem reduced (decreased) in the control group, but improved (increased) in the intervention group with each counseling session.

From the analysis, it is concluded that counseling was effective in improving self-esteem with each follow-up session with a large effect size. The large effect size indicates the implementation of the intervention would detect an improvement in the self-esteem by a large magnitude of difference.

Table I: Socio- demographic characteristics of patients (n=161)

Characteristics	Frequency, n (%)		Total	Test	p value
	Intervention group	Control group			
1. Age					
< 45	8 (9.9)	13(16.3)	21(13.1)	χ^2	0.168
45-54	14(17.3)	15(18.8)	29(18.0)		
55-64	21(25.9)	27(33.8)	48(29.8)		
> 64	38(46.9)	25(31.1)	63(39.1)		
Total	81(100)	80(100)	161(100)		
Mean, SD	67.46(1.38)	63.52(1.43)	65.49(1.41)	t	0.219
95%CI	(66.08-68.84)	(62.09-64.95)	(64.08-66.90)		
2. Gender					
Male	34(42.0)	42(52.5)	76(47.2)	χ^2	0.181
Female	47(58.0)	38(47.5)	85(52.8)		
3. Race					
Malay	44(54.3)	40(50.0)	84(52.2)	χ^2	0.394
Chinese	22(27.2)	26(32.5)	48(29.8)		
Indian	14(17.3)	10(12.5)	24(14.9)		
Others	1 (1.2)	4 (5.0)	5 (3.1)		
4. Religion					
Islam	44(54.3)	40(50.0)	84(52.2)	χ^2	0.527
Buddha	22(27.2)	26(32.5)	48(29.8)		
Hindu	14(17.3)	10(12.5)	24(14.9)		
Christian	1 (1.2)	3 (3.8)	4 (2.5)		
Others	0 (0)	1 (1.2)	1 (0.6)		
No Religion	0 (0)	0 (0)	0 (0)		
5. Marital Status					
Single	8 (9.9)	3 (3.8)	11 (6.9)	χ^2	0.306
Married	54(66.7)	62(77.5)	116(72.1)		
Widowed	10(12.3)	11(13.7)	21(13.0)		
Divorced	5 (6.2)	2 (2.5)	7 (4.3)		
Separate	4 (4.9)	2 (2.5)	6 (3.7)		
6. Number of Children					
No Child	11(13.6)	7 (8.8)	18(11.2)	χ^2	0.490
1-2	26(32.1)	27(33.7)	53(32.9)		
3-4	23(28.4)	31(38.7)	54(33.5)		
>4	21(25.9)	15(18.8)	36(22.4)		
7. Number of Family members Living Together					
None	7 (8.6)	7 (8.8)	14 (8.6)	χ^2	0.902
1-2	20(24.7)	17(21.2)	37(23.0)		
3-4	18(22.3)	23(28.8)	41(25.5)		
>4	36(44.4)	33(41.2)	69(42.9)		
8. Education level					
Primary	15(18.5)	18(22.5)	33(20.5)	χ^2	0.538
Secondary	32(39.5)	23(28.8)	55(34.2)		
University	16(19.8)	17(21.2)	33(20.5)		
None	18(22.2)	22(27.5)	40(24.8)		
9. Working status					
Yes	32(39.5)	27(33.8)	59(36.6)	χ^2	0.246
No	33(40.7)	28(35.0)	61(37.9)		
Retired	16(19.8)	25(31.2)	41(25.5)		
10. Monthly Income					
No income	33(40.7)	28(35.0)	61(37.9)	χ^2	0.381
< 1501	14(17.3)	18(22.5)	32(19.9)		
1501-3500	22(27.2)	16(20.0)	38(23.6)		
>3500	12(14.8)	18(22.5)	30(18.6)		

Table I: Socio- demographic characteristics of patients (n=161) continue

Characteristics	Frequency, n (%)		Total	Test	p value
	Intervention group	Control group			
16. Treated with anti-depressants					
Yes	5 (6.2)	9(11.2)	14 (8.7)	FET	0.194
No	76(93.8)	71(88.8)	147(91.3)		
17. Alternative Medication					
Yes	8 (9.9)	8(10.0)	16 (9.9)	FET	0.539
No	73(90.1)	72(90.0)	145(90.1)		
18. Hormone Medication					
Yes	27(33.3)	20(25.0)	47(29.2)	χ^2	0.245
No	54(66.7)	60(75.0)	114(70.8)		
19. Joined Cancer Support Society					
Yes	5 (6.2)	1 (1.2)	6 (3.7)	FET	0.108
No	76(93.8)	79(98.8)	155(96.3)		

Chi square test ($\chi 2$), Fisher's exact test (FET)
*Significant at $p < 0.05$

Table II: Baseline comparison on mean scores of psychological effects and self-esteem between the intervention and control group

Outcome measures	Mean score(SD)			p-value
	Overall	Intervention	Control	
Psychological Effects				
Depression	1.35(1.05)	1.41(1.07)	1.29(1.03)	0.471
Anxiety	2.07(0.87)	2.15(0.81)	1.99(0.93)	0.245
Self Esteem	25.28(6.77)	24.41(6.92)	26.16(6.55)	0.100

p value was calculated using an independent t-test
*Significant at $p < 0.05$

Table III: Baseline comparison of depression and anxiety between the intervention and control group

Outcome measure	Frequency, n (%)		Total	p[a] value
	Intervention group	Control group		
Psychological effects				
1. Depression				
Normal	20(24.7)	22(27.5)	42(26.1)	0.878
Mild	24(29.6)	25(31.3)	49(30.4)	
Moderate	21(25.9)	21(26.2)	42(26.1)	
Severe	16(19.8)	12(15.0)	28(17.4)	
2. Anxiety				
Normal	4 (4.9)	6 (7.5)	10 (6.2)	0.227
Mild	9(11.2)	17(21.3)	26(16.2)	
Moderate	39(48.1)	29(36.2)	68(42.2)	
Severe	29(35.8)	28(35.0)	57(35.4)	

Chi square test ($\chi 2$)
*Significant at $p < 0.05$

Table IVa: Group main effect on Depression at baseline, 1st follow-up, 2nd follow-up and 3rd follow-up: Comparison between Intervention and Control groups

Outcome measures	Mean ± SD (95%CI)		F	p value
	Intervention group (n =81)	Control group (n= 80)		
Depression			One way ANOVA	
Baseline	1.41 ± 1.07(1.17-1.64)	1.29 ± 1.03(1.06-1.52)	0.523	0.471
1st follow-up	0.78 ± 0.84(0.59-0.96)	1.36± 1.01(1.14-1.59)	16.031	0.001*
2nd follow-up	0.57 ± 0.88(0.37-0.76)	1.44 ± 0.95(1.23-1.65)	36.232	0.001*
3rd follow-up	0.62± 0.87(0.42-0.81)	1.54 ± 1.01(1.31-1.76)	38.427	0.001*

Significant at $p < 0.05$

Table IVb: Main effect of group, time and group vs. time interaction on Depression

Source	Type III Sum of Squares	df	Mean square	F	p value	Partial Η²
Depression						
Group	51.149	1	51.149	14.939	0.001*	0.086
Error(Between)	544.410	159	3.424			
Time	11.224	2.130	5.270	41.885	0.001*	0.209
Group*Time	27.709	2.130	13.009	103.400	0.001*	0.394
Error (within)	42.608	338.658	0.126			

*Significant at p<0.05

Table Va: Group main effect on Anxiety at baseline, 1st follow-up, 2nd follow-up and 3rd follow-up: Comparison between Intervention and Control groups

Outcome measures	Mean ± SD (95%CI)		F	p value
	Intervention group (n =81)	Control group (n= 80)		
Anxiety			One way ANOVA	
Baseline	2.15 ± 0.81(1.78-2.32)	1.99 ± 0.93(1.78-2.20)	1.363	0.245
1st follow-up	1.80 ± 0.93(1.60-2.01)	1.90± 0.99(1.68-2.12)	0.417	0.519
2nd follow-up	1.22± 1.02(1.00-1.45)	1.86 ± 1.00(1.64-2.09)	16.047	0.001*
3rd follow-up	1.21± 0.94(1.00-1.42)	1.89± 0.98(1.67-2.11)	19.933	0.001*

Significant at p < 0.05

Table Vb: Main effect of group, time and group vs. time interaction on Anxiety

Source	Type III Sum of Squares	df	Mean square	F	p value	Partial Η²
Anxiety						
Group	15.843	1	15.843	4.940	0.028*	0.030
Error(Between)	509.906	159	3.207			
Time	31.374	2.561	12.253	73.090	0.001*	0.315
Group*Time	20.560	2.561	8.030	47.898	0.001*	0.232
Error (within)	68.251	407.126	0.168			

*Significant at p<0.05

Table VIa: Group main effect on Self-esteem at baseline, 1st follow-up, 2nd follow-up and 3rd follow-up: Comparison between Intervention and Control groups

Outcome measures	Mean ± SD (95%CI)		F	p value
	Intervention group (n =81)	Control group (n= 80)		
Baseline	24.41 ± 6.92(22.88-25.94)	26.16 ± 6.46(24.71-27.62)	2.734	0.100
1st follow-up	26.99 ± 6.73(25.50-28.48)	23.46± 5.48(22.24-28.48)	13.265	0.001*
2nd follow-up	28.25± 6.55(26.80-29.70)	23.01 ± 5.35 (21.82-24.20)	30.783	0.001*
3rd follow-up	29.41± 5.97(28.09-30.73)	22.03± 4.64(20.99-23.057)	76.729	0.001*

*Significant at p < 0.05

Table VIb: Main effect of group, time and group vs. time interaction on Self-esteem

Source	Type III Sum of Squares	Df	Mean square	F	p value	Partial Η²
Self-esteem						
Group	2082.680	1	2082.680	15.131	0.001*	0.087
Error(Between)	21885.922	159	137.647			
Time	29.012	1.745	16.622	2.955	0.041*	0.018
Group*Time	1837.764	1.745	1052.898	187.196	0.001*	0.541
Error (within)	1560.951	277.524	5.625			

*Significant at p<0.05

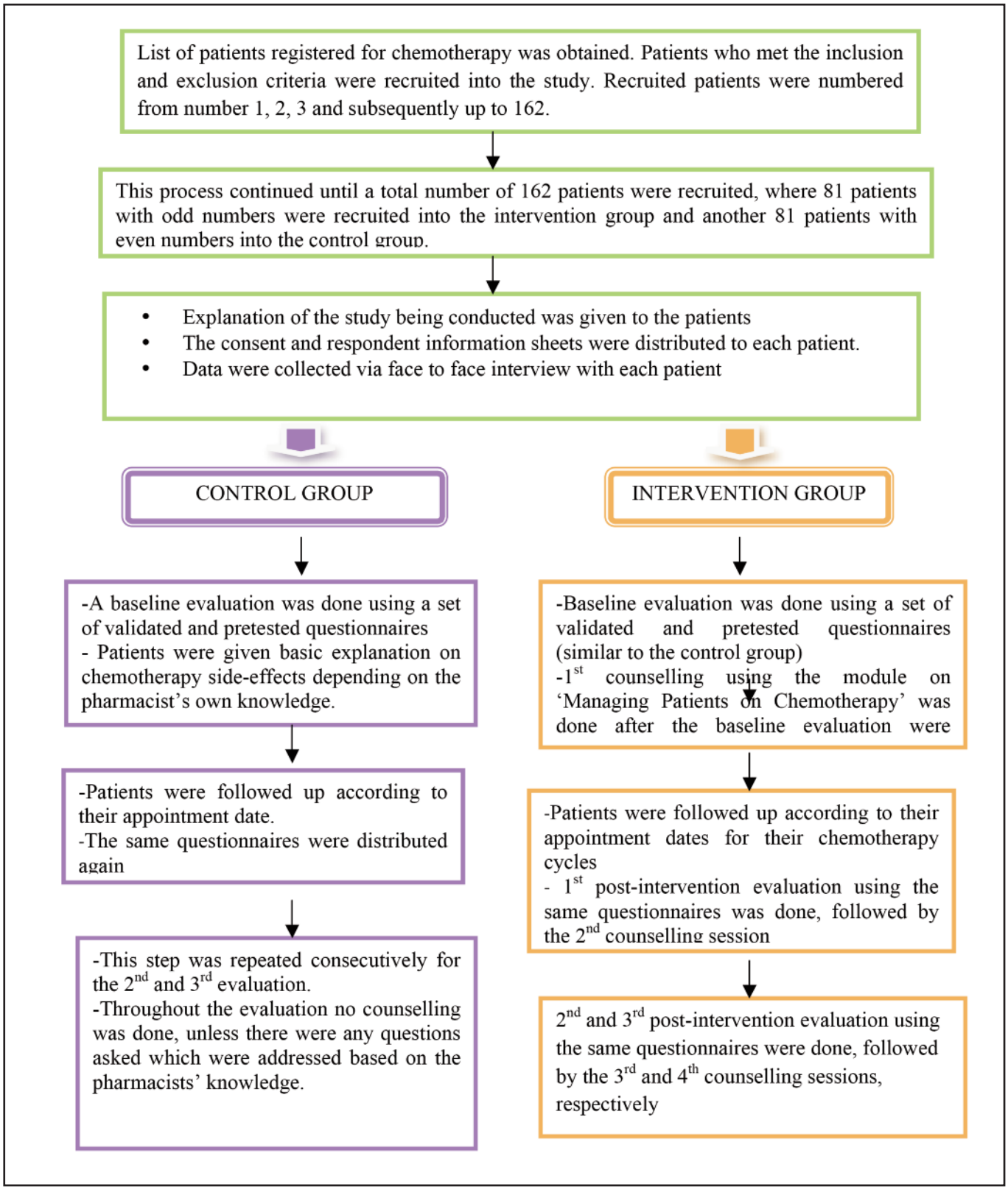

Fig. 1: A schematic diagram of the Data Collection procedure.

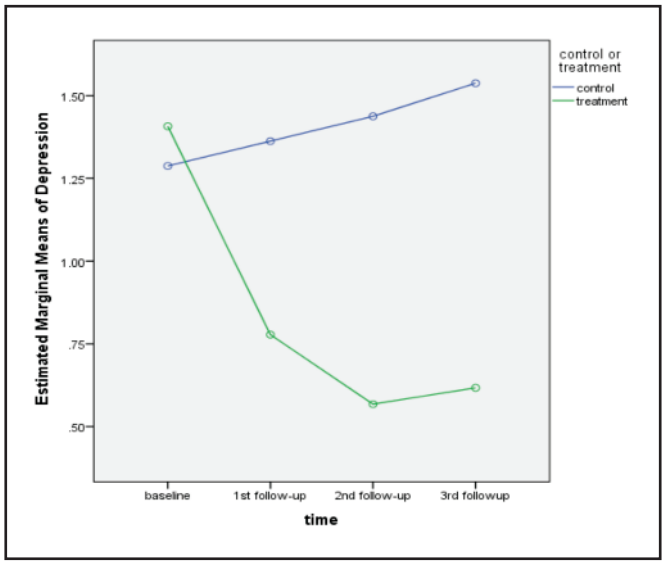

Fig. 2: The interaction plot between group and time for Depression mean scores.

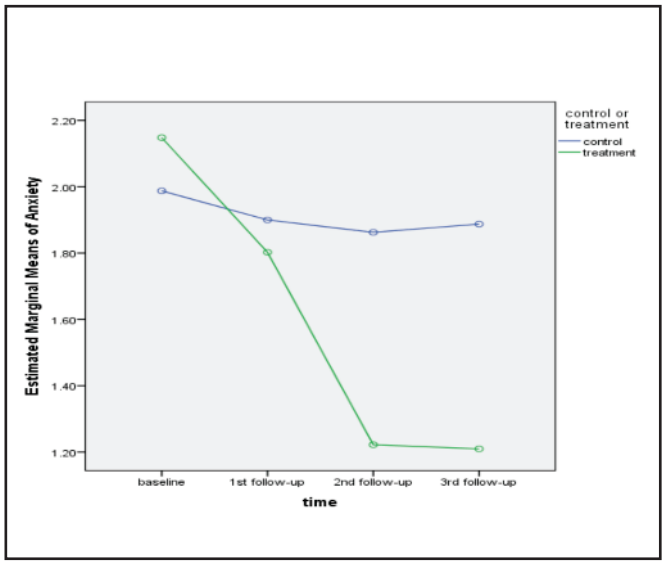

Fig. 3: The interaction plot between group and time for Anxiety mean scores.

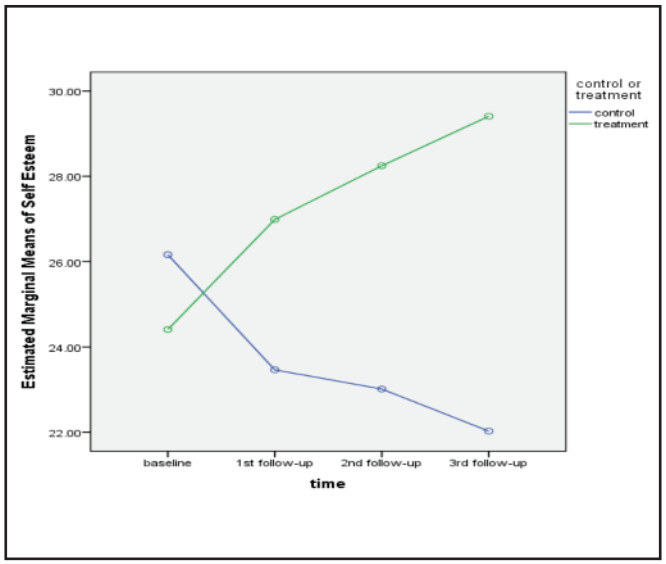

Fig. 4: The interaction plot between group and time for Self-esteem mean scores.

DISCUSSION

Depression

In this study, there were no significant differences in depression scores between the intervention and control groups at baseline. The study results revealed that, the baseline percentage number of patients who had depression was 73.9 % which includes mild, moderate and severe depression. According to Lloyd-Williams, (2001) severe depression is a co morbid disabling syndrome that affects approximately 15% to 25% of cancer patients.[27] Massie, (2004) further reported that the prevalence for major depression was between 0% - 38%; while in patients with depression spectrum syndromes was 0% to 58%.[28] There was significant improvement in this study with large effect size for depression (p = 0.394) over time with repetitive counseling among patients in the intervention group. In comparison to the control group, there were significant reductions in the severity of depression in the intervention group upon subsequent follow-ups. The study observed that spending quality time with patients and frequent interaction improved the patients' view of managing their disease positively. Additionally, the pharmacists had the chance to positively impact this population of patients as well as the outcome of their treatment.[29] Another study conducted in Kuwait, revealed that despite patients receiving explanation on their disease and treatment from their physicians, they are often searching for more information. In addition, patients reported that the pharmacists' counseling on drugs and their side-effects was more comprehensive than the physicians' explanation.[30] A local study mentioned one of the main reasons given for a delay in seeking treatment is the fear of side effects. However perceptions were reported to change after receiving treatment when effective management and counseling given to reduce the risk of side effects had been experienced.[31] Another study revealed that in addition to comprehensive counseling, the pharmacist played an important role in the treatment of depression through adherence and frequent follow-up. Adherence involves a partnership between the patient and physician / pharmacist with regard to health –related decisions.[32]

Anxiety

In this study, the results for anxiety showed there were no significant differences between the intervention and control groups at baseline. The study results showed that at baseline, the percentage of patients who had anxiety was 93.8% which included mild, moderate and severe anxiety. However, there was significant improvement in this study with large effect size for anxiety (p = 0.232) over time with repetitive counseling among oncology patients in the intervention group. In comparison to the control group, there were significant reductions in the severity of anxiety upon the subsequent follow-ups. In China, the prevalence of anxiety in cancer patients was (32% to 40%).[33] A similar study indicated that person-centered counseling is effective for patients with

common mental health problems, such as anxiety and depression. Effectiveness is not limited to individuals with mild to moderate symptoms of recent onset, but extends to people with moderate to severe symptoms of longer duration.[34]

Self-esteem

In this study, the results for self-esteem showed that there were no significant differences between the intervention and control groups at baseline. At baseline the patients had a self-esteem mean score of 25. However there was significant improvement in this study with large effect size for self-esteem (p = 0.541) upon time with repetitive counseling in the intervention group. In comparison to the control group, there was a significant improvement in the self-esteem upon the subsequent follow-ups. A study has showed that some cancer survivors report feelings of anger, isolation, and diminished self-esteem in response to chemotherapy side effects. However, a close relationship with medical staffs, spending quality time with them has led to psychological improvement.[35] The study also suggests that patients who are being overshadowed by fear of failure, not feeling good enough, and a lack of confidence is alleviated through counseling with a sense of personal value and an identity independent of what they do or how others view them.[35]

The important role of pharmacists in managing patients undergoing chemotherapy

The pharmacist is in a unique position to collaborate with health care professionals and optimize care. Since the oncology health care team can be quite complex, consisting of surgeons, oncologists, and primary care providers, the pharmacist is in the best position to coordinate drug therapy as a consistently present member of the team.[14] Pharmacists, therefore play a big role in improving the adherence to chemotherapy through effective counseling.[14] Mancini *et al.* (2011) reported that the goal of including a pharmacist in the care of patients with cancer is to avoid focusing only on oncology.[15] The study also said that, to treat patients with cancer, the whole patient should be treated; this includes knowing, understanding, and reviewing the other co-morbidities these patients may have. A pharmacist is uniquely trained to understand all the medications a patient may be using and how those interact with the cancer treatment medications.

While it is acknowledged that holistic approach is often adopted in the care of cancer patients, and other medical and health personnel (namely physicians, oncologists and nurses) as well as family members and carers have important roles in the management and care of cancer patients, this study was conducted to evaluate the effectiveness of chemotherapy counselling by pharmacists. In hospital settings, pharmacists play a large role on patient support and care in managing their side-effects due to chemotherapy; and to prepare them mentally and physically in coping with these side-effects. This study provided evidence that chemotherapy counselling by pharmacists could reduce depression and anxiety; and improve self –esteem of patients. This shows that chemotherapy counselling can reduce the severity of depression and anxiety among cancer patients, and hopefully this helps patients to cope with their treatment and disease, and improve their quality of life.

Implications of the study

The 'Managing Patients on Chemotherapy' module can be utilized in all hospitals for patients undergoing chemotherapy to minimize chemotherapy induced side –effects among all patients undergoing chemotherapy. As found in this study, this module helps pharmacists to spend quality time with each patient individually to overcome chemotherapy induced psychological effects and self-esteem. In addition, repetitive counseling which is conducted frequently and in every cycle helps to monitor its sustained effects among oncology patients undergoing chemotherapy.

Strengths and Limitations

The major strength of the study was the use of a randomized, single blind, placebo controlled study design to evaluate the effectiveness of a chemotherapy counseling module. The study design was considered as a method to measure the efficacy of an intervention on the outcome measures. The use of a comparable control group in the study helped in controlling the effect of maturation which is one of the threats to the internal validity of the study. The presence of the control group helped in controlling the effect of biological or psychological changes that may occur within the patients due to the passage of time. Random assignment of the respondents into the intervention and control groups reduced the threat of selection bias on the internal validity of the study. It helped in controlling the significant differences between patients in both groups before the intervention. Conducting a pre-test for baseline assessment before the intervention and administering post-test evaluations in the study at selected time intervals helped in controlling the effect of history. It controlled the events that happened outside the experiment which could have affected the measurement of the outcomes. The blinding process in the study helped in controlling the effect of testing on the study results. The patients did not know which groups they were allocated to; hence they could not be subjected to response bias while answering the questions especially on evaluating the post-test assessments among those in the intervention group.

One of the limitations in the study was that all of the patients' symptoms were self-reported and it was sometimes difficult to determine whether the symptoms were due to cancer or chemotherapy, or even other co-morbid factors. No physicians were involved in this study, unless there were patients with severe depression and anxiety, as well as any suicidal tendencies. These patients were immediately referred to the psychiatrist. Another limitation was that there were no other local publications or studies found in this area. As far as we know this is the first study conducted in Malaysia on managing psychological effects and self-esteem due to chemotherapy side effects.

CONCLUSION

In conclusion, the main pitfall of chemotherapy is its adverse effects. The side effects of chemotherapy have been heavily publicized and therefore, patients are aware of it. However, the details of the side effects such as the severity and frequency have not been well explained. In addition, the message that these side effects are preventable and treatable with medications is also not properly delivered. As a result,

the impression on side effects of chemotherapy among the public is bias and skewed. Therefore, correct information given by the appropriate medical profession such as pharmacists is essential to alleviate unnecessary worries and fears toward chemotherapy among the patients.

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