Effectiveness of music therapy on biophysiological and psychological outcomes during chemotherapy among patients with cancer- A pilot study

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Introduction

The diagnosis and the treatment for cancer are significant stressors for the patients. Chemotherapy is often considered the most stressful of the treatment modalities primarily as a result of the myriad of side effects that the patient has to endure. The diagnosis can affect the patient's physical, psychological well being. They experience a wide range of symptoms and side effects due to different procedures and treatment options. The role of complementary and alternative therapies has increased dramatically. One complementary therapy that can be of value to decrease psychosocial distress in the oncology setting is music therapy. The music as therapy is now practiced worldwide in various health care settings and medical departments, including geriatric medicine, gynecology, general surgery, pediatrics, cardiology, oncology and palliative care, adult and child psychiatry, drug abuse and rehabilitation. Music has improved the mood and decreased anxiety and pain associated with surgery and medical procedures. In chronic conditions, music is shown to improve quality of life during end-of-life care. With the above mentioned background, the aim of the present study was to determine the effect of music therapy on biophysiological and psychological parameters of patients with cancer undergoing for the first chemotherapy in the oncology centre.

Materials and Method

The quasi experimental research with time series control group design was adopted to carry out the study. The total 20 study participants were selected from the two hospitals (control and experimental group). The patients with cancer receiving chemotherapy were selected by using purposive sampling technique with the inclusion criteria such as willing to participate in the study, available at the time of date collection and the participants were excluded those who are, unable to listen to music due to hearing problems, having head and neck cancer, having diabetes, hypertension and thyroid problems.

To determine the equality of variance among two groups of sample, Levine's test was used and the p value (0.05). Variability in the two groups was not significantly different. Hence it was concluded that the two groups of the pilot study were homogenous.

Data collection procedure: The formal permission from the authorities was obtained before collecting the data. Study purpose was explained to the participants with assurance of confidentiality and informed consent was taken. The pre-test was done on the 1st day by assessing the bio-physiological parameters such as collection of saliva, assessment of Blood pressure, heart rate, temperature and pain level by using the researcher developed methods and protocols and psychological outcomes like anxiety and quality of life using the standardized tools (state anxiety inventory and QLQ C-30). A music preference questionnaire was administered to the experimental group before administration of music therapy. Music was administered to the experimental group by following the researcher developed protocol for 3 hours of duration.

Control group was provided with the standard routine care during the chemotherapy. The oncology unit of both experimental and control group setting were free from other entertainment resources such as television, centralized music systems etc. family members were well informed about the study and its benefits and they were kept away from the study boundaries.

The post tests were done on the day 1 i.e. soon after the intervention for the experimental group and after three hours of chemotherapy for the control group. Post tests were also done on day 2, day 3, day 4 and day 5. The data was collected before and after the intervention was tabulated, analyzed and interpreted by using descriptive and inferential statistics according to the objectives and hypothesis of the study.

Results

Frequency and percentage distribution of subjects (patients with cancer) according to their baseline characteristics

Variable	Frequency(f)		Percentage (%)	
	Exp	Cont	Exp	Cont
Age (in years)				
21-30	2	3	20	33.3
31-40	4	2	40	22.2
41-50	3	3	30	33.3
51-60	1	1	10	11.1
Gender				
Male	5	5	50	55.6
Female	5	4	50	44.4
Education				
No formal education	4	2	40	22.2
Primary education	-	5	-	55.6
Secondary education	2	1	20	11.1
Pre university	3	1	30	11.1
Degree and above	1	-	10	-
Occupation				
Home maker	4	4	40	44.4
Agriculture	2	2	20	22.2
Business	3	2	30	22.2
Private/Govt employ	1	1	10	11.1
Unemployed	-	-	-	-
Marital status				
Married	7	7	70	77.8
Unmarried	3	2	30	22.2
Divorced/separated	-	-	-	-
Widow	-	-	-	-
Type of cancer				
Ca Lung	1	1	10	11.1
Ca Bladder	1	1	10	11.1
Ca Breast	2	1	20	11.1
Ca Cervix	2	-	20	-
Ca Ovary	-	-	-	-
Ca Stomach	1	3	10	33.3
Ca Rectum	1	1	10	11.1
Ca Kidney	1	1	10	11.1
Lymphoma	1	1	10	11.1
Ca Colon	-	-	-	-
Leukaemia	-	-	-	-
Stage of cancer				
I stage	1	1	10	11.1
II stage	5	4	50	44.4
III stage	4	4	40	44.4
IV stage	-	-	-	-
Type of treatment				
Adjuvant chemotherapy	7	7	70	77.8
Neo adjuvant chemotherapy	3	2	30	22.2
Exposure to any therapies before				
Yes	-	-	-	-
No	10	9	100	100

Exposure to music therapy before				
Yes	-	-	-	-
No	10	9	100	100

Mean, Mean Difference, Standard Deviation, 't' value and 'p' value between Pre-test and Post-test amylase level of experimental and control group

	Exp (M±Sd)	**Cont (M±Sd)**
Pre (day 1)	812.9269±381.44907	788.8740±221.39823
Post (day 3)	601.1475±225.39151	808.1149±243.06356
Post (day 5)	502.9840±267.79665	876.2224±302.62764
	Mean Diff	**Mean Diff**
Pre (day 1)-post (day 3)	211.77940	-19.24089
Pre (day 1)-post (day 5)	316.85980	-104.56680
	T value	**T value**
Pre (day 1)-post (day 3)	3.893	-0.669
Pre (day 1)-post (day 5)	3.100	-2.740
	P value	**P value**
Pre (day 1)-post (day 3)	0.004*	0.522
Pre (day 1)-post (day 5)	0.036*	0.052

*-significant ($p<0.05$)

The data in the above table shows that the mean post test amylase score was significantly lower than the mean pre test score compared to the control group.

Mean, Mean Difference, Standard Deviation, 't' value and 'p' value between Pre-test and Post-test score of blood pressure (Systolic) among experimental and control group

	Exp (M±Sd)	**Cont (M±Sd)**
Pre (Day 1)	132.9000±6.99921	136.2222±9.92192
Post (Day 1)	127.2000±6.54557	139.5556±7.60117
Post (Day 2)	128.4000±6.58618	140.4444±6.61648
Post (Day 3)	128.2000±7.14609	140.7778±7.57921
Post (Day 4)	128.0000±7.61577	143.2000±8.31865
Post (Day 5)	126.0000±6.16441	143.8000±7.22496
	Mean Diff	**Mean Diff**
Pre (Day 1)-post(Day 1)	5.70000	-3.33333
Pre(Day 1)-post(Day 2)	4.50000	-4.22222
Pre (Day 1)- Post (Day 3)	4.70000	-4.55556
Pre (Day 1)- Post (Day 4)	7.00000	-2.00000
Pre (Day 1)- Post (Day 5)	9.00000	-2.60000
	t value	**t value**
Pre (Day 1)-post(Day 1)	5.405	-2.774
Pre(Day 1)-post(Day 2)	2.971	-2.562
Pre (Day 1)- Post (Day 3)	4.211	-2.692
Pre (Day 1)- Post (Day 4)	5.217	-2.236
Pre (Day 1)- Post (Day 5)	6.708	-1.692
	p value	**p value**
Pre (Day 1)-post(Day 1)	0.000*	0.024
Pre(Day 1)-post(Day 2)	0.016*	0.034
Pre (Day 1)- Post (Day 3)	0.002*	0.027
Pre (Day 1)- Post (Day 4)	0.006*	0.089
Pre (Day 1)- Post (Day 5)	0.003*	0.166

*-significant ($p<0.05$)

The data in the above table shows that the mean post test blood pressure(systolic) score was significantly lower than the mean pre test score compared to the control group.

Mean, Mean Difference, Standard Deviation, 't' value and 'p' value between Pre-test and Post-test score of blood pressure (Diastolic) among experimental and control group

	Exp (M±Sd)	**Cont (M±Sd)**
Pre (Day 1)	83.2000±3.79473	83.3333±4.12311
Post (Day 1)	79.0000±3.91578	85.7778±2.72845
Post (Day 2)	80.6000±2.67499	84.2222±2.53859
Post (Day 3)	79.2000±3.42540	83.0000±2.44949
Post (Day 4)	79.6000±3.84708	82.8000±2.28035
Post (Day 5)	79.6000±2.96648	82.8000±2.28035
	Mean Diff	**Mean Diff**
Pre (Day 1)-post(Day 1)	4.20000	-2.44444
Pre(Day 1)-post(Day 2)	2.60000	-0.88889
Pre (Day 1)- Post (Day 3)	4.00000	0.33333
Pre (Day 1)- Post (Day 4)	4.00000	2.00000
Pre (Day 1)- Post (Day 5)	4.00000	2.00000
	t value	**t value**
Pre (Day 1)-post(Day 1)	7.584	-3.355
Pre(Day 1)-post(Day 2)	2.414	-0.800
Pre (Day 1)- Post (Day 3)	3.464	0.316
Pre (Day 1)- Post (Day 4)	2.390	1.118
Pre (Day 1)- Post (Day5)	2.582	1.118
	p value	**p value**
Pre (Day 1)-post(Day 1)	0.000*	0.010
Pre(Day 1)-post(Day 2)	0.039*	0.447
Pre (Day 1)- Post (Day 3)	0.007*	0.760
Pre (Day 1)- Post (Day 4)	0.075*	0.326
Pre (Day 1)- Post (Day 5)	0.061*	0.326

*-significant ($p<0.05$)

The data in the above table shows that the mean post test blood pressure (diastolic) score was significantly lower than the mean pre test score compared to the control group.

Mean, Mean Difference, Standard Deviation, 't' value and 'p' value Between Pre-test and Post-test score of heart rate among experimental and control group

	Exp (M±Sd)	**Cont (M±Sd)**
Pre (Day 1)	77.2000±4.73286	75.4444±4.50309
Post (Day 1)	72.5000±3.86580	78.0000±3.74166
Post (Day 2)	72.8000±4.54117	76.1111±4.25572
Post (Day 3)	73.9000±4.67737	76.0000±4.35890
Post (Day 4)	73.6000±5.54977	74.4000±1.67332
Post (Day 5)	72.4000±4.33590	76.0000±3.16228
	Mean Diff	**Mean Diff**
Pre (Day 1)-post(Day 1)	4.70000	-2.55556
Pre(Day 1)-post(Day 2)	4.40000	-0.66667
Pre (Day 1)- Post (Day 3)	3.30000	-0.55556
Pre (Day 1)- Post (Day 4)	5.20000	0.60000
Pre (Day 1)- Post (Day 5)	6.40000	-1.00000
	t value	**t value**
Pre (Day 1)-post(Day 1)	6.714	-3.190
Pre(Day 1)-post(Day 2)	6.128	-0.610
Pre (Day 1)- Post (Day 3)	4.038	-0.618
Pre (Day 1)- Post (Day 4)	10.614	0.302
Pre (Day 1)- Post (Day5)	6.532	-0.620
	p value	**p value**
Pre (Day 1)-post(Day 1)	0.000*	0.013

Pre(Day 1)-post(Day 2)	0.000*	0.559
Pre (Day 1)- Post (Day 3)	0.003*	0.554
Pre (Day 1)- Post (Day 4)	0.000*	0.778
Pre (Day 1)- Post (Day 5)	0.003*	0.569

*-significant($p<0.05$)

The data in the above table shows that the mean post test heart rate score was significantly lower than the mean pre test score compared to the control group.

Mean, Mean Difference, Standard Deviation, 't' value and 'p' value Between Pre-test and Post-test score of pain level among experimental and control group

	Exp (M±Sd)	**Cont (M±Sd)**
Pre (Day 1)	7.2000±1.03280	7.0000±1.32288
Post (Day 1)	5.9000±0.99443	6.8889±1.16667
Post (Day 2)	5.2000±0.78881	6.7778±0.83333
Post (Day 3)	4.2000±0.78881	6.4444±0.88192
Post (Day 4)	4.6000±0.54772	6.4000±0.54772
Post (Day 5)	4.0000±0.00000	6.6000±0.89443
	Mean Diff	**Mean Diff**
Pre (Day 1)-post(Day 1)	1.30000	0.11111
Pre(Day 1)-post(Day 2)	2.00000	0.22222
Pre (Day 1)- Post (Day 3)	3.00000	0.55556
Pre (Day 1)- Post (Day 4)	3.00000	0.80000
Pre (Day 1)- Post (Day 5)	3.60000	0.60000
	t value	**t value**
Pre (Day 1)-post(Day 1)	4.333	0.426
Pre(Day 1)-post(Day 2)	6.708	0.686
Pre (Day 1)- Post (Day 3)	8.216	1.890
Pre (Day 1)- Post (Day 4)	6.708	1.633
Pre (Day 1)- Post (Day5)	9.000	1.000
	p value	**p value**
Pre (Day 1)-post(Day 1)	0.002*	0.681
Pre(Day 1)-post(Day 2)	0.000*	0.512
Pre (Day 1)- Post (Day 3)	0.000*	0.095
Pre (Day 1)- Post (Day 4)	0.003*	0.178
Pre (Day 1)- Post (Day 5)	0.001*	0.374

*-significant($p<0.05$)

The data in the above table shows that the mean post test pain score was significantly lower than the mean pre test score compared to the control group.

Mean, Mean Difference, Standard Deviation, 't' value and p value Between Pre-test and Post-test score of temperature among experimental and control group

	Exp (M±Sd)	**Cont (M±Sd)**
Pre (Day 1)	100.5200±1.63081	98.7111±0.86233
Post (Day 1)	100.0000±1.39682	98.9889±0.86378
Post (Day 2)	99.0500±1.04376	98.7333±0.52915
Post (Day 3)	98.8000±0.95801	98.8556±0.38115
Post (Day 4)	98.4400±0.43932	98.8000±1.02956
Post (Day 5)	97.9800±0.41473	98.8000±1.04642
	Mean Diff	**Mean Diff**
Pre (Day 1)-post(Day 1)	0.52000	-2.7778
Pre(Day 1)-post(Day 2)	1.47000	-0.02222
Pre (Day 1)- Post (Day 3)	1.72000	-0.14444

Pre (Day 1)- Post (Day 4)	2.08000	-0.40000
Pre (Day 1)- Post (Day 5)	2.54000	-0.40000
	t value	**t value**
Pre (Day 1)-post(Day 1)	4.146	-2.174
Pre(Day 1)-post(Day 2)	4.777	-0.155
Pre (Day 1)- Post (Day 3)	5.003	-0.730
Pre (Day 1)- Post (Day 4)	6.232	-1.414
Pre (Day 1)- Post (Day 5)	7.672	-1.569
	p value	**p value**
Pre (Day 1)-post(Day 1)	0.003*	0.061
Pre(Day 1)-post(Day 2)	0.001*	0.880
Pre (Day 1)- Post (Day 3)	0.001*	0.486
Pre (Day 1)- Post (Day 4)	0.003*	0.230
Pre (Day 1)- Post (Day 5)	0.002*	0.192

*-significant($p<0.05$)

The data in the above table shows that the mean post test temperature score was significantly lower than the mean pre test score compared to the control group.

Mean, Mean Difference, Standard Deviation, 't' value and 'p' value between Pre-test and Post-test score of anxiety among experimental and control group

	Exp (M±Sd)	**Cont (M±Sd)**
Pre (Day 1)	70.9000±3.07137	66.5556±2.18581
Post (Day 1)	41.9000±3.95671	68.3333±1.58114
Post (Day 2)	31.0000±4.13656	71.0000±2.17945
Post (Day 3)	28.3000±2.35938	72.0000±2.34521
Post (Day 4)	24.2000±2.16795	72.4000±2.07364
Post (Day 5)	23.2000±1.30384	71.6000±3.04959
	Mean diff	**Mean diff**
Pre (Day 1)-post(Day 1)	29.00000	-1.77778
Pre(Day 1)-post(Day 2)	39.90000	-4.4444
Pre (Day 1)- Post (Day 3)	42.60000	-5.44444
Pre (Day 1)- Post (Day 4)	45.60000	-5.00000
Pre (Day 1)- Post (Day5)	46.60000	-4.20000
	t value	**t value**
Pre (Day 1)-post(Day 1)	19.168	-2.604
Pre(Day 1)-post(Day 2)	23.802	-7.663
Pre (Day 1)- Post (Day 3)	35.947	-10.273
Pre (Day 1)- Post (Day 4)	31.771	-11.180
Pre (Day 1)- Post (Day 5)	38.566	-4.118
	P value	**P value**
Pre (Day 1)-post(Day 1)	0.000*	0.031
Pre(Day 1)-post(Day 2)	0.000*	0.000
Pre (Day 1)- Post (Day 3)	0.000*	0.000
Pre (Day 1)- Post (Day 4)	0.000*	0.000
Pre (Day 1)- Post (Day 5)	0.000*	0.015

*-significant($p<0.05$)

The data in the above table shows that the mean post test anxiety score was significantly lower than the mean pre test score compared to the control group.

Mean, Mean Difference, Standard Deviation and 't' value Between Pre-test and Post-test score of quality of life among experimental and control grou

	Exp (M±Sd)	**Cont (M±Sd)**
Pre (day 1)	84.6000±6.20394	86.7778±3.19287
Post (day 3)	87.8000±6.35610	89.0000±3.27872
Post (day 5)	88.8000±6.45755	83.2000±5.76194
	Mean diff	**Mean diff**
Pre (day 1)-post (day 3)	-3.20000	-2.22222
Pre (day 1)-post (day 5)	-8.60000	3.20000
	t value	**t value**
Pre (day 1)-post (day 3)	-2.927	-4.264
Pre (day 1)-post (day 5)	-16.866	1.751
	P value	**P value**
Pre (day 1)-post (day 3)	0.017*	0.003
Pre (day 1)-post (day 5)	0.000*	0.155

*-significant ($p<0.05$)

The data in the above table shows that the mean post test quality of life score was significantly lower than the mean pre test score compared to the control group.

Effectiveness of music therapy on bio-physiological and psychological outcomes

		Mean	**SD**	**Mean Diff**	**t value**
Amylase	Exp	316.8598	228.52117	1.80000	0.224
	Cont	-104.5668	85.33214		0.221
Blood pressure Systolic	Exp	9.0000	3.00000	-11.60000	0.000*
	Cont	-2.6000	3.43511		0.000*
Blood pressure Diastolic	Exp	4.0000	3.46410	-2.00000	0.423
	Cont	2.0000	4.00000		0.423
Heart rate	Exp	6.4000	2.19089	-7.40000	0.006*
	Cont	-1.0000	3.60555		0.004*
Temperature	Exp	2.5400	0.74027	-2.94000	0.000*
	Cont	-0.4000	0.57009		0.000*
Pain	Exp	3.6000	0.89443	-3.00000	0.004*
	Cont	0.6000	1.34164		0.003*
Anxiety	Exp	-65.8000	1.78885	1.80000	0.224
	Cont	-64.0000	2.44949		0.221
Quality of life	Exp	-78.8000	6.87023	-5.40000	0.187
	Cont	-84.2000	4.54973		0.181

*-significant ($p<0.05$)

The above table shows that the music was effective in terms of biophysiological and psychological outcomes among patients with cancer.

Conclusion

The study concludes that the use of patient preferred music during the treatment of cancer particularly while receiving the chemotherapy will be very effective in reducing the biophysiological and psychological outcomes such as blood pressure, heart rate, pain and anxiety.

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