ORIGINAL ARTICLE

The Effectiveness of Music Therapy for Post-Operative Pain Control among Total Knee Replacement Patients

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ABSTRAK

Sakit adalah sensasi yang tidak menyenangkan dan boleh menyebabkan masalah fizikal dan psikologi untuk pesakit. Walaupun intervensi secara farmakologi digunakan untuk mengurangkan kesakitan, ia masih kekal sebagai salah satu isu selepas pembedahan. Penggunaan terapi muzik sebagai intervensi bukan farmakologi boleh memberikan kesan terhadap kesakitan selepas pembedahan dan keperluan sakit untuk mendapatkan analgesik. Tujuan kajian ini adalah untuk menentukan kesan terapi muzik terhadap kesakitan selepas Pembedahan Elektif Penggantian Lutut secara total. Kajian ini membandingkan penggunaan analagesik selepas pembedahan oleh pesakit dalam dua kumpulan. Kajian ini juga mendedahkan kesan terapi muzik terhadap kumpulan etnik yang berbeza. Kajian berbentuk kuasi-experimental dengan persempalan berkemudahan mengambil pesakit berumur 49-76 yang telah menjalani pembedahan penggantian lutut secara keseluruhan di PPUKM dari Mei sehingga Disember 2012. Sebanyak 40 pesakit dipilih secara rawak dalam salah satu daripada dua kumpulan dengan mengunakan teknik sampul surat tertutup. Kumpulan eksperimen telah mendengar muzik selama lima hari selapas pembedahan dan diberi analgesik serta kumpulan kawalan hanya menggunakan intervensi farmakologi sahaja. Skor kesakitan telah diukur dengan mengunakan soal selidik kesakitan McGill bentuk ringkas pada waktu rehat di katil pada hari pertama, ketiga dan kelima selepas pembedahan. Analisis (Mann-Whitney) menunjukkan kumpulan eksperimen mengalami kesakitan yang berkurangan pada hari pertama dan kelima berbanding kumpulan kawalan pada tahap 0.05 menggunakan PRI, VAS dan PPI. Analisis (Friedman) menunjukkan sampel dalam kumpulan mengalami penurunan kesakitan ketara dari masa ke masa pada tahap 0.05 menggunakan PRI, VAS dan PPI. Analisis (Mann-Whitney) menunjukkan tidak terdapat perbezaan yang signifikan dalam menggunakan analgesik dalam milligram

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antara dua kumpulan ini dalam tempoh lima hari selepas pembedahan namun min menunjukkan kumpulan eksperimen menggunakan kurang analgesik berbanding kumpulan kawalan. Analisis (Krusl-Wallis) menunjukkan tidak terdapat perbezaan yang ketara dalam kesan terapi muzik selepas pembedahan antara kaum (Melayu, Cina dan India) menggunakan VAS. Terapi muzik merupakan intervensi yang berkesan ringkas mudah, dipadah, selamat, murah dan efektif untuk pengurusan kesakitan selepas pembedahan. Gabungan intervensi bukan farmakologi dan analgesik boleh mengurangkan kesakitan lebih daripada hanya menggunakan intervensi farmakologi sahaja. Pengurusan kesakitan adalah satu peranan penting dalam kejururawatan dan jururawat boleh menggunakan terapi muzik sebagai intervensi secara langsung dalam mengurangkan kesakitan pesakit.

Kata kunci: pengurusan sakit, terapi music, pembedahan penggantian lutut, intervensi bukan farmakologi, jururawat

ABSTRACT

Pain is an unpleasant sensation that can cause physical and psychological problems for the patient. Despite the pharmacological intervention for reducing pain, it remains as an issue after surgery. Music therapy as non-pharmacological intervention can effect post-operative pain and patients' requirement of analgesics. The purpose of this study was to determine effect of music therapy on pain after elective total knee replacement (TKR) surgery. This study compared analgesics consumption by patients post-operatively for five days. A Quasi-experimental design with convenience sample of patient with a mean of 64.35 (49-76) who underwent TKR in UKM Medical Centre from May to December 2012 was used. Forty patients were randomly assigned in one of the two groups using a sealed-envelope technique. The experimental group listened to music for five days post-operatively and were on analgesics and control group were treated with pharmacological intervention only. Pain was measured by McGill Pain Questionnaire-Short Form (MPQ-SF) for patient on bed rest on day one, day three and day five post-operatively. Statistical (Mann- Whitney) findings between groups showed the experimental group significantly had less pain on day one and day five rather than the control group at 0.05 level using Pain Rating Intensity (PRI), Visual Analogue Scale (VAS) and Present Pain Intensity (PPI). Statistical (Friedman) tests within group showed that the patient had significantly decreased pain over time at level 0.05 using PRI, VAS and PPI. Statistical (Mann- Whitney) tests revealed that there was no significant difference when using analgesics between the two groups in five days post-operatively at milligram but comparing median showed experimental group used less analgesic than control group. Music therapy is simple, available, save and cheap effective intervention for pain management post-operatively. Pain management is one of the key roles of nursing and nurses can use music therapy as a simple intervention to reduce pain.

Keywords: pain management, music therapy, TKR, non-pharmacological intervention, nurses

INTRODUCTION

According to the American Academy of Orthopedic Surgeons (AAOS), 32.9 million people had been diagnosed with some types of arthritis, in the United States (Prouty et al. 2006) and about 250,000 knee replacement surgeries were performed annually (Dahlen et al. 2006). Pain after surgery can be considered a form of acute pain with inflammatory responses resulting from surgical tissue damage. It is estimated that approximately 80% of patients experience post-operative pain, of which 86% have moderate, severe, or extreme pain (Elliott 2011).

Adequate pain control assists in early post-operative mobility, earlier hospital discharge, increased patient satisfaction, reduced recovery time (Herkowitz et al. 2007; Simcock et al. 2008). Patients will experience less pain, reduced physiological and psychological problems (Gillaspie 2010). Pain can reduce range of motion in knee joint, cause limitation in leg movement, muscle weakness, muscle wasting (Dahlen et al. 2006), delayed healing, reduced immune function, decreased quality of life, increased stress and anxiety. It may also cause increased re-admission rates, increased healthcare costs (Gordon et al. 2000), increased analgesic usage, and also symptoms like nausea and vomiting (Indelli et al. 2005).

Post-operative pain in adults is usually not adequately managed because nurses fear addiction and complications of analgesic (McCaffrey & Locsin 2006). Therefore, combination of analgesic with non-pharmacological intervention may become an effective measure to reduce post-operative pain. Music therapy is one method of non-pharmacological intervention that can reduce post-operative pain (Masuda et al. 2005). Listening to music is a noninvasive, safe and inexpensive nursing intervention that has been successfully used in hospitals (McCaffrey & Locsin 2006). The aim of the present study was to identify the effect of music therapy on pain after TKR surgery and usage of analgesic among patients admitted in UKMMC.

The effect of non-pharmacological intervention on post-operative pain was practiced after various elective surgeries such as orthopedic, abdominal, cardiac and gynecology. A few of them found significant difference in pain score between the music therapy group and the control group (Ebneshahidi & Mohseni 2008; Good et al. 2005; Hook et al. 2009; Tse et al. 2005) and the others figured out that there was no significant difference in pain score between the music therapy group and the control group (Allred et al. 2010; Pellino et al. 2005). Few studies have reported that music therapy can reduce usage of post-operative analgesic (McCaffrey & Locsin 2006; Ebneshahidi & Mohseni 2008; Tse et al. 2005; Pellino et al. 2005). Intra operative music therapies had also been performed and it was

mentioned that music therapy could reduce post-operative pain (Simcock et al.2008; Mottahedyan et al. 2012) and also minimize excessive usage of analgesic (Mottahedyan et al. 2012).

Research in music therapy has revealed that it not only reduces pain but also helps in overall physical rehabilitation, facilitates ambulation, motivates patients to become engaged in their treatment and also provides emotional peace to patients (American Music Therapy Association Inc). Gallagher (2012) explained that the effect of music on pain relates to the gate control theory, that when a patient is focused on the music, this is what goes through the neurotransmitters at the time and it shuts the gate on pain because its hard for a person to focus on two things at one time.

The aim of the present study was to determine the different levels of post-operative pain score between the group using music therapy and the control group. We also aimed to determine the usage of analgesics between the experimental and control group.

MATERIALS AND METHODS

MCGILL PAIN QUESTIONNAIRE

Pain was measured by short form of the McGill Pain Questionnaire (MPQ-SF) that consisted of three parts: A) Pain Rating Intensity (PRI): 15 descriptors of pain (11 sensory; 4 affective) which were rated an intensity scale as 0 = none, 1 = mild, 2 = moderate, and 3 = severe, three pain scores were derived from the sum of the intensity rank values of the words chosen for sensory, affective and total descriptors. B) Visual Analogue Scale (VAS) (0-10). C) Present Pain Intensity (PPI) which were rated on intensity scale as No Pain = 0, Mild = 1, Discomforting = 2, Distressing = 3, Horrible = 4, Excruciating = 5 (0-5) (Melzack 1987). Permission was requested from Dr. Melzack and a pilot study was carried out for the Malay version of the questionnaire, the Cronbach's Alpha was 0.876. Reliability and validity of MPQ-SF had been proved in many studies in countries such as England, Thailand, Turkey etc (Melzack 1987; Kitisomprayoonkul et al. 2006; Yakut et al. 2007).

MUSIC SET

The music set for this study consisted of music booklet, compact discs (CD) bag consist of 14 CD, head phone, and DVD player. The first option to listen to music was patient's choice. Patient could bring the CD from their home to the hospital or they could choose their favorite CD from the researcher's collection (Simcock et al. 2008; McCaffrey & Locsin 2006; Heitz et al. 1992). Collection of music for this study was based on soothing and relaxing music (Good et al. 2005; Tse et al. 2005; Bunt & Stige 2014; Shertzer & Keck 2001). This researcher's collection consisted of 6 types of music which were soothing and relaxing music without lyric: 1) Relaxing and soothing music, 2) the nature sound (meditation), 3) soul relaxation, 4) romantic piano, 5) classic collection and 6) violin music. Lo (2012) reviewed ten articles using music therapy for reducing pain after TKR surgery. They recommended guidelines that consisted of sedative or relaxation

music (music which had no lyrics), sustained melodic quality; absence of strong rhythms or percussion; rate of 60-80 beats per minutes). In this study, the patients were instructed to listen to music for an hour, four times in a day depending on their choice of time for listening (McCaffrey & Locsin 2006).

STUDY DESIGN

A quasi-experimental design (non-equivalent post-test-only control group) was used for this study. A convenience sample of 58 patients was obtained from the Orthopedic Ward of UKMMC over a period of 8 months (from May 2012 to December 2012). Sample size was calculated by PS version 3.0.4 by using research of Simcock et al. (2008), power 0.80, alpha=0.05, and in dependence T-test. The sample size was 40 (experimental group: 20 and control group: 20). The inclusion criteria were: patients aged 40-80 years-old, scheduled for elective TKR, able to listen to music, able to communicate in English or Malay language, able to fill out the questionnaires, alert and oriented to time, person and place. The exclusion criteria consisted of history of mental illness, allergic to analgesics, patients admitted to intensive care unit (ICU) post-operatively, hemodynamically unstable and patient dependent on opioids.

DATA COLLECTION

The study was approved by the UKMMC Ethical committee on 4th April 2012. Each patient was informed on the importance of study one day before surgery when admitted to the ward. Patients who agreed to participate were asked to fill up the consent form and return it to the researcher. There were 58 patients who willingly participated in the study but 8 of them were excluded due to various reasons (post-operative ICU admission, discharged earlier, addiction, hearing problem, age less than 40, communication problem) and 10 patients refused to participate in this study (Figure 1). Demographic data was obtained and McGill questionnaire was explained to the patients for both groups.

To ensure the smooth flow of the process, there were certain rules the patients had to follow. They were not allowed to bring electronic devices such as radio, CD player and laptop. All other instructions were the same for both groups including surgeon, operation room, anesthesia medication, private room post-operatively, type of pain relief medication. The patients were divided into two groups with 20 in each group using the sealed envelope technique. The two groups in this study were the experimental group who received music therapy post-operative to TKR, control group who did not undergo any intervention. Both groups received pain relief as ordered by the doctor.

In the experimental group, the musical set was given to the patient a day prior to surgery (Day 0) and the patient kept the music set till discharge from the ward. The experimental group listened to music after surgery for an hour, four times a day. The two groups were monitored by the researcher and nurses, the questionnaire was taken on post-operative day 1, post-operative day

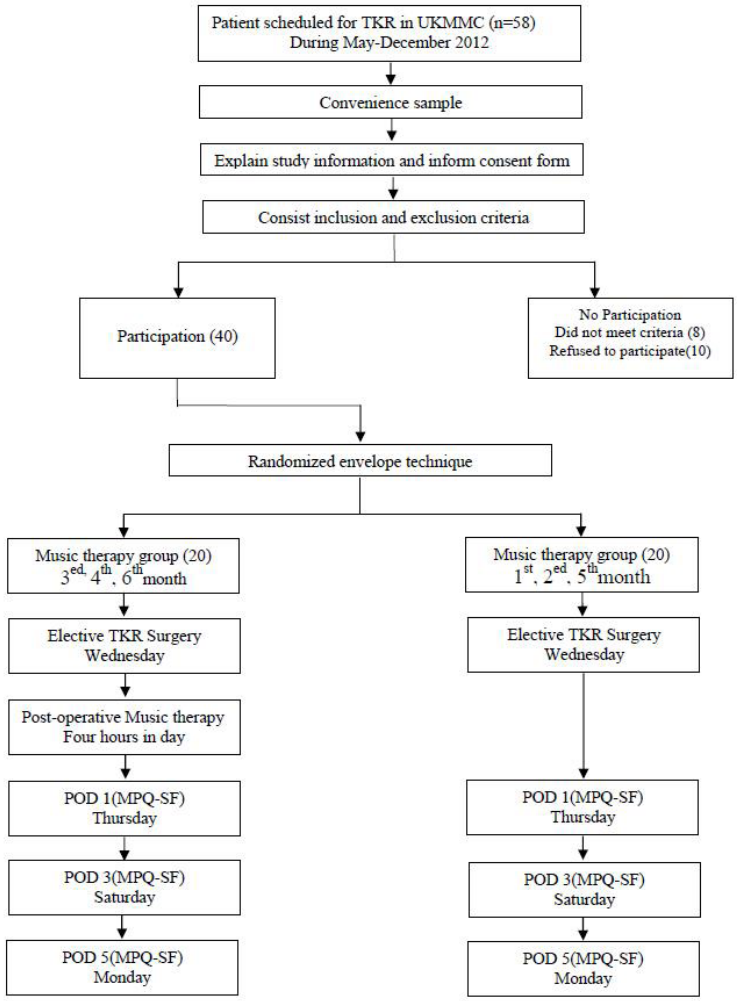

Figure 1: Research Framework

3 and post-operative day 5. The time for filling the questionnaire was the same for all patients. Patients were still in the rest position before taking medication at noon. The dosage of analgesia used was measured and calculated over five days post-operatively and compared between two groups. The majority of medication used for post-operative pain control was Paracetamol, Celecoxib and Tramadol.

DATA ANALYSIS

All collected data were converted, coded and transferred into the SPSS program version 19 to carry out an analysis. Data was not normally distributed after conducting Skewness, Kolmogorov-smirnov, Shapiro-Wilk and histogram normality test. The researcher therefore used median and mean rank for analyzing the data Mann-Whitney test was used between groups'

comparison and Friedman test was used within group comparison for pain score. Mann-Whitney test used dosage of analgesics between two groups.

RESULTS

SOCIO-DEMOGRAPHIC DATA OF PATIENTS

There were 32 (80%) females and the rest were males. The mean age of patients who participated in this study was 64.35 years old (49 to 76 years). The racial distribution was 20 Malays (50%), 3 Indian (7.5%) and 17 Chinese (42.5%). Most of the patients were married 36 (90%). The religion of patient were: 20 Muslims (50%), 3 Hindus (7.5%) and 17 Buddhist (42.5%). Equal percentage of patients had primary school education and secondary education (47.5%) where only 2 (5.0%) patients had tertiary education, and majority of patients were unemployed 39 (97.5%). There were significant statistical differences in terms of race and religion and the comparison between the two groups is shown in Table 1 and 2.

ANALYSIS OF PRI BETWEEN TWO GROUPS ON DAY 1, 3 AND 5

The Pain Rating Intensity (PRI) was not normally distributed for analysis of pain score between the two groups using Mann–Whitney test, the results showed that there was significant difference in pain score between experimental and control group at 0.05 level on day 1(P = 0.00), day 3(P = 0.00) and day 5 (P = 0.00) post-operatively using PRI. Therefore, with the above results and compared mean rank between two groups, it could be concluded that pain in the experimental group was less than in the control group on day 1 (13.40 < 27.60), day 3(12.65 <, 28.35) and day 5 (11.78 <29.23) post-operatively (Figure 2).

ANALYSIS OF PRI WITHIN GROUP ON DAY 1, 3 AND 5

The PRI was not normally distributed for analysis pain score within groups using Friedman test, the result showed there was significantly different pain score (PRI) on day 1, day 3 and day 5 at 0.05 level (P =0.00). Therefore, with this result and compared mean rank of three days (day1>day3>day5) (2.44>2.25>1.31), it can be concluded that pain reduced over time (Table 3).

ANALYSIS OF VAS BETWEEN TWO GROUPS ON DAY 1, 3 AND 5

The Visual Analogue Scale (VAS) was not normally distributed for pain analysis score between the two groups. When Mann-Whitney test was used, the results showed there

Table 1: Age of Patient

Variables	Experimental n=20		Control n=20	
	Mean	(SD)	Mean	(SD)
*Age	63.80	5.64	64.90	6.94

*No significant different with p<0.05 using independence T-test

Table 2: Socio-Demographic Data of Patient

Variables	Experimental n=20		Control n=20	
	n	(%)	n	(%)
Gender				
Female	14	(70.0%)	18	(90%)
Male	6	(30.0%)	2	(10%)
*Race				
Malay	15	(75%)	5	(25.0%)
Chinese	2	(10.0%)	15	(75.0%)
Indian	3	(15.0%)	0	(0.0%)
Marital				
Single	3	(15.0%)	1	(5.0%)
Married	17	(85.0%)	19	(95.0%)
*Religion				
Islam	15	(75%)	5	(25.0%)
Buddha	2	(10.0%)	15	(75.0%)
Hindu	3	(15.0%)	0	(0.0%)
Education				
Level				
Primary	6	(30.0%)	13	(65.0%)
Secondary	12	(60.0%)	7	(35.0%)
Tertiary	2	(10.0%)	0	(0.0%)
Occupation				
Employment	1	(5.0%)	0	(0.0%)
Unemployment	19	(95.0%)	20	(100.0%)

*Significant difference with $p<0.05$ using chi-square test

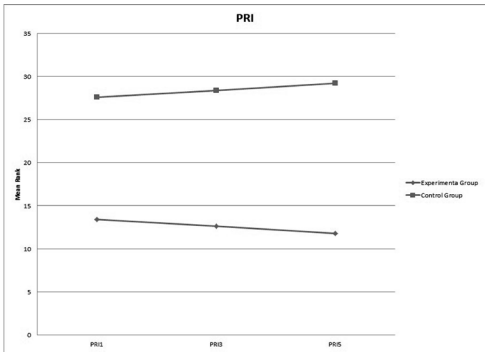

Figure 2: PRI between two groups in day 1, day 3 and day 5

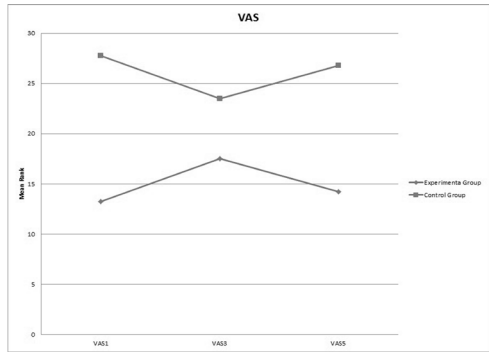

Figure 3: VAS between two groups in day 1, day 3 and day 5

Table 3: Analysis of PRI, VAS, PPI Within group in Day1, 3 and 5

Variable	Median	Mean rank	χ^2	P value
PRI			32.069	*0.00
Day1	3.00	2.44		
Day3	3.00	2.25		
Day5	2.00	1.31		
VAS			19.884	*0.00
Day1	3.00	2.35		
Day3	3.00	2.17		
Day5	2.00	1.48		
PPI			19.586	*0.000
Day1	1.00	2.26		
Day3	1.00	2.21		
Day5	0.50	1.53		

*Significant different with p<0.05 using Friedman test

was a significantly different pain score between the experimental and control group at 0.05 level on day 1 (P =0.00) and day 5 (P =0.00) post-operatively using VAS. It can be concluded that pain in the experimental group was less than in the control group on day 1 (13.23< 27.78) and day 5 (14.20< 26.80) post-operatively. There was no significant difference between the two groups on day 3 (P =0.09) but the mean rank score of experimental group was less than the control group (17.52<, 23.48) (Figure 3).

ANALYSIS OF VAS WITHIN GROUP ON DAY 1, 3 AND 5

The VAS was not normally distributed for analysis pain score within groups using Friedman test, the result showed there was significantly different pain score (VAS) on day 1, day 3 and day 5 at the 0.05 level (P =0.00). Therefore, with this result and compared mean rank for three days (day1>day3>day5) (2.35 > 2.17> 1.48), it can be concluded that pain reduced over time (Table 3).

ANALYSIS OF PPI BETWEEN TWO GROUPS ON DAY 1, 3 AND 5

The Present Pain Intensity (PPI) was not normally distributed for analysis pain score between the two groups using Mann – Whitney test, the results showed that there was significant difference in pain score between experimental and control group at 0.05 level on day 1 (P = 0.029) and day 5 (P = 0.001) post-operatively, using PPI. Therefore, with the above results and compared mean rank between two groups, it could be concluded that pain in the experimental group was less than control group on day 1 (16.83 < 24.18) and day 5 (15.00<26.00) post-operatively. There was no significant difference between the two groups on day 3 (P = 0.557) but the mean rank score of the experimental group was less than the control group (19.52<,

21.48) (Figure 4).

ANALYSIS OF PPI WITHIN GROUP ON DAY 1, 3 AND 5

The PPI was not normally distributed for analysis of pain score within groups using Friedman test. The results showed that there was a significant difference in pain score (PPI) on day 1, day 3 and day 5 at the 0.05 level (P =0.000). It can be concluded that with the above result and the compared mean rank of three days (day1>day3>day5) (2.26>2.21>1.53), that pain reduced over time (Table 3).

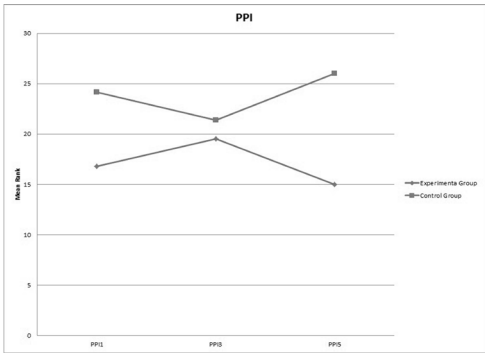

Figure 4: PPI between two groups in day 1, day 3 and day 5

COMPARISON OF PARACETAMOL, CELECOXIB AND TRAMADOL USAGE BETWEEN TWO GROUPS

The analgesic was not normally distributed using Mann–Whitney test, the result showed there was no significant difference on using Paracetamol, Celecoxib or Tramadol between experimental and control group for five days post-operative at the 0.05 level. Despite this view, compared median showed experimental group used less analgesic than control group post-operatively (paracetamol (16000.00 < 17000.00), Celecoxib (600.00 < 1600.00) and Tramadol (125.00 < 225.00) (Table 4).

ADDITIONAL PAIN DESCRIPTION RESULTS

The pain feeling was one of the foundations of this study and the interesting result showed 97.5% to 82.5% had the pain feeling of heavy and tenderness. Hot burning and aching were the two most descriptive with 40% and 30%. None of the patients complained of shooting and punishing-cruel pain.

Table 4: Comparison of Paracetamol, Celecoxib, Tramadol Usage between Two Groups

Variable	N	Median	Mean rank	Mann-withney U	P value
Paracetamol				175.500	*0.494
Experimental group	20	16000.00	19.27		
Control group	20	17000.00	21.73		
Celecoxib				133.500	*0.067
Exprimental group	20	600.00	17.18		
Control group	20	1600.00	23.83		
Tramadol				194.500	*0.878
Exprimental group	20	125.00	20.23		
Control group	20	225.00	20.78		

DISCUSSION

The results of the study showed that music therapy reduced post-operative pain after TKR. It was found that the pain score in the experimental group was statistically significantly less than control group on day 1 and day 5 by using PRI, VAS and PPI. The result was similar with other research findings that explained post-operative music therapy had positive effect on post-operative pain (Masuda et al. 2005; Laurion & Fetzer 2003; Sendelbach et al. 2006; Voss et al. 2004).

Pain score on day 3 post-operatively using the VAS and PPI was not significantly different but when these were compared, the mean rank showed that the experimental group suffered less pain than the control group. The possible reason for worsening pain on day 3 could be due to reduced duration of listening, reduced concentration of listening and increased pain due to ambulation. The same result was found in a study by Vaajoki et al. (2012). They found significant difference in the patients' pain intensity and pain distress on bed rest, during deep breathing and on shifting position on the second post-operative day but there was no significant difference on pain intensity and distress on day 3.

The reason for no difference in pain score between the two groups on day 3 could possibly be due to patient's concentration on the music. The researcher could not be sure that the patient concentrated on the music or was thinking of something else. According to Simcock et al. (2008), they found that music therapy had positive effect on post-operative pain but sometimes patient listened to music for only 60% of the time. This could reduce the effect of music therapy on pain (Simcock et al. 2008). The study totally depended on the patients' intent to listen to the music and the nurses and researcher checked on them on and off but there was no accurate calculation that the patients listened for four hours daily. On post-operative day 3, patients usually started walking using the walking frame and this could affect the increasing pain rather than when patient was on rest position.

Another interesting finding of this study was that the pain score within groups was reduced over time by using PRI, VAS, and PPI (Day 1 >day 3 >day 5). The commonly used drugs on post TKR were Paracetamol, COX 2 inhibitors (Celecoxib) and opioid drugs (Tramadol) for five days post-operative. The results showed there was no statistical difference between experimental and control group who required analgesic but when median rate was compared it was clear that the experimental group used less analgesic compared to the control group. Many studies have explained that music therapy could not reduce usage of analgesic post-operatively (Sendelbach et al. 2006; Voss et al. 2004). In spite of this, some research explained that music therapy could reduce the usage of post-operative analgesic (McCaffrey & Locsin 2006; Ebneshahidi & Mohseni 2008; Tse et al. 2005; Pellino et al. 2005).

Patients were distributed equally between the two groups according to demographic data except for race and religion. Therefore, this study

had unequal race distribution where experimental group had 15 Malays, 2 Chinese and 3 Indians, and the control group had 15 Chinese, 5 Malays and no Indians. The data was a randomized distribution between the two groups for improving accuracy and to reduce bias. If the race had been normally distributed between the two groups the result of pain score may have changed.

On the first day, the patients were not very interested in the music but on day 5 they changed and explained that the private room was rather boring without music. Majority of patients explained that music therapy was effective in reducing their pain and were feeling comfortable and relaxed. In one study, patients reported they were not sure that music could have an effect on reducing their pain but they believed that music therapy could divert their mind from the surgery (Simcock et al. 2008). In another study they had positive patient report in the treatment group, they mentioned that the interventions were helpful for pain (96%), and majority (64%) mentioned that their pain reduced to a moderate amount or a lot and increased their feeling of being in control of pain (62%) (Good et al. 2005).

LIMITATION OF THE STUDY

This study was a Quasi-experimental design that took every patients who were admitted and underwent the procedure of TKR in UKMMC at that particular time. This research population may not represent the whole population of Malaysia. Secondly, the ethnic group was not normally distributed between experimental and control group because this study used randomized technique for dividing the patients into two groups. Thirdly, communication was a problem, Malaysia has different races and languages, therefore some patients could not speak English or Malay, so they were omitted from this study. Information bias could also have happened; some patients may not have related their exact experience of pain.

NURSING IMPLICATION

This study recommended listening to the music as one of the non-pharmacological intervention that could reduce pain and could be more effective when used with analgesic drugs. Music therapy is cheap, available, safe and without side effects and are interventions that the nurses could use directly for reducing pain. Nurses play an important role in providing health care to patients. They are the ones in the frontline and receive the initial complains about pain from patients. It is important that nurses know that it is not only analgesics but music therapy too could help alleviate pain among patient. It is hoped that music therapy will be adopted as one of the non-pharmacological interventions for pain among patients in the wards eventually.

RECOMMENDATION

Non pharmacologic intervention is cheap, safe and with no side effects. Many studies have suggested that combination of non-pharmacological intervention with pharmacological intervention can reduce pain better instead of by only using drugs. Therefore, this study suggests that

usage of different types of non-pharmacological intervention such as music therapy for reducing pain, can increase patient satisfaction and comfort. Music therapy is not common as non-pharmacological intervention in Malaysia and it is expected that in future, elaborate research on the effect of music therapy on post-operative pain in different areas could be carried out. Many studies support that music therapy can reduce anxiety and stress, so it will be interesting if soothing and relaxing music can be used in the ward environment and these may have a positive effect on patients and nurses.

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