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EFFECT OF COLD APPLICATION ON PAIN PERCEPTION AMONG CLIENTS RECEIVING LOW MOLECULAR WEIGHT HEPARIN – A PILOT STUDY

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ABSTRACT

The main **aim** of the study was to assess the effect of cold application on pain perception among clients receiving Low Molecular Weight Heparin Injection in Cardiology Ward at AIMs Kochi**. Background**: Dry cold application is simple and in-expensive which has been accepted for decades are effective non pharmacological intervention for pain management and progression of ecchymosis. There was a significant association with cold therapy and presence of hematoma .The cold application can reduce the pain intensity and occurrence of hematoma in patients who receives Enoxaparin injection. **Methods** : Using Quasi experimental post- test only design .Using Purposive sampling techniques 12 samples were selected and randomly assigned to experimental group (n=6) and the control group (n=6) . The cold application was given for 5 minutes prior to the Low Molecular Weight Heparin injection site for the experimental group. The pain perception was assessed using numerical pain rating scale. **Results** of the study reveals that in the experimental group 50% patients experienced mild pain immediately after withdrawing the needle, 33.3% patients had experienced moderate pain and 16.7% patients had no pain immediately after with- drawing the needle whereas in the control group 66.7% patients had experienced moderate pain immediately after removing the needle and only 33.3% patients had experienced mild pain. **Conclusion:** These study findings stated that cold application on injection site before LMWH injection reduces the pain.

Keywords: Dry cold application, Pain perception.

INTRODUCTION

Nurses have a primary responsibility for drug Administration. Nurses are responsible for receiving the order from the doctor, recording the order in the appropriate place, obtaining, preparing and administering the drug, evaluating the treatment by observing the response shown by the patient. One of the interventions which is most performed by nurses is the administration is subcutaneous injection, which is generally used for inoculation and for such drugs as insulin, hormones, and heparin. Heparin is of benefit in preventing thromboembolisms, increasing the quality of life and prolonging life[1].

The possibility of developing a deep vein thrombosis (DVT) is one major complication for the patient population with damaged blood vessels, decreased circulation problem, or restricted mobility. Use of a low molecular weight heparin (LMWH), as part of the patients Anticoagulation therapy, is one intervention that can be implemented to prevent the formation of thrombi(clots) that cause DVTs, pulmonary emboli, strokes and myocardial infarctions(Suddarth & Brunner, 2014). These complications would not only cause harm to the patient but also increase the resources needed to treat and rehabilitate that individual. (Chenicek, 2004)[2,7,8].

The low molecular weight heparin poses many side effects such as pain, fever, confusion, nausea, haemorrhage, hypochromic anemia, thrombocytopenia, bleeding, ecchymosis, injection site hematoma, oedema and peripheral edema(skidmore-Roth, 2009).one of the most commonly encountered adverse physiological responses to this intervention is the formation of hematomas at the injection sites. (Batra, 2014)[2]. Pain, which is "an unpleasant, sensory and emotional experience, is mostly associated with tissue injury or infection and seeks medical management" . It is mostly a subjective perception and hence individual variation exists[3].

Cold application has a physiological effect that can avoid SCAI related complications by increasing vasoconstriction at the injection site and the inflammatory process. Cold prevents the intensity of pain through its effect on sensory nociceptors by decreasing the conduction time and the synaptic activity in peripheral nerves. When heat in the nerves is reduced, a decrease in the sensory and motor conduction velocities is observed; thus the intensity of pain is prevented.

A simple and inexpensive therapy, dry cold application has been accepted for decades as an effective non pharmacologic intervention for pain management. It can enhance patient's sense of control over their management of sides effects, is cost-effective and improves the quality of life. It is also an innovative idea to involve patients in their own care to play a major role in relieving distressing symptoms through a simple procedure like dry cold application[4].

El-Deen DS, Youssef NF conducted a study on the effect of cryotherapy application before versus after subcutaneous anticoagulant injection on pain intensity and hematoma formation. It was a quasi-experimental study with 105 sample who were admitted in abiggest teaching hospital in Cairo and receiving SCAI. The patients were randomly allocated into 3 groups. A Control group who received the routine hospital care (G1,$n = 35$) and two intervention group who received cryotherapy for 5-min (G2: cryotherapy applied before SCAI, $n = 35$; G3: cryotherapy applied after SCAI, $n = 35$). And the results shows that the pain intensity among the patients in the two intervention groups (G2: *Median* = 1.0; G3: *Median* = 0) was significantly lower than in the control group (G1, *Median* = 3.0). No significant difference was found between G2 and G3($P = 0.728$). Applying cryotherapy after SCAI (G3) decreased the frequency of hematoma formation (48hrs = 31.4% & 72hrs = 28.5%) compared to applying it before injection (G2, 100%) or not applying it (G1, 100%). The size of hematoma in G3 was smaller than that in G2 ($P < 0.01$). The study concluded that applying cryotherapy significantly decreased pain intensity and hematoma occurrence/size. Applying cryotherapy after injection was more effective in preventing hematoma formation and decreasing its size than applying it before injection[5].

Sendir M, Büyükyilmaz F, Çelik Z, Tasköprü I conducted a study to compare the effects of the injection duration (30 seconds) and local dry cold application (5 minutes before and after injection) on pain intensity and bruising at the injection site in subcutaneous heparin injections. This was a randomized controlled, prospective, experimental study. The sample consisted of 60 patients receiving subcutaneous injections of heparin once a day. A computerized randomization program was used to allocate the patients to 3 experimental groups: group A (30-second injection duration), group B (30-second injection duration and 5-minute dry cold application applied locally), and group C (injection administered for 10 seconds and no dry cold application applied locally). This study observed statistically significant differences in pain intensity and bruising occurrence and formation measured over time among groups A and B (30-second injection duration or 30-second injection duration and 5-minute local dry cold application) and group C (10-second injection duration). It was determined that a subcutaneous injection duration of 30 seconds and 5-minute local dry cold application (before and after injection) can be effective in decreasing the intensity of pain[6].

METHODOLOGY

Quantitative research approach was adopted for the study with quasi-experimental post-test only design. The study was conducted in the cardiology wards in Amrita Institute of Medical Science, Kochi. The purposive sampling technique was used to select the samples .The setting was selected because of the easy accessibility and proximity. All the 12 patients who meet the sampling criteria were randomly assigned to experimental group (n=6) and control group (n=6). The independent variable of the study was dry cold application .The dependent variable of the study was pain perception among patients receiving Low Molecular Weight Heparin Injection. The researcher explained the purpose of the study and obtained an informed consent from each subject. The tool for data collection include semi-structured questionnaire of 3 sections . Section A: Socio demographic data, Section B: Clinical variables and Section C: Numerical pain rating scale. Dry cold application was given for 5

minutes before low molecular weight heparin injection to the experimental group. The post test was done to assess the pain perception immediately after withdrawing the needle.

RESULTS

Section A: description of socio demographic variables of the subjects.

The results of the pilot study showed that, among the 6 subjects of the experimental group 83.34% patients were above 50 years of age group and 16.67 % patients were between the age group of 41 to 50 years. In the control group 50% were above 51 years and 50% were between 41 to 50 years respectively. In experimental group 100 % people are male followed by the control group majority are male. The educational status of patients receiving low molecular weight heparin. The result shows that in the experimental group most of the people (83.3%) were under the primary schooling, and only 16.7% patients had pre degree. In the control group 66.7 % patients had primary schooling, 33.3% were graduates. The marital status of the subject reveals that in the experimental group majority (83.3%) of patients are married and 16.7% patients were separated, in the control group all are married .The occupation of the patients receiving low molecular weight heparin shows that in the experimental group , 50% patients were Government employees and 33.3% patients were jobless, In the control group 25% of patients were government employees ,33.3% were private employees and 25% were jobless.

Section B: Description of sample characteristic based on clinical variables

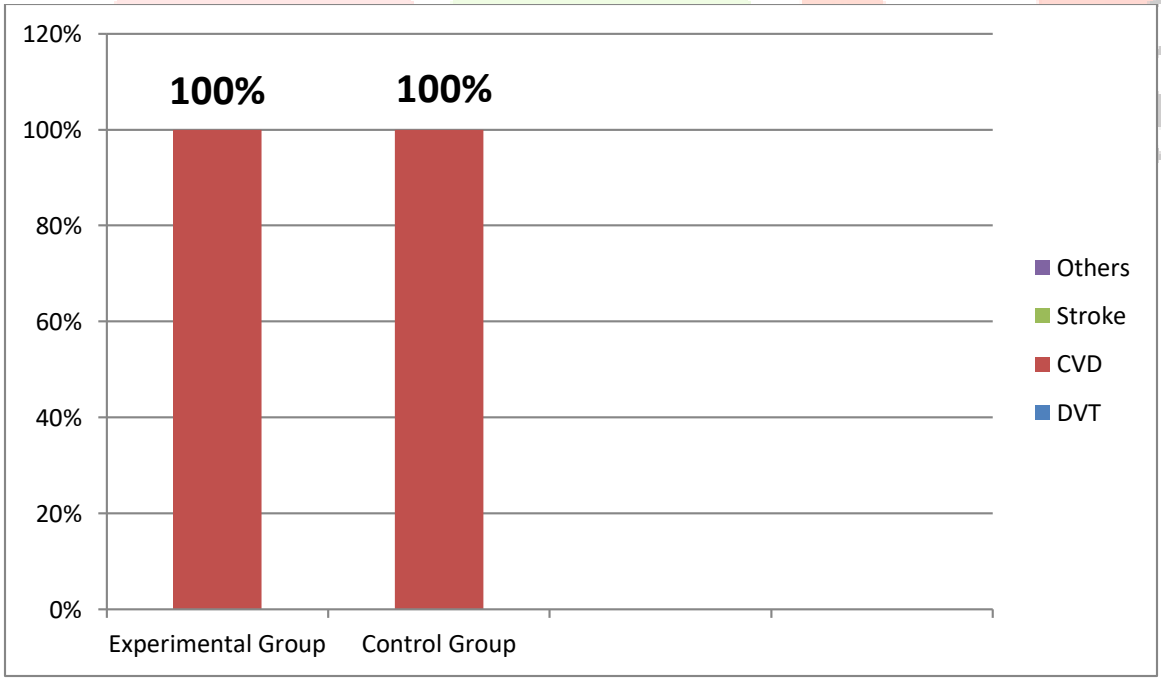

Diagram:1 shows that percentage distibution of subject based on clinical variable:present disease condition.

The above diagram 1 depicts the diagnosis of patents receiving LMWH reveals that in the both experimental and control group all patients were diagnosed with CVD.

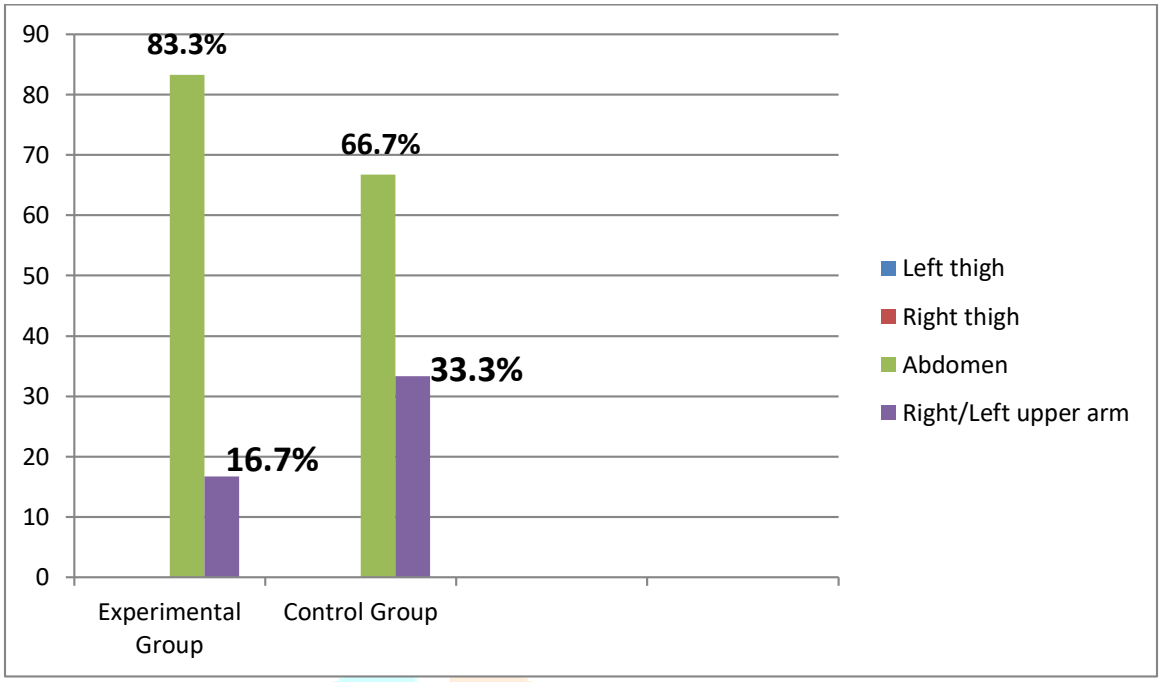

Diagram2: Shows that percentage distribution of subject based on clinical variable; Site of injection

The above diagram shows that in experimental group 83.3% were receiving the injection at abdomen and 16.7% were receiving the injection at right or left upper arm. whereas in the control group 66.7% received injection at abdomen and 33.3% received injection at right or left upper arm.

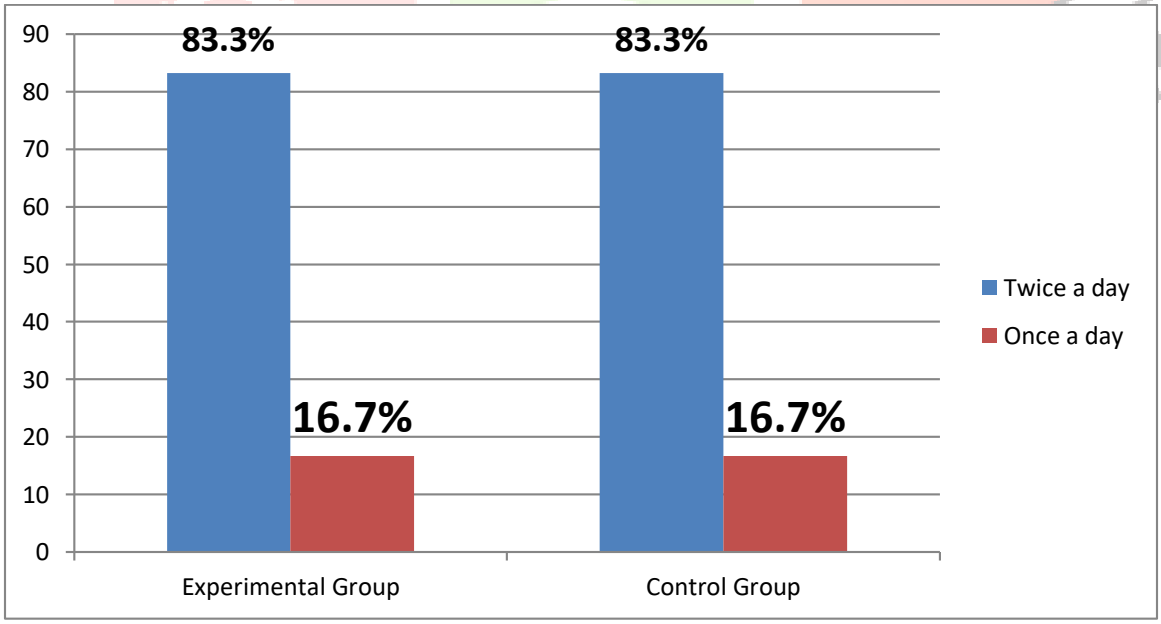

Diagram: 3 Shows the percentage of distribution of subject based on clinical variable; Frequency of Injection.

In both experimental and control group 83.3% patients received LMWH injection twice a day 16.7% patients had received LMWH injection once in a day.

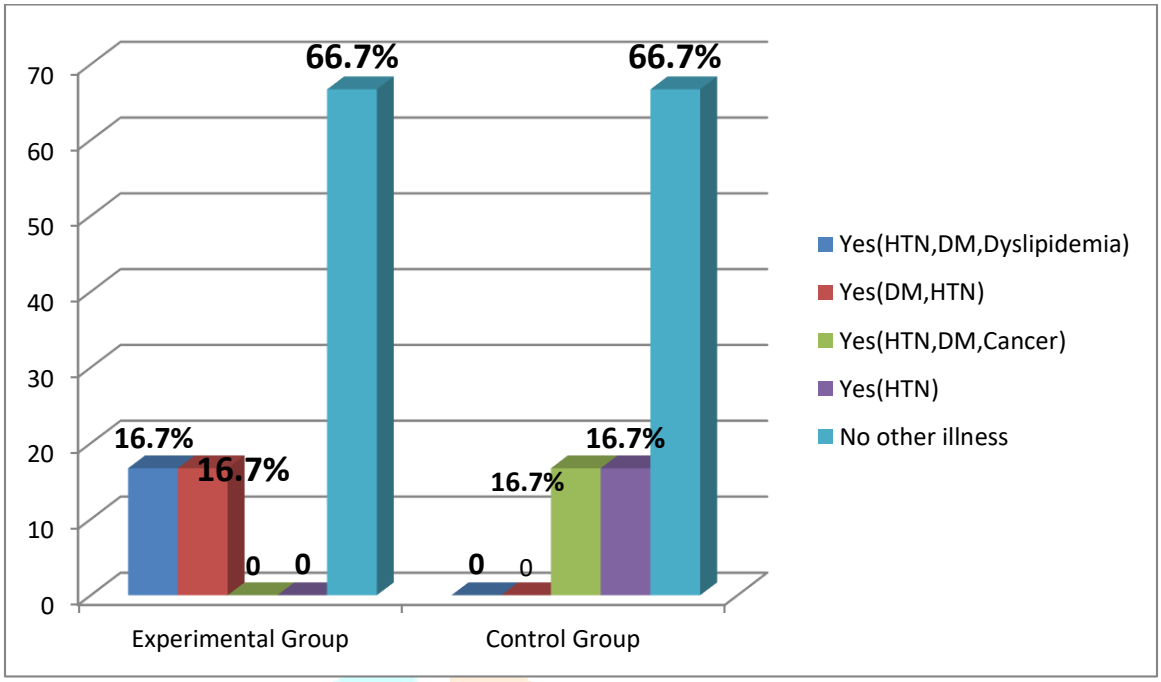

Diagram 4: Shows the percentage of distribution of any other illness

The above bar diagram 4 depicts that in the presence of any other illnesses among patients receiving LMWH reveals that in the experimental group 66.7% patients not have any other illness and 16.7% patients has Diabetes ,Hypertension ,Dyslipidemia respectively .The control group 66.7% patients not had any other illness and 8.3% patients had other illness.

Section c: Description of numerical pain score assessment

Table 2 shows the frequency and percentage distribution of subjects based on Numerical Pain Score

Pain Score	Experiment Group		Control Group	
	f	%	f	%
No Pain	1	16.7	0	0.0
Mild Pain	3	50.0	2	33.3
Moderate Pain	2	33.3	4	76.7
Severe Pain	0	0.0	0	0.0

The above table 2 shows that numerical pain assessment reveals that in the experimental group 50% patients experienced mild pain immediately after withdrawing the needle, 33.3% patients had experienced moderate pain and 16.7% patients had no pain immediately after with- drawing the needle. Whereas in the control group 66.7% patients had experienced moderate pain immediately after removing the needle and only 33.3% patients had experienced mild pain.

DISCUSSION

In this study we found that the only 33.3% subjects in the experimental group had moderate pain. Whereas in control group 76.7% had moderate pain. So it reveals that significant relief of pain with cold application in experimental group when comparing to the control group. This result is supported with the study conducted by Kilic E.K and Midilli T.S in Turkey to investigate the effects of cold application on pain and bruising complications associated with subcutaneous heparin in ICUs patients. The results showed that total pain scores were significantly lower with the cold application intervention ($z=6.60, p=0.0001$). This study was found that 2 minute cold application before and after subcutaneous heparin injection reduced pain score and size of bruises 48 and 72 hours after heparin injection. Another study conducted by Sarah Abdulaziz Alabdalhai, Fatma Mahmoud Mokabel and Dr. Yasser al-Ghuneimy on Impact of cold therapy on the pain and hematoma on the site of injection of Enoxaparin. The results concluded that the mean pain was significantly high in cases of without cold therapy.($p<0.0001$).

This study results also showed that in experimental group 83.3% were receiving the injection at abdomen and 16.7% were receiving the injection at right or left upper arm. Whereas in the control group 66.7% received injection at abdomen and 33.3% received injection at right or left upper arm. And in both experimental and control group 83.3% patients received LMWH injection twice a day 16.7% patients had received LMWH injection once in a day and all the subjects in both group had co morbidities. However, the results of this pilot study didn't show any significant association between the pain score and the variable like site of injection, frequency of injection and any other co-morbidity.

CONCLUSION

The study was conducted to identify the effect of cold application pain perception among clients receiving low molecular weight heparin injection in Cardiology wards at AIMs Kochi. This study results shows that the cold application is an effective method in reducing pain perception among patients receiving LMWH. In patients receiving cold application the results shows that there is a mild pain and in the patients not receiving cold application experiences moderate pain according to numerical pain score assessment. So there is difference in pain perception among the two groups. Since this was a pilot study the sample size was less(n=12). So the study will continue with more sample size.

CONFLICTS OF INTEREST

All authors have none to declare

SOURCE OF FUNDING

Self.

ETHICAL CLEARANCE

Research proposal was presented before the research committee of Amrita College of Nursing and obtained approval. Later ethical clearance obtained from the ethical committee of Amrita Institute of Medical Sciences, Kochi.

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