

## Effect of Cold Compresses on Pain Intensity and Ecchymosis Among Patients Receiving Subcutaneous Anticoagulant Injection



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### 1.ABSTRACT

**Background:** Subcutaneous anticoagulant injection frequently result in pain, swelling, and bruising at the injection site. Cold compresses are a pain-relieving treatment that works by lowering catecholamine levels, raising endorphin levels, and delaying pain signal transmission to the central nervous system. **Aim of the study:** To evaluate the effect of cold compresses on pain intensity and ecchymosis among patients receiving a subcutaneous anticoagulant injection. **Design:** A quasi-experimental research design (study/control group) was utilized. **Setting:** The research was carried out at Benha University Hospital's Cardiac Care Unit. **Participants:** A six-month purposive sample of cardiac care unit patients who were treated with subcutaneous anticoagulants (from the beginning of february2021 to the end of July 2021). **Tools for gathering data include:** Tool I Patient Assessment Tool, Tool Bruising Category Scale, Tool Visual Analogue Pain Rating Scale, and Tool IV Ecchymosis Education Scale are some of the tools used to assess patients. **Results:** The difference in pain intensity between the study and control groups was highly statistically significant at a p-value of 0.000, with more than half of the control group suffering bruising at the injection site, compared to less than a quarter of the study group. In terms of ecchymosis, more than half of the study group had no ecchymosis, compared to less than a quarter of the control group. **Conclusion:** Based on the data, it can be concluded that applying cold compresses to the study group reduced pain intensity, bruising, and ecchymosis formation more effectively than in the control group. **Recommendations:** To generalize the findings more broadly, the study could be done with bigger sample size.

**Keywords:** Cold compresses, Ecchymosis .pain intensity, Subcutaneous anticoagulant injection

### 2.Introduction:

Nurses need to be able to administer safely, and this is a common intervention. The use of anticoagulants to prevent or treat venous thromboembolism is prevalent. Anticoagulant injections subcutaneous can result in consequences such as discomfort and hematoma at the injection site. Patients' physical and mental discomfort is increased as a result of these consequences, according to previous research (Unal N., et al., 2019).

Venous thromboembolism is one of the leading causes of death and morbidity in individuals with heart disease, and standard anticoagulants are used to lower the risk. Patients in cardiac wards experience pain as a result of medical and therapeutic procedures, and good pain management is the most critical part of cardiovascular patient care. This is a problem that must be addressed, particularly in critically ill patients in the cardiology ward. (Fareed J et al. 2018)

In hospitalized patients, subcutaneous anticoagulant injections can induce discomfort and

ecchymosis. Pain from subcutaneous injections can generate anxiety, needle phobia, and distrust of healthcare practitioners in the long run, while injection speed, kind of medication and amount of injectable medications can all influence pain severity (Amanian S, 2016).

Injection time, injection site, injection dose, needle size, and use of cold therapy are all factors that affect pain and bruising caused by subcutaneous anticoagulants. The use of cold compresses lowers tissue temperature, blood flow, and cellular metabolism. Because these difficulties might threaten patient safety and drive patients to avoid future injections, caregivers must utilize ways to limit the occurrence of these adverse effects to improve patient satisfaction and trust in healthcare providers (Hu L, 2019).

Cryotherapy is another name for cold therapy. It works by restricting blood flow to certain locations, lowering pain-inducing inflammation and swelling, particularly around joints and tendons. It can temporarily diminish nerve activity as well as discomfort. Cold therapy can be applied to the affected area in a variety of

methods, including B. Ice packs or cryogel packs, ice massages, and ice baths (Ozkan & Cavdar, 2021).

The use of cold compresses lowers tissue temperature, blood flow, and cellular metabolism. Cold compresses are a nonpharmacological technique that reduces catecholamine levels, increases endorphin levels, and delays the transmission of pain signals to the central nervous system, all of which serve to lessen pain severity. Cold compresses help alleviate discomfort and ecchymosis by constricting peripheral blood arteries and reducing blood flow to tissues (Quinlan P, et al. 2017).

The caregiver has a significant level of authority for administering safe and correct doses. As a result, they should be aware of acceptable and effective techniques for reducing possible damage and complications in hospitalized patients that are based on scientific evidence. Applying pressure before injection, cooling the needle, injecting at a precise moment, and cooling the injection site before and/or after it is heated are some of these tactics. Furthermore, caregivers must be well-versed in the potential negative effects of injectable drugs. (El-Deen DS, Youssef NFA,2018)

### Significance of the study:

Today, non-pharmacological pain management approaches such as relaxation, touch therapy, music therapy, imagery therapy, and the use of heat and cold are popular. Non-pharmacological treatments are simple to use, patient-acceptable and can be employed by nurses themselves. Some nurses prefer non-pharmacological techniques because they are low-risk and allow patients to take an active role in their pain relief. Cold therapy is a non-drug, low-cost way to relieve pain (Thijs E et al., 2019).

Anticoagulant injections are being given to an increasing number of individuals. Is a class of anticoagulants used to prevent and treat venous thromboembolism (deep vein thrombosis and pulmonary embolism) and other cardiovascular illnesses, as well as deep vein thrombosis before and after surgery. The injection process causes fears in people of all ages, from newborns to the elderly. Pain is the primary source of this phobia. Anticoagulant injections under the skin are a regular technique that frequently results in bruising, discomfort, and hematoma at the injection site(Amanian S, 2016).

Cold compresses are one of the simplest and most inexpensive non-drug approaches to pain treatment. Cold compresses are a simple and efficient treatment. The benefits of cold compresses for pain relief are widely recognized, and they have few negative effects. There are no dangers or negative effects with cold therapy. Cold has been shown to reduce pain and lower pain thresholds in studies. To satisfy analgesic needs, clinicians have reportedly used several pain control medicines, such as opioids, nonsteroidal anti-inflammatory drugs (NSAIDs), local anesthetic infiltrations, and nerve blockers (zkan and Cavdar, 2021).

The subcutaneous method is used to give all forms of anticoagulant medicines parenterally. The medicine can induce regional swelling, bruises, and discomfort at the injection site, as well as systemic effects such as bleeding and thrombocytopenia. These bruises and hematomas from treatment not only cause physical stress but also produce alterations in body awareness, making future injection site selection problematic. Using the damaged location for successive injections, after all, might cause pain and reduce drug absorption. The location of subcutaneous heparin injections and the time it takes to administer the injections are two factors that contribute to these issues. Time spent with needles in tissue, airlock, and suction procedures are all factors to consider. Cold compresses are one of the applications for preventing these issues, in addition to injectable procedures. (Jueakaew et al., 2019)

### Aim of the study

This study aimed to evaluate the effect of cold compresses on pain intensity and ecchymosis among patients receiving subcutaneous anticoagulant injection **Research hypotheses**

**H1;** The study group who received cold compresses will have a significantly lower pain intensity than the control group who received routine hospital care

**H2;** The study group who received cold compresses will have a significantly lower incidence of ecchymosis formation compared with the control group who received routine hospital care

**H3;** The study group who received cold compresses will have a significantly smaller size of ecchymosis than the control group who received routine hospital care

### 3. Subjects and Methods

#### 3.1. Research design

A quasi-experimental research design (study/control group) was utilized to accomplish the aim of this study.

#### 3.2 Research Setting

The research was carried out in Benha University Hospital's cardiac care unit, which comprises three wards, each with six beds, and a two-bed economy ward. In the heart station, there are a total of 20 beds.

#### 3.3. Subjects

A purposive sample of 100 people using subcutaneous anticoagulation in the Cardiology Unit of Benha University Hospital for 6 months (from the beginning of february2021 to the end of July 2021), with the following criteria:

**Inclusion criteria:** Patients between the ages of 20 and 60 years old, both male and female. For prophylaxis or treatment, only newly admitted patients received subcutaneous intraperitoneal anticoagulation. The study included conscious, oriented, and non-intubated patients who could assess pain scale intensity.

**Exclusion criteria:** Patients who are pregnant, unconscious, intubated, have cognitive impairment or injuries or are unable to sense or report discomfort. Thrombocytopenia, liver disease, and other coagulation problems patients

#### 3.4. The sample size ;

The total sample size was 100 patients who agreed to participate and met the inclusion criteria. Each group of 50 patients was randomly assigned to one of two groups (study group or control group). Simple randomization was used to allocate participants to the research and control groups: each participant was given a number, which was written on a slip of paper, placed in a container, mixed thoroughly, and taken out separately. Allow time to distribute the appropriate samples. The number was taken from the container by the researchers. The study group received a cold compress before receiving an anticoagulant injection subcutaneously, while the control group received standard treatment.

#### 3.5. Tools of data collection

Data was gathered using the following tools: After reviewing relevant literature, the researcher designed them. It has three sections and is written in simple Arabic:

#### 1.A Structured Interview Questionnaire

**Patient assessment tool:** The researcher developed the tool. It is divided into two sections: demographic information and medical information.

**Part I: Demographic Data:** Processes patient sociodemographic data such as age, gender, educational level, occupation, marital status, and location of residence.

**Part II: Medical Data:** The researchers created this tool to collect information from patient admission records on patient care units, medical history, patient weight, and laboratory tests such as prothrombin time, prothrombin concentration, and international normalized ratio (INR)). At the same time, the researchers took measurements of height and BMI.

**Bruising Category Scale:** This scale was adopted from (McGowan and Wood, 1990) and is used by researchers to measure contusion. At 48 and 72 hours after the injection, the researchers measured bruises.

**Scoring system:** Based on the surface area, bruising was categorized into three categories: no bruising (less than 2mm<sup>2</sup>), light bruising (2-5mm<sup>2</sup>), and severe bruising (more than 5mm<sup>2</sup>).

2. **Visual Analogue Scale for pain (VAS):** This pain intensity scale, adopted, was used by the examiner to assess pain intensity (Ohnhaus & Adler, 1975). Patients were asked to rate their current pain sensation on a scale of 0 to 10 at the time of the injection.

**Scoring system:** There were four levels of pain intensity: none, mild, moderate, and severe: no pain (0), mild pain (1-4), moderate pain (5-7), and severe pain (8-10).

3. **Ecchymosis Formation Scale:** This scale was adopted from a previous study to measure ecchymosis (Andersen, Bregendahl, Kaestel, Skriver, & Ravkilde, 2015). Ecchymosis was measured 48 and 72 hours following the injection by the researchers.

**Scoring system:** Ecchymosis are classified into four groups based on their surface area: no Ecchymosis (less than 2 cm in diameter), tiny Ecchymosis (less than 2 cm in diameter), large Ecchymosis (greater than 5 cm in diameter), and marked Ecchymosis (greater than 10 cm in diameter).

### **Administrative design :**

The hospital director and the cardiac care unit manager were permitted to perform this study by the authorities of Benha University Hospital's Faculty of Nursing (to obtain their approved study letter).

Face-to-face discussions with nurses and doctors were also held to explain the study's goal and to ensure the greatest possible teamwork. Patients' oral informed agreement to participate in the study was also acquired once the purpose and methods were explained to them. **Operational**

### **design:**

The preparation phase, content validity and reliability, pilot studies, and fieldwork are all part of operational design.

### **Preparatory phase:**

The researchers used books, papers, and the Internet to review current relevant literature and theoretical knowledge on many topics of this study to build adequate data collection tools.

**3.6. Validity** of the proposed tools by using face and content validity. Face validity aimed at inspecting the items to determine whether the tools measure what supposed to measure. Content validity was conducted to determine whether the content of the tools cover the aim of the study. Validity tested it was tested by a jury of five experts in the field of the study, Three of them were professors and two are assistant professors of medical surgical nursing at faculty of nursing, Benha University, The expertise reviewed the tools for clarity, relevance, comprehensiveness, simplicity and applicability, All necessary modification were carried out accordingly.

**3.7. Reliability** of tools is the ability of a tool to produce stable and reliable outcomes measured by its reliability. The visual analog scale's dependability was assessed statistically using intraclass correlation coefficients (ICCs), which were 0.97. (Bijur, Silver & Gallagher, 2001). The intraclass correlation coefficients (ICCs) with an ICC of 0.962 were used to determine the reliability of the ecchymosis and bruising scales (Cosman, 2012).

### **3.8. Pilot study:**

A pilot study was done on 10% of the study sample (10 patients) to examine the clarity and usefulness of data collection tools, as well as to establish the necessity for an applied research time tool. Because of minor changes made following the

pilot research, patients enrolled in the pilot study were excluded from the sample.

### **3.9. Fieldwork:**

The researchers introduced themselves to the patients, described the aim of the research, and gained verbal consent before evaluating and arranging the intervention. The researchers underlined the necessity of active participation while maintaining the right of the patient to withdraw at any moment. Embarrassment or a negative influence on patient care are both possibilities.

Researchers will consider all newly admitted patients receiving subcutaneous anticoagulants for inclusion once the required approvals are obtained to proceed with the proposed trial. Patients who satisfy the research's requirements should be given detailed information about the trial and asked whether they accept to participate. For all actual work, researchers were accessible at the heart station three days a week from 9:00 a.m. to 3:00 p.m. till interviewing people. The data were collected over six months by the researchers (from early February 2021 to late July 2021).

**The equipment used in this study consists** of a 15 x 15 cm refillable cold bag; a thermometer for determining package temperature; a disposable towel to cover the refillable cold bag; a clock with a second hand to determine the length of anticoagulant injection Cold compress time and duration; a permanent marker to identify injection site; To measure the diameter of bruises and ecchymoses, use a transparent millimeter ruler.

**Firstly**, demographic information such as the individuals' age and gender, as well as medical information, were entered in a data collection form.

**Body mass index:** Weight (kg)/height<sup>2</sup> (m) is computed by dividing the weight (kg) by the square of the height (meters). Patients' body mass index was categorized into three categories by (Pi-Sunyer et al., 1998): normal (18.5-24.9) kg/m<sup>2</sup>, overweight (25.0-29.9) kg/m<sup>2</sup>, and obese (30.0 kg/m<sup>2</sup>).

- During the study, refillable rubber ice packs with clips were employed. The researchers filled the bag two-thirds full with ice and a little water, then sucked out the remaining air and closed the clips. To prevent frostbite and tissue damage, the ice pack is wrapped in a towel or cotton cloth to function as a barrier between the ice pack and the patient's skin. According to the guidelines in existing nursing

textbooks, the temperature range for these ice packs is below 150°C (Berman et al., 2015).

- In the control group, the researcher used the SC injection technique to inject an anticoagulant into the abdomen without using a cold compress, designated the injection site with a permanent marker, drew a 5cm<sup>2</sup> circle around the injection site, and documented the data on the collecting form. The pain level was measured right after the injection. At 48 and 72 hours, ecchymosis and bruising were examined.
- In the study group the researcher used an ice pack for 5 minutes before the injection, and then performed an abdominal SC injection using the SC injection technique, marking the site with a non-fading pen, and drawing a circle of approximately 5 cm<sup>2</sup> around the insertion point and recording it in the data collection form. The pain level was measured right after the injection. At 48 and 72 hours, ecchymosis and bruising were examined.
- For all patients in two patient groups (study and control), the subcutaneous injection regimen is as follows: Type of syringe: single dosage prefilled syringe It has a 27 gauge needle. Alcohol Swabs: Before inserting the needle, clean the area with alcohol and let it air dry. Inhaling: There will be no inhalation. The angle of insertion: 90 degrees Abdomen in a circle around the navel Time to inject: 10 seconds Following the injection: For 10 seconds, apply mild pressure to the injection site without massaging it.

• **Measurement of bruise and ecchymosis:**

It was found that bruising or ecchymosis caused by anticoagulant subcutaneous injection was most noticeable 48 hours after injection and faded 72 hours later (Potter and Perry, 2007). As a result, 48 and 72 hours after injection, bruising and ecchymosis measurements were taken. Researchers carry out the evaluations. A clear meter was inserted at the injection site to measure any skin discoloration larger than 2 mm<sup>2</sup> in diameter, and the bruised area was calculated in mm<sup>2</sup>. The size of the ecchymosis at the injection site was measured with a transparent millimeter ruler, with the broadest dimension measured to the nearest centimeter.

**Assessment of pain intensity:**

A visual analog scale (VAS) was used to measure pain immediately after each injection. 0 indicates no discomfort, whereas 10 indicates severe pain and anguish. Subjects were asked to

give a number between 0 and 10 that represented their current pain perception at the time of the injection immediately after each injection.

**3.10.Ethical consideration:**

1. Each patient was informed that tools will not embarrass of modesty and will not cause any harm or pain for participant patients.
2. It will not cause risks of physical or psychological, social and don't run with ethical beliefs.
3. Confidentiality was ensured throughout the study process, where personal data was not disclosed, and the patient were assured that all data will be used only for research purpose.

Each patient was informed that, participation is voluntary and his withdrawal will not affect his care

**3.11.Statistical Design:**

The Statistical Package for Social Sciences (SPSS) version was used to organize, categorize, tabulate, and statistically analyze the data collected (20). Counts, percentage distributions, chi-square tests, means, standard deviations, and correlation coefficients were employed in data analysis, and paired t-tests were utilized to examine the significance of variables. P 0.05 and P 0.001 were considered significant level values.

**4. Results:**

**Table 1:** demonstrates the distribution of the study and control groups regarding their demographic characteristics. It shows that 56% of the study group and 54% of the control group were in the age category 40<50 years old. Regarding gender 72%, and 64% of both study and control groups respectively were males. There was no statistical significance difference between both groups with a p-value >0.05, indicating that the two groups were nearly homogenous.

**Table 2:** shows the distribution of the study and control groups regarding their medical data .it reveals that 76% and 72% of both study and control group has normal body mass index with mean scores of  $23.40 \pm 2.902$  and  $24.106 \pm 2.731$  respectively. As regards laboratory investigation, 78% and 76% of the study and control group have normal INR, 88%, 84% of them have normal PC .also, 86% and 88% of the study and control group have normal PT respectively. Regarding past medical history, 36% and 42% of both the study

and control group have diabetes Mellitus respectively. There was no statistical significance difference between both groups with a p-value >0.05, indicating that the two groups were nearly homogenous.

**Table 3:** illustrates the comparison of the study and control groups regarding pain intensity scores. It shows that the mean score of pain intensity after cold compresses in the study group was 3.2400±1.974, while it was 5.0600±1.754 for the control group without cold compresses with a highly statistically significant p-value of 0.000, which indicates the effect of cold compresses in lower in pain intensity.

**Table 4:** demonstrates the comparison of the study and control groups regarding bruising formation after 48 hours and 72 hours. It reveals that after 48 hours of injection, 60% and 32% of the study group has no bruises and small bruises respectively, while 60% and 20% of the control

group has small bruises and large bruises respectively. As regards bruises after 72 hours of injection, 66% and 34% of the study group has no bruises and small bruises respectively compared to 26% and 60% of the control group. There were highly statistically significant differences between the study and control group at a p-value of 0.000.

**Table 5:** displays a comparison of the study and control groups regarding ecchymosis formation after 48 hours and 72 hours. It reveals that after 48 hours of injection, 56% and 34% of the study group had no ecchymosis and small ecchymosis respectively compared to 18% and 60% of the control group. As regards ecchymosis formation after 72 hours of injection, it was noted that 60 % and 40% of the study group had no ecchymosis and small ecchymosis respectively compared to 24% and 58% % of the control group. There were highly statistically significant differences between the study and control group at a p value<0.001(50.0%)

**Table (1):** Frequency distribution of the study and control groups regarding their demographic characteristics

Variable	Study group N= 50		Control group N= 50		X <sup>2</sup>	P value
	No	%	No	%		
<b>Age</b>						
20<30 years	1	2	1	2	.480	0.922 ns
30<40years	1	2	1	2		
40<50years	18	36	27	54		
50- 60years	12	24	11	22		
<b>Mean ±SD</b>	30.82±17.210		30.76±16.020		(t)=0.048	0.692ns
<b>Sex</b>						
Male	11	22	11	22	0.703	0.391ns
Female	12	24	18	36		

X<sup>2</sup>: Chi-square test

ns: not significant

(t) paired t-test

**Table (2):** Frequency distribution of the study and control groups regarding their medical data

Variable	Study group N= 50		Control group N= 50		X <sup>2</sup>	P value
	No	%	No	%		
<b>BMI</b>						
Normal	18	36	11	22	1.781	0.410ns
Over weight	1	2	11	22		
Obese	1	2	1	2		
<b>Mean ±SD</b>	17.20±1.602		17.10±1.771		(t)=-1.229	0.117ns
<b>Laboratory investigation</b>						
<b>INR</b>						
• Low	2	4	1	2	0.490	0.782ns
• Normal	19	38	18	36		
• High	1	2	1	2		
<b>PC</b>						
• Low	6	12	8	16	.332	.567ns
• Normal	44	88	42	84		
<b>PT</b>						
• Normal	11	22	11	22	.008	.936ns
• High	7	14	6	12		
<b>Past medical history</b>						
Diabetes	1	2	1	2	1.226	.295ns
Hypertension	11	22	11	22		
Cardiac diseases	12	24	11	22		
Renal disease	1	2	1	2		

X<sup>2</sup>: Chi-square test

ns: not significant

(t) paired t-test

**BMI:** Body mass index **INR:** International Normalized Ratio **PT:** Prothrombin time

**PC:** Prothrombin concentration

**Table (3): Comparison of the study and control groups regarding pain intensity score.**

Variable	Study group N= 50		Control group N= 50		X <sup>2</sup>	P value
	No	%	No	%		
<b>Pain intensity</b>						
No pain (0)	3	6	0	0	15.179	0.002*
Mild pain( 1-3)	24	46	8	16		
Moderate pain (4-7)	22	44	40	80		
Sever pain(8-10)	1	2	2	4		
<b>Mean ±SD</b>	3.2400±1.974		5.0600±1.754		<b>t=- 4.872</b>	<b>0.000**</b>

X<sup>2</sup>: Chi-square test (t) paired t-test

(\* ) Statistically Significant at ≤0.05 (\*\* ) Highly statistically significant at ≤0.001

**Table (4): comparison of the study and control groups regarding bruising category scale after 48 hours and 72 hours.**

Variable	Study group N= 50		Control group N= 50		X <sup>2</sup>	P value
	No	%	No	%		
<b>bruising category scale after 48 hours</b>						
No bruise (<2 mm2)	30	60	10	20	16.832	0.000**
Small bruise (2-5 mm2)	16	32	30	60		
large bruise (>5 mm2)	4	8	10	20		
<b>bruising category scale after 72 hours</b>						
No bruise (<2 mm2)	33	66	13	26	18.779	0.000**
Small bruise (2-5 mm2)	17	34	30	60		
large bruise (>5 mm2)	0	0	7	14		

X<sup>2</sup>: Chi-square test (\*\* ) Highly statistically significant at ≤0.001

**Table (5): comparison of the study and control groups regarding ecchymosis formation scale after 48 hours and 72 hours.**

Variable	Study group N= 50		Control group N= 50		X <sup>2</sup>	P value
	No	%	No	%		
<b>ecchymosis formation scale after 48 hours</b>						
No ecchymosis (<2cm <sup>2</sup> in diameters)	28	56	9	18	10.691	<0.001**
Small ecchymosis (2≤ 5 cm <sup>2</sup> in diameter)	17	34	30	60		
Medium ecchymosis (5≤ 10 cm <sup>2</sup> in diameter)	3	6	7	14		
large ecchymosis (≥ 10 cm <sup>2</sup> in diameter)	2	4	4	8		
<b>ecchymosis formation scale after 72 hours</b>						
No ecchymosis (<2cm <sup>2</sup> in diameters)	30	60	12	24	17.714	<0.001**
Small ecchymosis (2≤ 5 cm <sup>2</sup> in diameter)	20	40	29	58		
Medium ecchymosis (5≤ 10 cm <sup>2</sup> in diameter)	0	0	8	16		
large ecchymosis (≥ 10 cm <sup>2</sup> in diameter)	0	0	1	2		

X<sup>2</sup>: Chi-square test (\*\* ) Highly statistically significant at ≤0.001

## 5. Discussion

Injection time, injection site, injection dose, needle size, and use of cold therapy are now factors impacting pain and bruising caused by subcutaneous injection of anticoagulant injections. The use of cold compresses lowers tissue temperature, blood flow, and cellular metabolism. Cold compresses are a nonpharmacological technique that reduces catecholamine levels, increases endorphin levels, and delays the transmission of pain signals to the central nervous system, all of which serve to lessen pain severity. Cold compresses also constrict peripheral blood arteries, lowering blood flow to tissues and reducing bruising and ecchymosis (Thijs E, 2019).

**Section (I):** demographic characteristics of the studied patients.

In terms of age, the current study discovered that more than half of the study patients were between the ages of 40 and 50, with a mean age of 45.8 7.435, which was compared to Alabdahai, Mokabel, and Al-Ghuneimy, (2017) in their paper entitled "Injection Site Pain and Hematoma as a Result of Noraparin (Kingdom of Saudi Arabia-Arabia) Patients ranged in age from 47.5 to 20.7 years. This finding was also similar to that of Zaki et al. (2020), who evaluated "The effect of cold compresses on patients receiving subcutaneous enoxaparin." ", found that more than half of the patients in the study were under the age of 50, with a mean age of 45.43 18.18 years. Ahmadi, Ahmadi, Saadati, and Mehrpour (2016), conducted a study titled "Effect of prolonged subcutaneous heparin injection on pain severity and incidence of bruising" and found that more than two-thirds of the cases were the case, contradict this finding. Patients in the study ranged in age from 50 to 69 years old.

In terms of gender, more than two-thirds of the patients in both the study and control groups were male, according to the current study. This finding is in line with that of Zaki et al. (2020), who found that men made up more than two-thirds of the study participants. This finding is congruent with Avsar & Kasikci (2019), who discovered that the majority of patients analyzed are male in their study "Assessing Four Different Methods of Subcutaneous Heparin Application in Inducing Bruising and Pain." This conclusion contradicts Sendir, Buyukyilmaz Celik, and Taskopru's (2015) findings in a study titled "Comparison of 3 techniques for pain and bruise avoidance following subcutaneous heparin administration," which

indicated that more than half of the patients investigated were women.

**Section (II):** medical data of studied patients :

Moreover, two-thirds of the study and control groups had a normal BMI, with mean values of 23,400 2,952 and 24,156 2,731, respectively, in the current study. Jareno-Collado et al. (2018) investigated "ecchymosis and/or hematoma formation following prophylactic treatment of enoxaparin in the abdomen or arms of critically ill patients" and found that only about a quarter of the patients were obese. This contradicts the findings of Palese et al. (2019), who discovered that just about half of the patients were obese.

In terms of laboratory tests, the majority of the study and control groups had normal INR, PC, and PT levels. This finding is in line with that of Alabdahai et al. (2017), who found that more than two-thirds of the patients in their research had normal prothrombin timings. This study's findings on INR are congruent with those of Zaki et al. (2020), who found that more than three-quarters of patients had a normal INR and only one-quarter had a high INR. This finding is in line with Palese, Aidone, Dante, and Pea (2019), who observed that the majority of patients had normal INR in their study titled "Incidence and extent of bruising according to the duration of subcutaneous low-molecular-weight heparin administration in Italy."

The current study found that less than half of the study and control groups had diabetes based on medical history. This is in line with the findings of Zaki et al. (2020), who found that only one-third of the patients investigated had diabetes. This could be because more than half of the patients studied were between the ages of 40 and 50, according to the researchers.

**Section III:** concerned with the assessment of pain intensity, bruising, and ecchymosis

The study group's mean pain intensity score after cold compress was 3.2400 1.974, whereas the control group's score without cold compress was 5.0600 1.754, which was highly statistically significant, demonstrating the efficacy of cold compress in reducing pain intensity. In a study (Effect of cold compress on pain and bruising in patients with subcutaneous low molecular weight heparin: a meta-analysis), Wang Haifeng et al. discovered that when compared to the control group, the cold compress group had a significant reduction in immediate post-injection pain intensity. This finding is also consistent with Fareed J (2018), who investigated the effect of



cold compress on pain and bruising in patients with subcutaneous low molecular weight heparin: a meta-analysis and found that the cold compress group was significantly different from the control group using the Verbal Descriptive Scale Pain Assessment Tool. Pain intensity, on the other hand, was greatly reduced shortly after injection. From the researchers' point of view, This could be due to the physiological effects of cold compresses, according to the researchers, and based on these findings, cold compresses before injection are both analgesic and beneficial in lowering discomfort at the injection site. Kilic & Midilli (2017) observed that pain scores with cold compress intervention were lower than pain scores without cold compress intervention, which is consistent with this finding.

Regarding the Bruising category for both the study and control group :

According to the findings of the current study, more than half of the control group had bruising (no cold compress) at the injection site, but only around a quarter of the study group had to bruise (cold compress). At 48 and 72 hours, the difference between the two approaches was extremely statistically significant, with P 0.000. Cold compresses at the injection site were avoided, and bruising was decreased, according to these data. This finding is in line with that of Wang Haifeng et al. (2020), who found that the cold compress group had a reduced bruise rate than the control group. This is similar to Fareed (2018), who found that subcutaneous enoxaparin plus a 2-minute cold compress were useful in preventing and minimizing bruising.

Regarding ecchymosis formation :

More than half of the trial participants had no ecchymosis 48 hours following the injection, compared to fewer than a quarter of the control participants. When it came to ecchymosis creation 72 hours after injection, more than half of the study group had none, whereas just a quarter of the control group did. With a p-value of 0.001, there was a very statistically significant difference between the study and control groups. Cold compresses reduced the occurrence of hematomas in patients getting enoxaparin injections, according to Alabdalhai et al. (2017).

This result differs from that of Zaki et al. (2020), who found that injection site hematoma developed in fewer than a fifth of patients during technique A. (no cold compress). With method B, however, just three patients developed hematomas (cold compress). This indicates that the majority of

the patients investigated did not develop hematomas using either approach, and there was no statistically significant difference in hematoma formation between the two techniques (p-value > 0.05).

## **6.Conclusion**

She concluded that more than half of the patients examined were between the ages of 40 and 50, that more than two-thirds of the patients examined (study and control) were male, and that more than 2-3 of them were female based on the findings of the current study. Only around half of the study and control groups had diabetes, while two-thirds of the study and control groups had normal BMI, INR, PC, and PT. More than half of the control group experienced bruising (no cold compress) at the injection site used, while less than a quarter experienced bruising at the injection site used, which is highly statistically significant at a p-value of 0.000, indicating the effect of cold compresses in reducing pain intensity. Bruises appeared in the control group (for cold compresses). This indicates that at 48 and 72 hours, the difference between the two approaches was extremely statistically significant (P 0.000). More than half of the trial participants had no ecchymosis 48 hours following the injection, compared to fewer than a quarter of the control participants. When it occurred to ecchymosis creation 72 hours after injection, more than half of the study group had none, whereas just a quarter of the control group did. The difference between the study and control groups was highly statistically significant, with a p-value of 0.001.

## **7.Recommendations :**

The following suggestions can be made based on the findings of this study:

- Larger sample sizes can be used in studies to more extensively generalize the findings.
- It is recommended that the cold application should be included in the subcutaneous anti-coagulant injection.
- Provides an ongoing and regular educational program on standard subcutaneous anticoagulant regimens as updates and new evidence of good practice.
- As updates and new evidence of good practice, hospital subcutaneous dosing regimens should be developed and regularly reviewed, and updated regimens should be communicated to nursing staff.

## 8. Ethics Statement

The study was done with ethical research standards, as well as the rights of participants to accept or decline participation in the study, and their information would be kept private and utilized for research reasons. Because they were not required to be identified, respondents remained anonymous.

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