

## Effect of Cryotherapy versus Heifer Technique on Pain Intensity among Adult Patients Receiving Intramuscular Injection.

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**Abstract:** Intramuscular injection (IMI) is most frequently used but causing painful experience for many individuals. patients are experiencing repeated injection which let them escape, sometimes faint, to keep away from visiting the doctor, or even refuse essential treatments. **Aim of the study :-**To evaluate the effect of cryotherapy versus heifer skin tapping technique on pain intensity among adult patients receiving intramuscular injection. **Methods:-** Quasi –experimental time-series was used in the current study. The study was conducted in medical departments at Mansoura University Hospital. Total number of (100) participants were recruited for the purpose of the current study, using power analysis that correspond inclusion criteria. Structured interview questionnaire tool was used to collect data including Part (1) The socio-demographic . part (2) health relevant data .Tool (2) Universal pain assessment tool and tool(3) Observation Checklist of nonverbal pain indicator (OCNPI).**Results.** showed that there were a highly significant statistically differences ( $p < 0.001$ ) between Verbal Descriptor Scale/Numerical Rating Scale (NRS), Wong-Baker Facial Grimace Scale/Visual Analog Scale (VAS) and Activity Tolerance Scale immediately intervention and after the intervention for both studied group and control group. **Conclusion and recommendations:** Cryotherapy is more effective in relieving pain from intramuscular injection and heifer technique are used in reducing pain from IMI than traditional technique. It was recommended that medical departments can apply cryotherapy technique and heifer technique to reduce needle puncture pain for IMI in routine care.

**Keywords:** Cryotherapy , Heifer technique , Intramuscular Injection, Pain .

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### I. Introduction

Pain is a multidimensional phenomenon, it is difficult to define, it is an individual and subjective experience, and no two individuals experience pain in the very same way. The international association for study of pain (IASP) gives the definition of the pain as "unpleasant sensory and emotional experience combined with the damage of actual or potential tissue, or describe in terms of such damage (1). According American pain society, Pain is as "the fifth vital sign" to stress its significance and to improve attention of health care professionals about the importance of effective pain management strategies, as well as continuous assessment (2).

The presence of pain is one of the main reasons why individuals get health care. Pain may be extremely unpleasant and a really personal sensation will not be participated with others; it can occupy all an individual's thinking, direct all activities and alter an individual life .Yet, pain may be a scary concept for a patient to communicate.(3). Pain is stand out amongst the most widely recognized reasons for human sufferings, which is considered as a major health problem among adults. There are 16 billion intramuscular injections (IMI) administered annually throughout the world (4).It infiltrates everyday living and might considerably decrease the quality of individual life . A person's response to pain is influenced by age, sex emotion, socio-cultural variables, previous experiences with pain, the meaning of pain and pain tolerance (5).

According to WHO, (2010) IM injection, are the most known health care procedure worldwide. In developing countries alone, some 16 thousand million injections are administered each year, more than 90%, are given for therapeutic purposes while 5 to 10% are given for preventive services, including immunization and family planning . The applications of the injection are used commonly forms of pharmacological therapy and the application of injection. The drug is administered into the muscle tissue in intramuscular injections that is the reason for enriching the muscle tissue in the vein deposits, The absorbing of the drug by the intramuscular injection is faster than the subcutaneous application and it can be administered that intense drugs which have high irritant impact into the tissue of the deep muscle. (6).

Good injection technique can mean the difference between less pain and injury. The procedural pain is the basic source of disturbance for hospitalized patients. Among all the painful invasive procedures .Intramuscular injection is a common nursing procedure that is the reason for the pain and discomfort to the patients. The management of Pain during invasive procedure is a challenge to the direct care providers. (7).

It is as the simple technique, but the process of the intramuscular injection is not done and it may be the reason for serious complications. These complications are necrosis, abscess, ecchymosis, hematoma, vascular , infection, pain, periostitis, and nerve injury . These complications can be decrease or prohibited in the case of health professionals, the required skills about intramuscular injections, (8).

Intramuscular (IM) injections are known and a part of routine health care. The techniques of good injection may make the experience painless for the patient. For many years, clinicians tried to discover many methods for decreasing the pain that involve the injections pain for decreasing the complications and the pain combined with the injection of IM , nurses should be know the literature and develop their skills. (9).

Intramuscular injections (IMI) are common complex technique used to deliver medication deep into the large muscle of the body. It estimated that around 10% of American adults are trypanophobic (fear of injections) and 1-3% U.K.(10)

Each year 16 billion injections are administered in developing and transitional countries. The vast majority, around 95% are given in curative care. Immunizations accounts for around 3 % of all injection. The prevalence of injections in European countries was 5.6-11.3 injections per person per year. The lowest annual numbers of injections were in America that is 1.7-1.9injections per person per year. People residing in developing regions receive 1.5-11.3 injections per person per year. India contributes 25-30% of global injection (11).

Nurses need to know the pain assessment, the cultural and psychosocial causes that influence the pain expression. IM injection is nursing practice, but there is a little practices that is based on the evidence regarding to IM injection pain. Nurses have legal and ethical responsibilities for managing pain. Effective pain control measures not only alleviate discomfort, but also promote clients' quality of life. (12).

The pain management aim to decrease the suffering by integrating with the alternative medicine systems and indigenous techniques such as aroma therapy acupuncture, biofeedback tapping treatment, meditation; exercise treatment; and massage, pressure, etc. (13).There are various pharmacological and non-pharmacological measures to lessen pain. As of late, the non-pharmacological measures of pain management strategy are picking up the prominence, for example cryotherapy, heifer technique , acupressure, massage and acupuncture etc.... (14). Research evidences demonstrated that non-pharmacological measures complimentary or alternative nursing interventions, which were advocated to minimize pain in patients (15).

Clinical can treat with the pain relating to the procedures of minor invasive nursing with non-pharmacological measuring than pharmacological measuring. The effect of its cost is considered as these simple but basic procedures are repeated for the same person for various times. Hence non-pharmacological measures can be the choice for relieving or preventing such minor invasive pain, like intramuscular injection pain(16).

Although the experienced pain that is the reason for IM injection, many researchers mentioned that 6-23% of patients have permanent pain, post IM injection. This is because of the reactions or complications, unsuitable technique of injection. The pain of IM injection due to the Mechanical stimulation and the sharp needle, Tissue reaction due to the volume of the drug injected, 'Potassium' is from inside of the damaged cells, Prostaglandins and histamine from immune cells that invade the area during any injury and Substance 'p' from nearby nerve fibres.(17).

"Whole Body Cryo Therapy" (WBC), is defined as " Air Cryo Therapy" (ACT) and "Cryosauna," was presented in 1978 Japan in 1978 to use the freezing therapy of short duration on patients with rheumatoid arthritis. Cold application relaxes muscle and muscle contractility, vasoconstriction reduces blood flow, capillary permeability, slows cellular metabolism. It reduces the pain via slowing the rate of nerve conduction and blocking nerve impulses, decreases the edema by relieving the capillary permeability .Cryotherapy is used to presenting for reducing the pain and fever, slowing the damage of thermal burns, controlling the bleeding, and prohibiting the edema that is by soft tissue trauma. (18).

These cryo-procedures decreased the pain felt during manipulation of their joints. The therapy was the rapid decreasing in the temperature of the skin outer layer that is result in releasing of endorphins, and thus less sensitivity to pain. Localized cryotherapy uses the localized freezing temperatures to deaden irritated nerves. The super-cold fluid is injected to the affected area. If one wants the experience of the "full body", you enter into the sized booth of the shower-stall in which the sub-freezing air surrounding you. (19).

In 1998, Ms Joanne Keiffer Heifer' try the decrease the pain of IM injections vai developing the technique of 'Heifer Skin Tap' where the tapping is on the site of injection before and during the procedure. There is decreased pain in administering the injection into a relaxed muscle. Tapping is also one of the many techniques for maintaining the muscles relaxed. (20).Heifer Skin Tap Technique is a non- pharmacological pain management techniques describes that mechanical stimuli on the skin may help changing the balance between

the small diameter fibers that carry the pain to the brain, and the large diameter fibers not carry the pain to the brain. The large diameter non-pain fibers will block or sedate the small diameter pain- taking through the effective skin tapping technique (21).

## **II. Significance of the study**

According to WHO, injections are the most frequently used medical procedures. Each year 16 billion injections are administered in developing countries. The vast majority, around 95% are given in curative care. Millions of people are plagued by a fear of injections. Chronic patients are suffering from repeated injection which let them escape, sometimes faint, avoid visiting the doctor, or even discontinue essential treatments. Nurses should be as supporter for adults, and decrease the emotional and physical impact of painful procedures. Presenting the relief of the pain is the most basic human right and it is the nurses' responsibility for using most effective approach to control pain. (22)

Different methods are used by the nurses to reduce pain during intramuscular injections such as applying pressure, taping the skin, applying heat and cold. Each method will have differences in their effect on the level of pain during intramuscular injection. Since several studies have been done in this field, it is pressing to conduct such a study to assess the effectiveness of cryotherapy and the technique of heifer skin tapping on pain intensity among the adult patients receiving intramuscular injection as a non-pharmacological pain management among Egyptian patients.

## **III. Methodology**

### **3.1 Aim;**

This aim of study was to evaluating the effect of Cryotherapy versus Heifer skin tapping technique on pain intensity among adult patients receiving an intramuscular injection

### **3.2 Research hypotheses;**

- H1. Patients who receive Cryotherapy will express lower pain intensity compared to patients who do not receive Cryotherapy.
- H2. Patients who receive heifer skin tapping technique will express lower pain intensity compared to who do not receive heifer skin tapping technique.

### **3.2 Research design;**

The researcher used the design of quasi experimental time-series. The researcher periodically observed the subjects to measure patients' pain intensity with the use of cryotherapy and heifer skin tapping technique. The experimental treatment is administered before observations to determine if cryotherapy and heifer technique is effective in reducing IMI pain, and if the effectiveness of the cryotherapy or heifer technique persists. The design of time-series with its many observations or measurements of the dependent variable assist in strengthening the validity of the design (23).

### **3.4 Setting;**

The study was conducted in medical departments at Mansoura University Hospital. Data collection period continued for 10 months started from March till December 2017.

### **3.5 Participants;**

Total number of (100) participants were recruited for the purpose of the current study using power analysis. The power analysis indicated that (85) participants with the power of .80 ( $\beta = 1 - .80 = .20$ ) at alpha .03 (one- sided) is used as significant level, so it is used in many behavioral science research (Ellis, 2010).

The medium effect size (0.3) refers to the conventional effect size in behavioral science that is used if the research is new and instruments do not tested well. (24). Although the power analysis need the minimum numbers of 85 subjects, the researcher aim at obtaining hundred subjects because 10% of the rate of non-response drop from the subjects.

### **3.6; Inclusion criteria**

- 1-Adult patients receiving intramuscular injection in dorso- gluteal muscle from both sex aged from 20 to 60 years
- 2- Drug = Neurovit (irritant vitamin).
- 3- Amount of drug=1ml.
- 4- Technique = angle (90°) degree in dorso- gluteal muscle.
- 5- Needle size = 20-22 gauge.
- 6- Position= right/ lift side-lying position with knee flexed.
- 7- Able to communicate.

8-Willing to participate in the study .

### **3.7;Exclusion Criteria**

- 1-Patients with chronic pain associated with other disease condition.
- 2-Sedated and Unconscious patients
- 3-Adult Patients who are receiving intramuscular injection for the first time.
- 4-Patients have impaired circulation, peripheral vascular disease
- 5-Local infection
- 6-Have received analgesics less than six hours before the procedure.
- 7-Patients who had undergone any painful procedure within 1 hour of the study.
- 8- Patients have cognitive or psychological problems.

### **3.8; Tools of data collection**

The data was collected throughout the following tools :

**3.8.1- The questionnaire of structured interview** developed by the researcher was used to collect the following data:

Part (1)- **The socio-demographic data** of adult patients such as age, gender, educational status, marital status, place of residence and occupation status.

Part (2)- **Health Relevant Data Sheet** including Smoking, height, weight and body mass index, Level of consciousness, Mobility and questions relevant to intramuscular injections (like chronic diseases that necessitate taking IMI for long period ,types of medications that taken through intramuscular injections ,fear of injections , previous IMI injections complications, preferred sites ,pain descriptions of IMI injections, factors that precipitate pain sensations from repeated intramuscular injections ,pain radiate to another area and caffeinated beverage .

#### **3.8.2- Universal pain assessment tool: developed by Dalton and McNaull (1998)**

This tool includes integration among the scale of Verbal Descriptor, Wong-Baker Facial Grimace or Visual Analog Scale (VAS) and Activity Tolerance Scale. Through which the patient indicated the level of pain.

**A- Verbal Descriptor Scale (VDS)** is a 0-10 scale whereas (zero)=no pain, (1-2)= mild pain, (3-6)=moderate pain, (7-8)=sever pain,(9-10)=worst pain.

**B- Wong-Baker Facial Grimace Scale (WFGS)** or Visual Analog Scale (VAS)uses the patient's facial expression for assessment whereas (zero)=alert smiling, (1-2)= no humor – serious – flat, (3-4)=furrowed brow – pursed lips – breath holding, (5-6)=wrinkled nose – raised upper lips – rapid breathing,(7-8)=slow blink – open mouth, (9-10)=eye closed – moaning – crying.

**C- Activity Tolerance Scale (ATS)** uses the patient's self-assessment activities whereas (zero)=no pain, (1-2)=can be ignored, (3-4)=interferes with tasks, (5-6)= interferes with concentration, (7-8)= interferes with basic needs, (9-10)=bed rest required.

**3.8.3- Observation Checklist of nonverbal pain indicator (CNPI):** It is a modified version of the University of Alabama Pain Behavior Scale (25).

This tool describes behavioral observation for interpreting expressed pain when patient cannot communicate his/her pain intensity. The tool consists of 6 items as: 1.The vocal complaints: nonverbal such as groans ,Sighs, gasps, moans, and cries, 2. Facial Grimaces/Winces such as Furrowed brow, jaw drop, narrowed eyes, clenched teeth, tightened lips, and distorted expressions 3. Bracing such as Clutching or holding onto equipment, furniture, affected area during movement,4.Restlessness such as Constant or intermittent shift of position, intermittent or constant hand motions, rock, inability for keeping, 5.Rubbing (Massaging affected area), 6. Vocal complaints: the expression of verbal words as discomfort or pain [e.g., "ouch," "that hurts"]; cursing during the motion; exclamations of protest [e.g., "stop," that's enough"].

**Scoring System:** The Score is "0" if the behavior is not noticed. Score "1" when the behavior is noticed during the activity or the rest. All observed behaviors indicators is collected at the rest, with movement and overall.

### **3.9;Content Validity**

*Content Validity* has been done by seven experts in the different fields . Three from Medical-Surgical department ,one from critical, one administrations and one pediatric two from the faculty of medicine, Nursing specialty who reviewed the tool for clarity, relevance, understanding, and applicability for implementation. According to their critiques, minor modifications were done.

### **3.10;Tools reliability**

*Content reliability done by* among patients suffering from rheumatic arthritis pain, reliability of the universal pain assessment tool (Which includes Verbal descriptor scale and visual analog scale “VAS”): The VDS test–retest reliability was ranging between  $r = 0.95$  and  $0.96$ , while the VAS test–retest reliability was ranging between  $r = 0.86$  and  $0.95$ .(26).

The observed indicators of checklist of non-verbal pain (CNPI) tool has been shown to be a reliable among adults with acute or chronic pain, in critical care units. This tool was previously tested .(27).

### **3.11;Pilot study**

A pilot study is conducted on ten percentage of all patients for investigating and ensuring the feasibility, objectivity, applicability, clarity, adequacy, content validity, and internal consistency of the study tools and to determine possible problems in the methodological approach or instrument. The results of the pilot study were used to test the proposed statistical and data analysis methods. The involved Subjects are eliminated from the basic study sample.

### **3.12;Ethical consideration**

The ethics and research committee at the Faculty of Nursing, Cairo University gained written approval. Informed consent was sought and obtained from each participating subject after explaining the nature and objectives of the study. Each assessment sheet was coded; subjects' names were not appeared on the sheets for the purpose of anonymity and confidentiality. Subjects were free to withdraw from the study at any time.

### **3.12;Procedure :**

Work plan will be done as the following:

1-Patient will be interviewed by the investigator to fill out the demographic data sheet and health relevant data sheet which include height, weight and body mass index, smoking medications ,chronic diseases, previous IMI complications, stimulants and .....etc to determine factors that may affect their pain intensity before starting the study.

2-The plan of work before intervention:

Several factors might affect pain during injection, such as drug and amount injected, technique used, needle size, patient position, speed of delivery that mention before in inclusion criteria should be Unifying before intervention. Therefore standardization of these factors would manipulate all patients in the same manner.

3-At first time patient will be served as a control group where no intervention (no cryotherapy and no heifer technique), the investigator will administer IMI of Neurovit vitamin to patient in dorso gluteal muscle with patient in side-lying with flex knee, and the pain scores will be recorded both on observation checklist of nonverbal pain indicator (by assistant researcher) and universal pain assessment tool at different time intervals i.e. immediately after the injection and 15 minutes after the administration of a single injection.

4- At second time the same patient will be served as study group where cryotherapy intervention will be applied in the medical unit. The researcher will position the patient in side-lying (right or left site) with flexed knee, and then apply ice gel (with 2-3cm) on dorsogluteal muscle for at least 30 seconds. Then inject vitamin with needle gauge 20-22. After injection the pain scores will be recorded both on observation checklist of nonverbal pain indicator (by assistant researcher) and universal pain assessment tool at different time intervals i.e immediately after the injection and 15 minutes after the administration of a single injection.

5-At third time the same patient will be served as study group where heifer technique intervention will be applied in the medical unit. The investigator places the patient in side-lying position and flexes the knee to relax the muscles. The investigator makes a wide V with thumb and the rest of the fingers of the non-dominant hand, over the buttocks and taping the skin with middle, ring and little finger of the dominant hand counts 1, 2, 3 simultaneously taps the skin ,Then inject vitamin with needle gauge 20-22. After injection the pain scores will be recorded both on observation checklist of nonverbal pain indicator (by assistant researcher) and universal pain assessment tool at different time intervals i.e immediately after the injection and 15 minutes after the administration of a single injection.

### **1.13 Statistical analysis;**

The data were collected, coded tabulated, and analyzed by computer using the "Statistical Package for Social Sciences" (SPSS 21.0) for completing the data collection. The Descriptive statistics as percentage, frequency, mean, and standard deviation were used for analyzing the data relating to the study variables. Statistical significant was at p-value <0.05.

## **IV. Results**

**Figure (1a,b,c,d,e,f)** showed that the studied group ages ranged between31-60 year and the mean age was  $53.58 \pm 6.94$ year. More than half (56%) were male. Regarding to educational status, the figure illustrates that more than half (67%) of study group had Read and write, while the minority were illiterate education (44%).It was found that the majority of them (88%) were married .In relation to residence, the majority of adult sample (93%) were from rural regions. In relation to occupation status, the majority (75%) Worked, while twenty five were house wife.

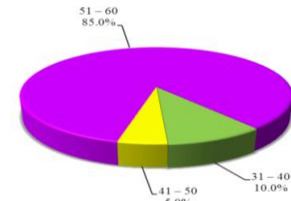


Figure (1a): Age

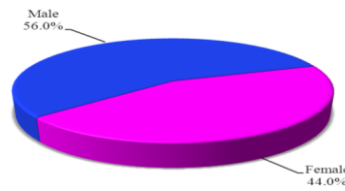


Figure (1b):gender

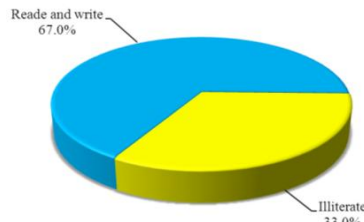


Figure (1c):Educational status

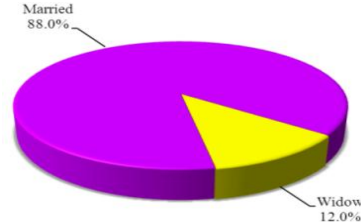


figure (1d):marital status

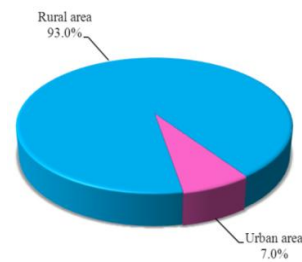
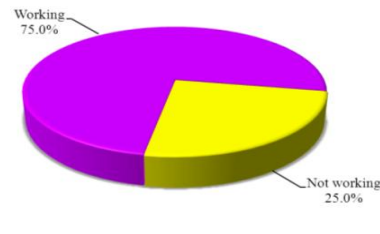


Figure (1e):Place of resident



Figure(1f):Occupation status

Figure(1)Frequency Distribution of patients in relation to their Socio-demographic data N=100.

Figure(2): Comparison between modalities of pain relieve according to verbal descriptor scale. Regarding pain during IMI, the table revealed that all patient (100%) in traditional group had severe pain immediately of IMI, while more than half of patients (67%)in heifer group had mild pain immediately of IMI, followed by less than one third (33%) of them had no pain ,but overall of patients(100%) in cryotherapy group had no pain immediately IMI. The same figure shows that ,more than half of patients(78%) reported pain after 15 minute in traditional group had mild pain, followed by less than one quarter(22%), had no pain while overall of patients (100)in cryotherapy and heifer group(study group) had no pain. The figure shows that the mean of verbal pain score immediately and after 15 minutes of intramuscular injection reduced in the study group(cryotherapy and heifer group) ( $0.0 \pm 0.0$ ,  $0.0 \pm 0.0$  respectively)(  $0.73 \pm 0.5$ ,  $0.0 \pm 0.0$  respectively) than the control group (immediately and after 15 minutes) (  $7.52 \pm 0.50$ ,  $1.05 \pm 0.70$ respectively). Concerning verbal pain scales immediately and after 15 minute ,table (3) showed that there were a highly statistically significant difference between control group and study group(heifer and cryotherapy group ) where  $p=(0.001,0.001,$ respectively),also there was a highly significant difference between cryotherapy and heifer groups regarding verbal pain scale immediately and after 15 minutes as p value  $<0.001$ ).

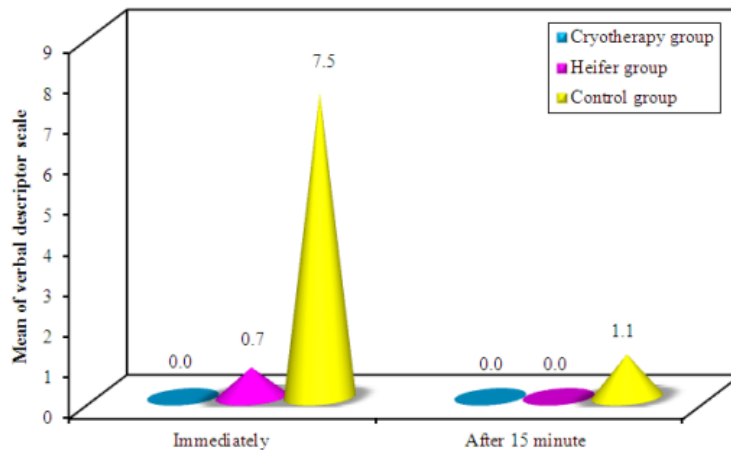
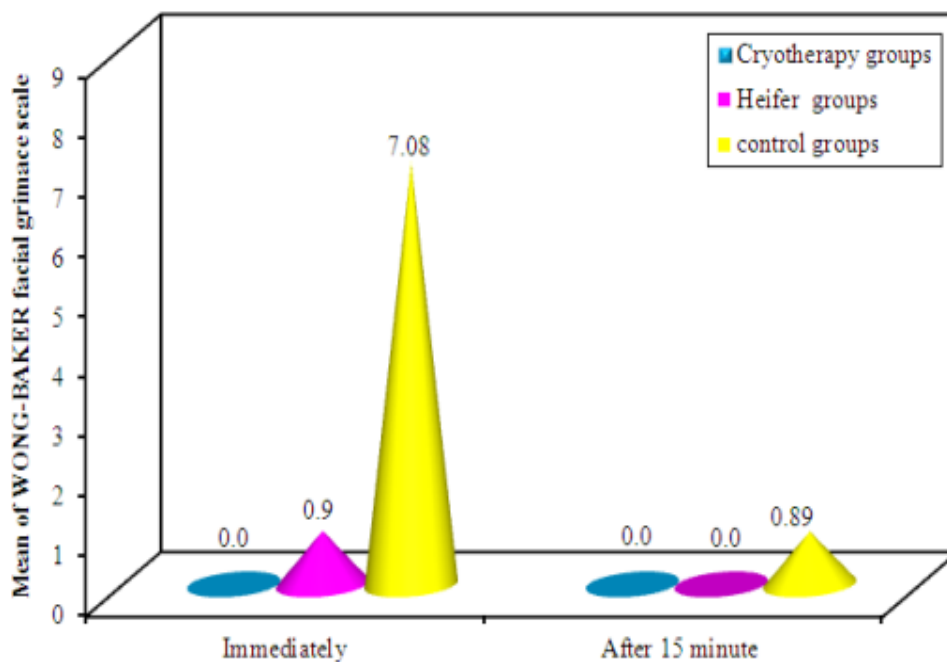


Figure (2): Comparison between modalities of pain relieve according to verbal descriptor scale

**Figure (3)** Comparison between modalities of pain relieve according to WONG-BAKER facial grimace scale. Regarding Wong- baker pain scale immediately IMI, the figure reveals that the majority of patients (90%) in control group immediately observed slow blink open mouth of IMI, about two third (67%)of patients in heifer group was no humor serious , while one third of them (33%) was alert smiling and all the patients(100%) in cryotherapy group was alert smiling. On the other hand, after 15 minute of IMI in control group more than half (52%) had alert smiling, followed by less than half (48%) was no humor serious, but overall of patients (100%)in cryotherapy group and heifer group(study group) was alert smiling .The same figure shows that the mean of Wong-baker score immediately and after 15 minutes of intramuscular injection reduced in the study group(cryotherapy and heifer group) ( $0.0 \pm 0.0$ ,  $0.0 \pm 0.0$  respectively)( $0.90 \pm 0.75$ ,  $0.0 \pm 0.0$  respectively) than the control group (immediately and after 15 minutes) ( $7.08 \pm 0.53$ ,  $0.89 \pm 0.96$  respectively). There were a highly statistically significant difference between control group and study group (heifer and cryotherapy group), also between cryotherapy and heifer technique as p value  $<0.001^{**}$ .



**Figure (3):** Comparison between modalities of pain relieve according to WONG-BAKER facial grimace scale

**Figure (4):** Comparison between the modalities of pain relieve according to activity tolerance scale. Regarding activity tolerance immediately IMI, the figure shows that all patients(100%) in control group ignored pain , while all patients(100%) in study group(cryotherapy and heifer group) had no pain immediately of IMI, while after 15 minute in control group more than half(58%) had no pain followed by less than half ignored(42%), but overall of patients (100%)in cryotherapy group and heifer group(study group) had no pain. The figure shows that the mean of activity tolerance score immediately and after 15 minutes of intramuscular injection reduced in the study group(cryotherapy and heifer group) ( $0.0 \pm 0.0$ ,  $0.0 \pm 0.0$  respectively)( $0.0 \pm 0.0$ ,  $0.0 \pm 0.0$  respectively) than the control group (immediately and after 15 minutes) ( $2.0-2.0$ ,  $0.84 \pm 0.99$  respectively).There were a highly statistically significant difference between control group and study group(heifer group ,also a highly statistically difference between cryotherapy and control groups (p  $<0.001$ ).

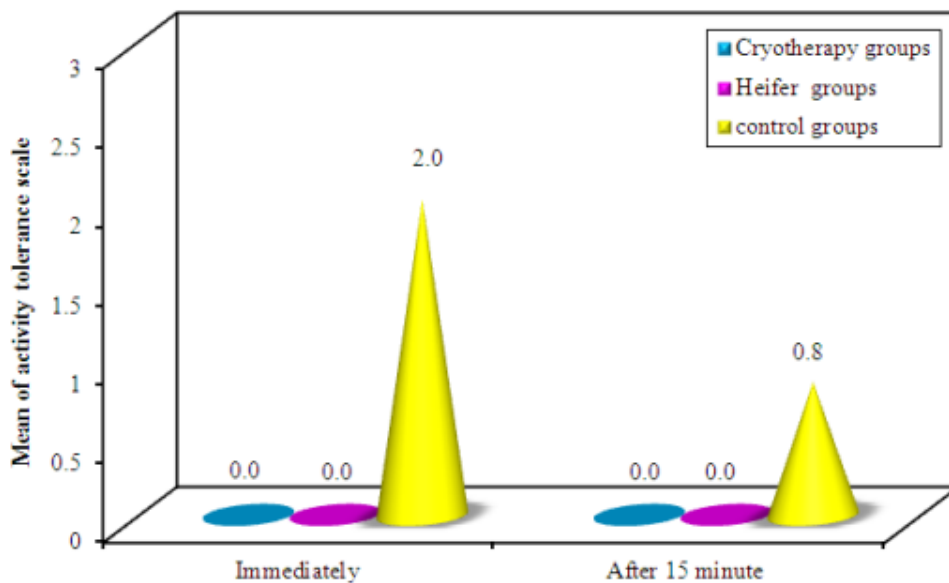


Figure (4): Comparison between the modalities of pain relieve according to activity tolerance

Figure (5a,b,c,d,e,f,g,h,i):Relation between verbal descriptor scale and health relevant data in each group in immediately period : the figure shows that, there were a highly significant positive relation between smoking, mobility ,onset of chronic disease and analgesic ,Neurovit and anticoagulant medication and verbal pain scale in the heifer group ( $p<0.005$ ), while there were a highly significant positive relation between verbal scale and mobility ,onset of chronic disease, analgesic, vitamin in the control group as ( $p<0.001^{**}$ ). Also, When look at the figure , it was found that a statistically significant relation between verbal descriptor scale and smoking ,mobility, chronic disease that necessitates taking IMI, Neurovit in control group after 15 minute as  $p$  value $<0.001^{**}$ .Relation between verbal descriptor scale and health relevant data in each group in immediately : In relation to health relevant data, the figure shows that there were positive correlation between verbal pain descriptor and fearing from injection ,time of feeling pain, factor precipitate pain sensation from repeated IMI in the control group after 15 minute( $p<0.001^{**}$ ). And also a significant relation between verbal pain and fearing from injection and previous IMI complication in the study group (heifer group) ( $p<0.001^{**}$ ). Furthermore after 15 minute, When look at the figure, it was found that a statistically significant relation between verbal descriptor scale fearing from injection ,previous IMI complication ,quality of pain and anticoagulant in the control group after 15 minute as  $p$  value $<0.001^{**}$ .

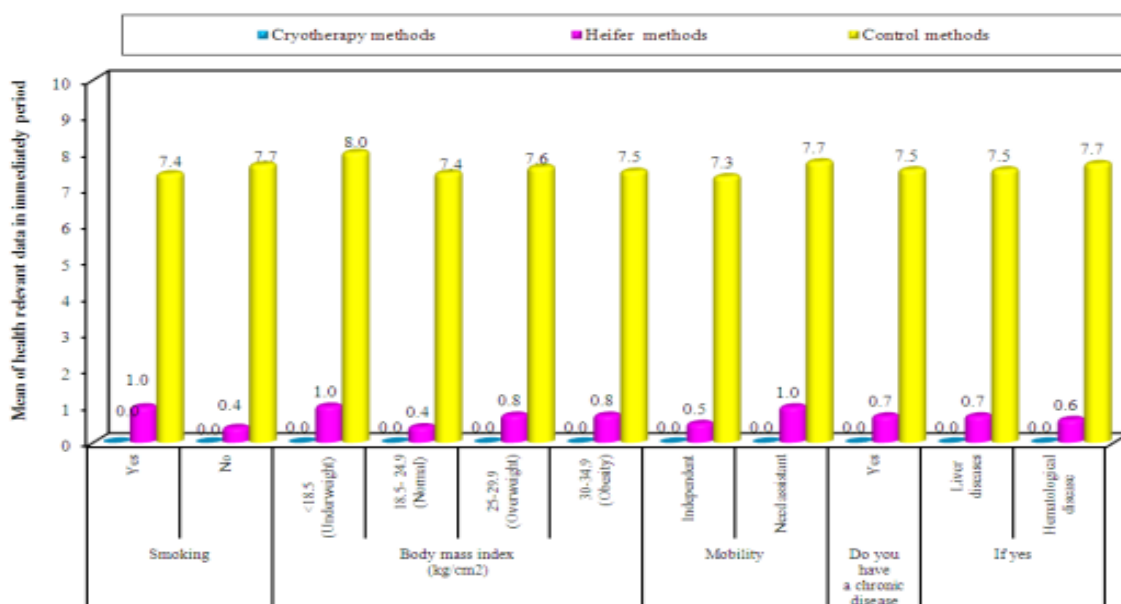


Figure (5a):Relation between verbal descriptor scale and health relevant data in immediately period .



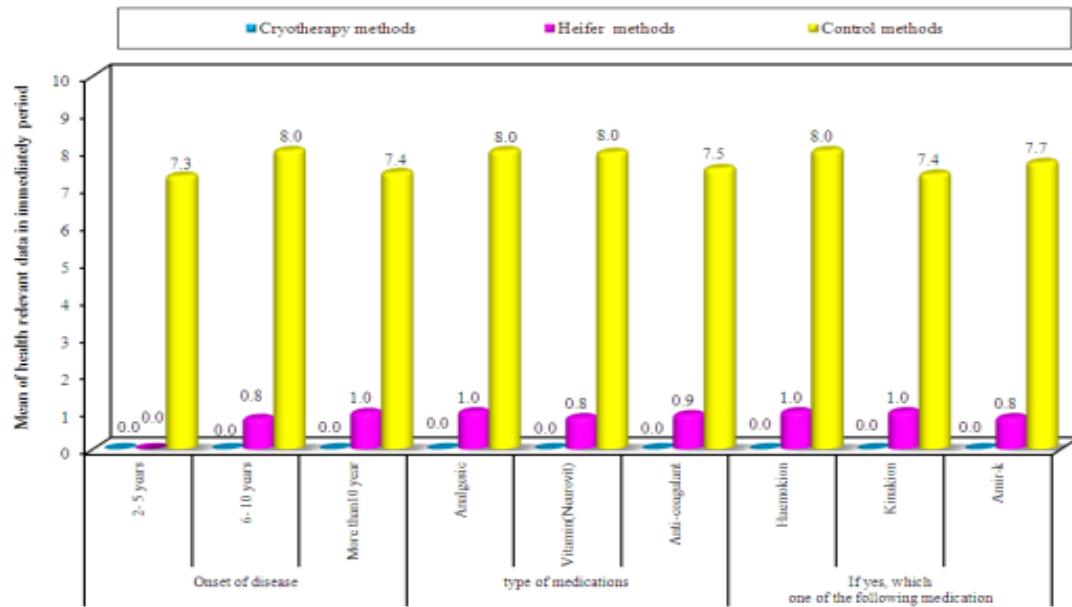


Figure (5b):Relation between verbal descriptor scale and health relevant data in immediately period "Continue"

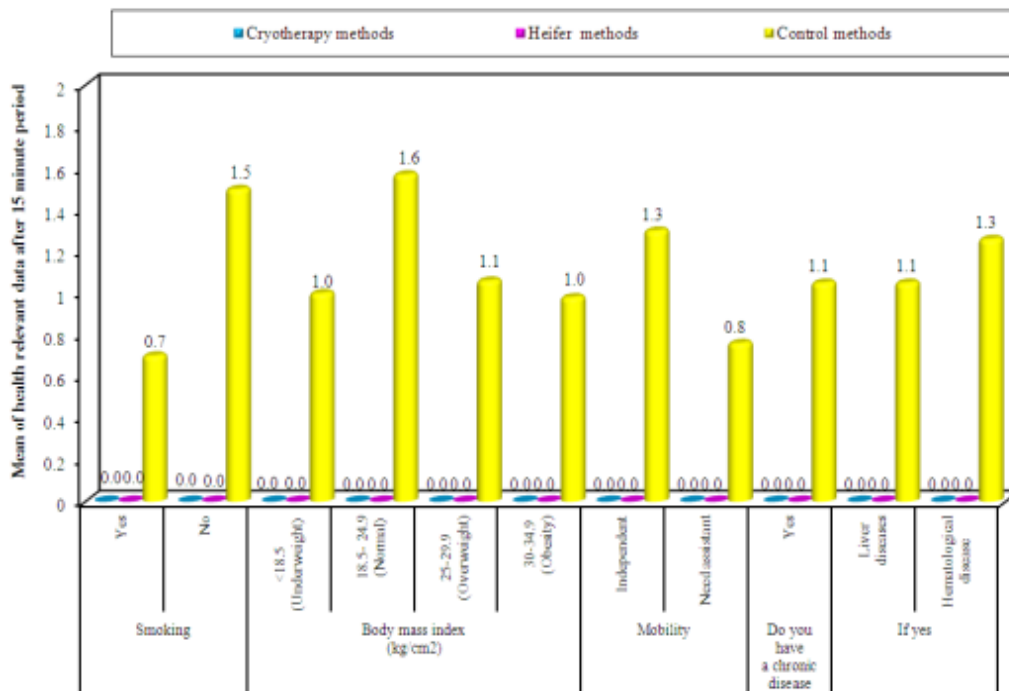


Figure (5c):Relation between verbal descriptor scale and health relevant data after 15 minute period "Continue"

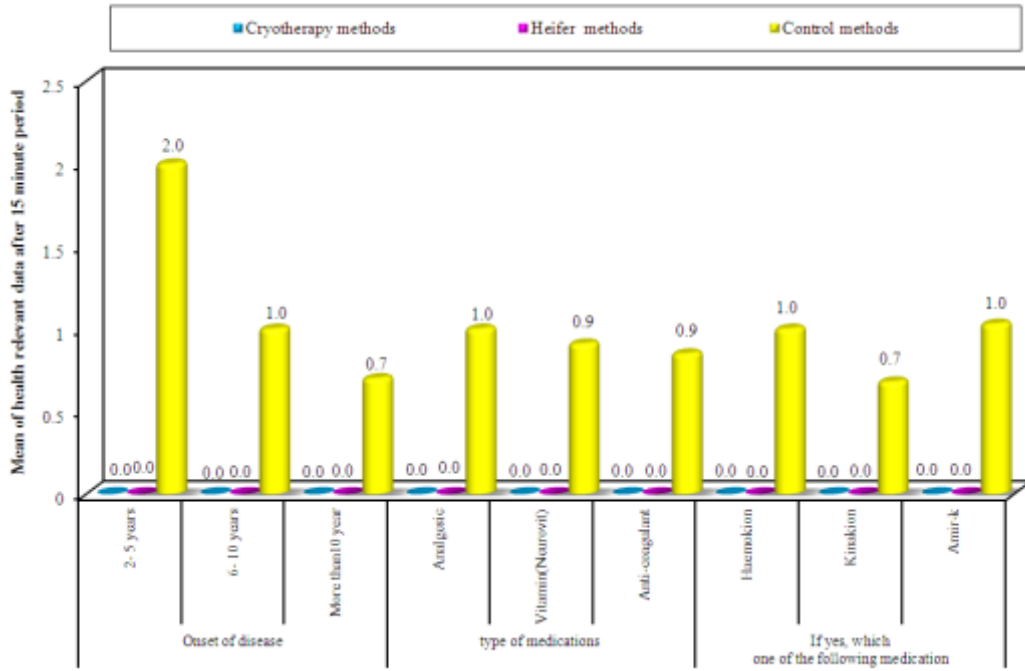
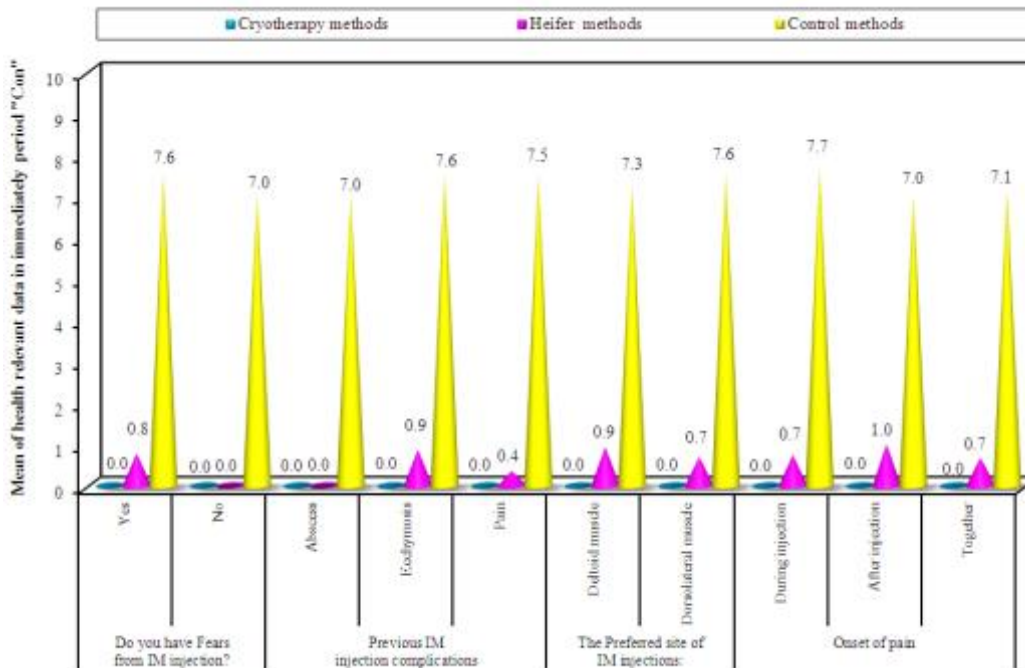


Figure (5d):Relation between verbal descriptor scale and health relevant data after 15 minute period "Continue"



Figure( 5f):Relation between verbal descriptor scale and health relevant data in immediately period "Continue"

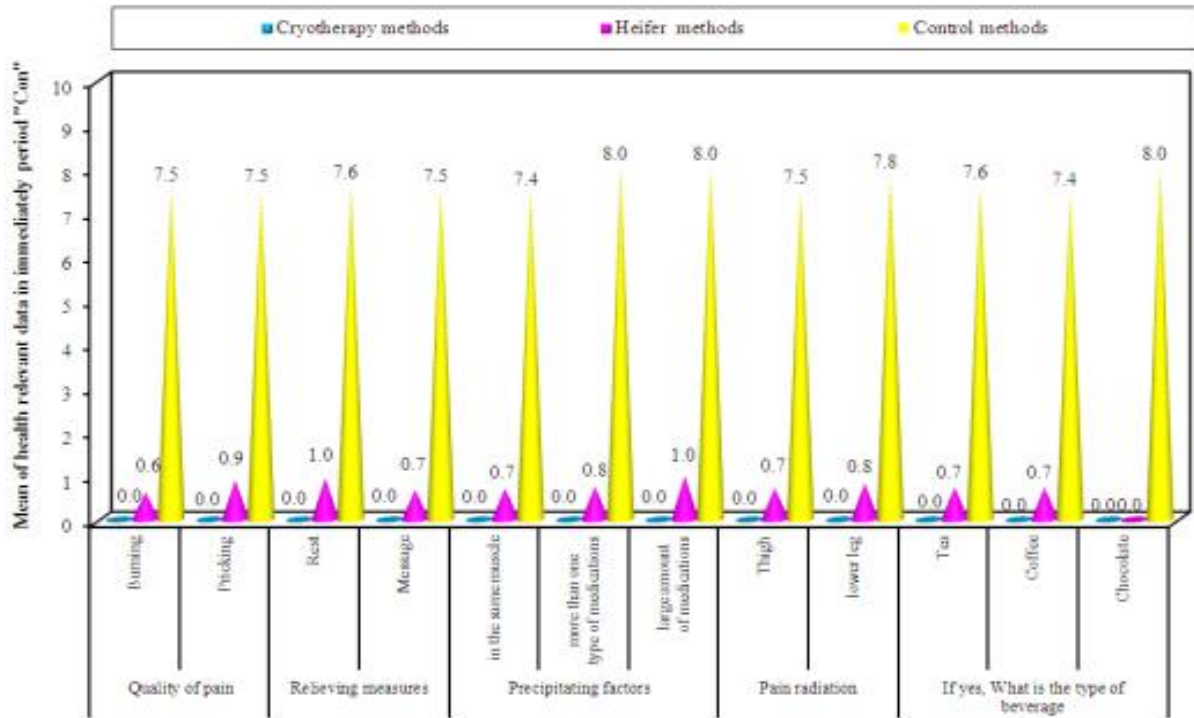


Figure (5g):Relation between verbal descriptor scale and health relevant data in immediately period "Continue"

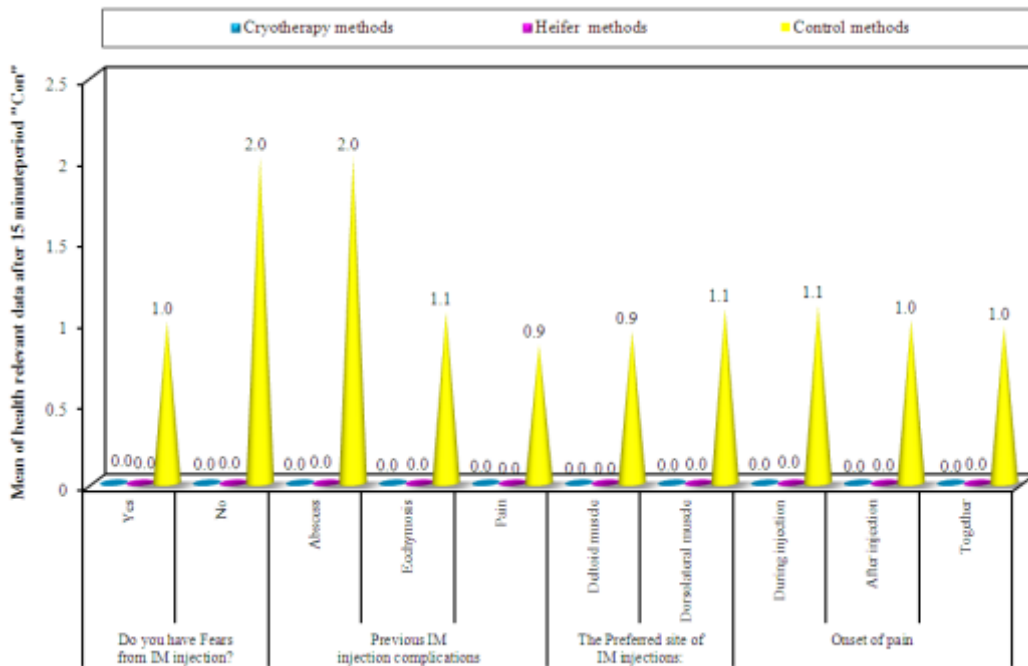


Figure (5h):Relation between verbal descriptor scale and health relevant data after 15 minute period "Continue"

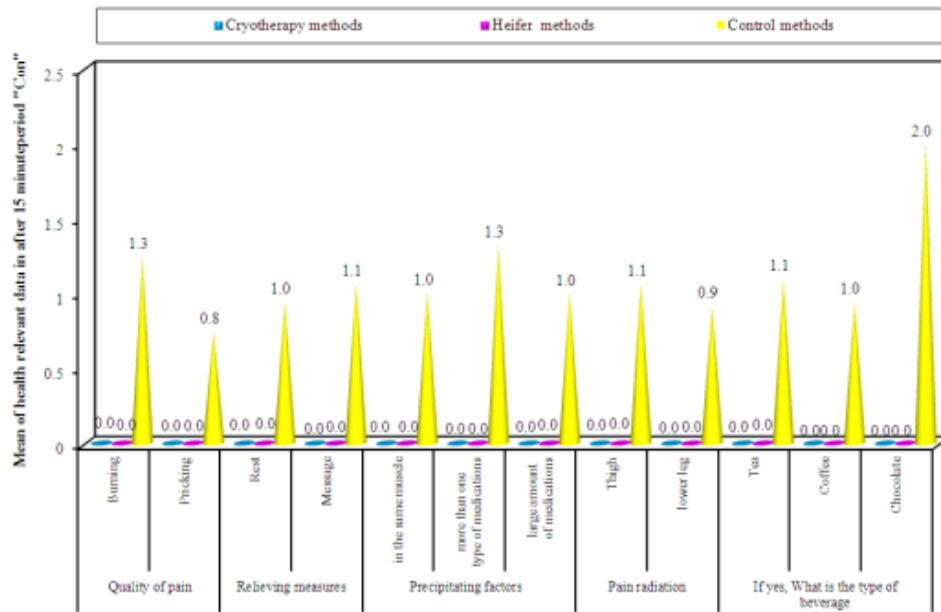


Figure (5i):Relation between verbal descriptor scale and health relevant data after 15 minute period "Continue"

## II. Discussion

### Part 1: Socio-demographic characteristics figure(1a,b,c,d,e,f):

Regarding socio-demographic characteristics, the study subject age ranged between 31-60 and the mean age was  $53.58 \pm 6.94$  year. These findings are in agreement with the finding of Hassnein&Soliman, 2016<sup>(28)</sup> who study Efficacy of helper skin tapping technique on pain intensity as perceived by the patients receiving Intramuscular Injection mentioned that the age group were 20- 60 years.

Series of studies assessed pain after IMI works, on the same age group agreed the same result. The findings also are congruent with Kanika, 2011<sup>(29)</sup> who study effect of massage on pain perception after administration of intramuscular injection and stated that the majority of her study subject were in the age 18-42 years.

In addition, the study done by chacho et al., 2011<sup>(30)</sup> who worked in The Intensity of pain experienced by respondents given intramuscular (IM) injection with/without skin tapping technique mentioned that the age group were 20- 40 years, Furthermore, to some extent this is considered similar to the result of Najafidolatabad et al., 2011<sup>(31)</sup> who have a Comparison of the pain severity, drug leakage and ecchymosis rates caused by the application on tramadol intramuscular injection in Z-track and Air-lock techniques who found that the age groups ranged from 20 to 39 years old, and also Gitanjali&Ragina, 2014<sup>(32)</sup> who study the effectiveness of Nursing Interventions on Pain Associated With Intramuscular Injection have the same results.

According to gender, the present study indicated that male were more than female, , Furthermore, to some extent this is considered similar to the result of Ağaç& Güneş<sup>(33)</sup> who have more male participant in study than female and it was about effect on pain of changing the needle prior to administering medicine intramuscularly and Vathani, Kumari, Pandit, 2017<sup>(34)</sup> found that more than half of participant were male. These results contradict the results of( Kanika, 2011), who found that more than half were female. And also (Gitanjali&Ragina, 2014), (Chacko et al., 2011), (Ülkü et al., 2013)<sup>(35)</sup> and (Najafidolatabad et al., 2010) confirm that result.

In relation to marital status, educational level and occupation status of current study subjects, the majority of patients, were married, and more than half of them had read and write and worked .In my point of view usually most of male of this age were married according to Egyptian culture , worked because of job opportunities offered by government and read and write that majority of them joined of illiteracy classes since 2008.

These result are in contrary with (kanika, 2011)and she said that majority of participant were having middle education and not working .Also Blanco-Hungría<sup>(36)</sup> founded that married female with lower educational level are not working .also these results are not in line with Daniel &Gruener, 2006<sup>(37)</sup> who reported that majority of patient were belong to low socioeconomic status .finally ( Chacko et al., 2011)said that majority of study sample were have primary level of education and not working.

In relation to residence, the majority of study subjects were from rural region that affiliate and receive medical treatment in Mansoura University hospital, whereas the study sample was from Mansoura city, these

results were in agreement with the results of Tripp et al.,2006<sup>(38)</sup> study the Prevalence and determinants of pain and pain-related disability in urban and rural settings who found that majority of patient belonging to rural areas , and also, Gitanjali&Ragina ,2014, having patient from rural areas in her study. These result are in contrary with(Hassnein&Soliman,2016)who worked in Efficacy of Heifer Skin Tapping Technique on Pain Intensity as perceived by the patients receiving Intramuscular Injection that above half belonging to urban areas.

**Part 2:Comparison between modalities of pain relieve according to verbal descriptor scale, Wong-bakers scale and activity tolerance scale.(figure 2,3,4):**

The present study, revealed that no pain score when IM injections were administered using cryotherapy Technique (immediately and after 15 minute time of injection) rather than heifer technique (immediately time of injection) while, the pain score was mild and sever pain using traditional standard technique .

This was in line with Ramadan, (2016)<sup>(39)</sup> who reported that the majority of study sample reduced pain intensity by using cryoyherapy. These findings were in the same line also with Farhadi and Esmailzadeh, (2011)<sup>(40)</sup>who analyzed the impact of local cold on intensity of pain due to Penicillin Benzathin,the results demonstrated that the local cold therapy was compelling in diminishing intensity of pain due to penicillin benzathin IMI in experimental group in contrast with control group . In addition to, Serena, (2010)<sup>(41)</sup> conducted a quasi-experimental study to assess the effectiveness of Helfer skin tap technique on pain in relation to IM injection which revealed that the effectiveness of Helfer Skin Tap Technique has produced a statistically highly significant in reducing pain during IM injection among patients at  $p < 0.05$  level.

Moreover, by using verbal descriptor pain scale,the findings of the current study demonstrated that all patients had no pain level on application of cryotherapy technique in immediately and after 15 minute of injection in study group I while in heifer technique ( immediately of injection) had mild pain in study group II and severe pain in traditional technique (immediately of injections) and the majority had mild pain after 15 minutes of injection in control group. The findings of the current study was congruent with Sabitha et al., (2008)<sup>(42)</sup> and Ramadan,(2016) who agreed that the pain intensity on numerical rating scale& observation checklist were observed to be significantly ( $P = 0.001$ ) reduced within the study group by the use of cryotherapy.

The findings of the current study was also congruent with Mini, et al, (2014)<sup>(43)</sup> and Hassnein &Soliman, (2016) who revealed that pain level decrease on experimental group due to application of skin tapping as majority of experimental group reporting mild pain. The same of Zore& Dias, (2014)illustrated that pre -test cases reporting moderate pain while posttest reporting mild pain. Although Serena,(2010) who founded that one third of patient has no pain with IM administration on verbal rating scale.

Concerning, Wong Baker facial Grimace Scale, it was alert smiling in all cryotherapy technique immediately and after 15 minute and no humor serious immediately and alert smiling after 15 minutes in heifer technique,but it was slow blink and open mouth immediately and alert smiling after 15 minute in traditional standard technique, this was not consistent with the results that reported by Hassnein&Soliman, (2016) who found that alert/smiling on the majority of patient on helper technique and furrowed brow and wrinkled nose for traditional technique.

These findings were in the same line with Farhadiand Esmailzadeh, (2011) who analyzed the impact of local cold on intensity of pain due to Penicillin Benzathin IMI, using VAS,in which their results demonstrated that the local cold therapy was compelling in diminishing intensity of pain due to penicillin benzathin IMI in experimental group in contrast with control group.

According to activity tolerance scale, all patients of study group I and group II (cryotherapy technique and heifer skin tapping technique) had no pain during daily level activity as a result of IM injection in immediately and after 15 minute of injection while, all patient of study group can be ignored pain during daily level activity with IM injection immediately and about half of them had not interfere with daily level activity after 15 minute of injection .This was not in a line with Sartorius et al.,(2010) who studied "Factors influencing time course of pain after depot oil intramuscular injection of testosterone undecanoat", they reported that pain required minimal pain relieving utilize and produced minimal interference in daily activities.<sup>(44)</sup>

**Part 3: Relation between verbal descriptor scale and health relevant data in immediately and after 15 minute (5a,b,c,d,e,f,g,h,i):**

Concerning to correlation of health relevant data in each group immediately and after 15 minutes. In the present study, there was a significant relation between smoking and verbal pain scores in which not smoking patients had higher pain with traditional group , less in heifer and no pain reported in cryotherapy immediately, but after 15 minute less pain reported with traditional and no pain detected with heifer and cryotherapy. In this regard, our findings are not in the same line with the study by Çelik et al. (2011)<sup>(45)</sup>, which reported no significant correlations between pain intensity and personal factors such as age, gender, and smoking habit ,also (Aghajanloo and Ghafourifard,2016)<sup>(46)</sup>who analyzing Comparison of the effects of cryotherapy and placebo on reducing the pain of arteriovenous fistula cannulation among hemodialysis patients

and found no significant relationship was observed between the duration of AVF, education status, and age of the participants and smoked habit.

On studying the relation between mobility and VPS of pain intensity, there were a significant relation between patients need assistant and pain scores with traditional and heifer technique that pain increase with control ,less with heifer and no pain with cryotherapy technique immediately and after 15 minute. In my point of view ,the select patient who were able to assume sidling position and flex the knee to relax gluteal muscle and when medication is administered to the relaxed muscle, patients experience less discomfort due to the reduction of muscle resistance and pressure on neural crests. Stutzig and Siebert (2015).<sup>(47)</sup>

Our result is similar to the findings of other studies , Papavasiliou& Bardakos (2012)<sup>(48)</sup>,which reported that placing the patient in the prone position with an internally rotated foot would cause the greater trochanter of the femur bone to move anteriorly, effectively relaxing the gluteal muscle so that patients experienced less pain.. Contrast study also (Farhadi&Esmailzadeh2011)who worked on Effect of local cold on intensity of pain due to penicillin benzathin intramuscular injection ,the subjects were informed that an ice would be placed on the injection site on the dorsogluteal muscle for 30 s prior to IM injection when patient move in lateral position without assistant ,no relation between pain receptor and mobility.

Regarding chronic disease, there were a significant relation between hematological disease and verbal pain scores with control group, that increase pain with control group ,less with heifer and no pain with cryotherapy group immediately , and after 15 minutes. These findings contradicted with Sabitha *et al.* (2008) who found that there was no significant correlation between the AV fistula puncture pain scores and variables such as the duration of AV fistula use. Hassan, *et al* (2012)<sup>(49)</sup> also noted that, There were obvious negative correlations between duration of disease, dialysis and AVF with subjective pain scores in the study group day 4 (vein site).

Concerning type of medication that taken through IMI,there were a significant relation between VPS and Voltaren, Neurovit and Haemokion with traditional and heifer technique. The patient felt higher pain with traditional technique and less pain with heifer and no pain felt with cryotherapy technique immediately .And after 15 minutes from IM injection of this medication, also a significant relation between Neurovit ,Amir-k and VPS ,the patients felt less pain with traditional technique and no pain felt with other experimental technique (heifer and cryotherapy).The result in the same line with Vathani,Kumari and Pandit (2016),find obvious correlation between diclofence sodium and pain sensation that using heifer technique reported less pain in study group.

The present study illustrated that, there is a significant relation between fearing from injection and feeling of pain in control and heifer technique than cryotherapy technique. Pain level increase with traditional technique, less with heifer technique and no pain detected with cryotherapy immediately. Although after 15 minutes has obvious relation between fearing from IM injection and VPS with traditional technique ,less pain reported with traditional group and no pain detected with other experimental technique. The majority of patients reported fearing from injection that increase pain sensation by opening gate control theory and close it by cold or pressure, so our result illustrate cryotherapy technique close the gate so no pain detected with experimental group.These findings contradicted with Shehata (2016)<sup>(50)</sup>, who revealed that no relation between fearing from injection and pain scores .

According to the present study, there was significant relation between previous complication from IMI and VPS with heifer technique. Our result reported that patient had ecchymosis reported high pain with traditional technique ,less pain with heifer technique and no pain with cryotherapy immediately from intervention, and after 15 minute, significant relation between patients had abscess and VPS in traditional group,the result show less pain with control group and no pain with the other experimental technique. Shehata (2016),reported that no significant statistically differences were found between VPS(verbal pain scale) study group I and II regarding previous IMI complication.

The current study illustrated that obvious relation between verbal pain descriptor and dorsogluteal site with traditional technique immediately .High pain reported with traditional group, less with heifer technique and no pain with cryotherapy..Also (Sivapriya& Kumari 2015)<sup>(51)</sup> illustrated that majority of study group had a significant relation between preferred dorsogluteal muscle and pain.

The current study reported an obvious correlation between time of feeling of pain ,quality of pain and (VPS) pain scores immediately and after 15 minutes with traditional and heifer technique. Immediately from intervention ,the result illustrate the patient during injection reported high burning pain with control group, less with heifer and no pain with cryotherapy .but after 15 minutes burning pain is decrease. On my of viewpoint , burning pain arise from the intrinsic physicochemical properties of either the drugs . this finding was disagree with Vathani, Kumari, Pandit, ( 2017 ) who study the effectiveness of heifer skin tap technique on pain reduction among the patients receiving intramuscular injection found a significant relation between quality of pain (pricking pain) and VAS of pain intensity that majority of control group suffered from pricking pain.

## VI. Conclusion

Injection itself is a fear to all irrespective of the ages because it causes pain. It is a foremost responsibility of the health care giver to provide a care for easing of discomfort like pain by using cryotherapy and Heifer Skin Tapping for IM injection . So that the health care receiver will be much benefited without any hurdles. So in future these kinds of studies definitely will be useful to the entire health care delivery system. The hypothesis of the present study was accepted through patients who got cryotherapy communicated no pain in contrast with patients who did not get cryotherapy immediately IMI insertion and Patients who receive heifer skin tapping technique will express lower pain intensity compared to who do not receive heifer skin tapping technique.

### Recommendation

The current study recommended the following:

In the light of the findings obtained from the current study the following recommendations are derived and suggested in nursing

a) Cryotheraapy and Heifer Skin Tapping can be adapted to the procedure of IM injection

-Nurses can be taught about the Heifer Skin Tapping and cryotherapy; and it can be practiced in the clinical setting.

b) Cryotherapy and Heifer skin tapping can be included in the literature on IM injection

The procedure of using Heifer Skin Tapping and cryotherapy for IM injection can be included into the nursing curriculum.

- Nursing students can be taught about Heifer Skin Tapping and cryotherapy for IM injection

c) Policies for the procedure of IM injection can be developed based on the study findings by incorporating Heifer Skin Tapping and cryotherapy techniques into the procedure.

- Nurse Managers can update about the procedure of IM injection using Heifer Skin Tapping and cryotherapy as well as educate nurses about it through in-service education programs.

- Nursing administrators can motivate nurses to use Heifer Skin Tap and cryotherapy techniques in their clinical areas.

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