Effect of intradermal sterile water injection on controlling low back pain intensity during the first stage of labour

Sahar Fahmy Gawad [(1)] **& Hend Salah eldeen Mohamed** [(2)]
[(1)] *Lecturer of Obstetrics & Gynecology- Faculty of Nursing-South Valley University (Kena),*
[(2)] *Assist professor of Obstetrics& Gynecology- Faculty of Nursing- Zagazig University.*

Abstract:

Background: Pain in labor is a nearly universal experience for childbearing women Non pharmacologic methods of pain relief such as, intradermal water blocks, and warm water baths are effective techniques for management of labor pain**. Aim of the study**: To identify the effect of intradermal sterile water injections on controlling low back pain intensity during first stage of labor**. Subjects and Methods**: **Research design**: A quasi- experimental design **Setting:** Labor and delivery suite at private obstetric center (El hyiaa) center Benha city **Subjects**: included 100 primipara during their 1st of stage of labor **Tools of data collection**: Four tools were used for data collection: *Structured Interviewing Schedule, Partograph*, *Pain rating scale and visual analogue scale* and woman satisfaction questionnaire. **Results:** SWI induced significant decrease of pain scores success rate of 62% compared to admission. Pain scores till 60-min showed non-significant difference. Pain scores at 90 and 120-min were significantly higher compared to 10-60 min scores but were significantly lower compared to admission scores. Four parturient found SWI is effective, but of short duration and requested it once again, 6 found SWI weakly effective and requested epidural analgesia, 5 parturient found SWI is weakly effective and 4 found SWI was ineffective and refused further analgesia. Total satisfaction score of parturient received SWI was 22.2±7.8. **Conclusion**: SWI provided satisfying analgesia for decreasing pain during 1st stage of labor **Recommendations**: Provision of knowledge about using SWI for decreasing labor pain during the antenatal visits especially for primipara women. Further study on large sample is needed.

Keywords: Labor low back pain; sterile water injection; Analgesia; Satisfaction

Introduction:

Almost one in three (30%) women in labor suffers from continuous lower back pain. This pain is often associated with varying degrees of fetal malposition, particularly occipito-posterior position, which may apply pressure on pain-sensitive structures within the pelvis. Characteristically, the pain persists throughout the normal painless resting intervals between uterine contractions and is associated with greater analgesic requirement. Pain intensified as labor progressed. The location of the pain also changed with the progression of labor. The type of low back pain in 54.29% of women in labor was "muscle soreness and pain". The women in labor who suffered from low back pain during pregnancy and had greater body weight when hospitalized were most likely to be in the low back pain group.[(1)]

Cochrane systematic reviews on the efficacy and safety of pharmacological and non-pharmacological interventions to manage pain in labor indicated discrepant data. There is more evidence to support the efficacy of pharmacological methods, but these have more adverse effects. Thus, epidural analgesia provides effective pain relief but at the cost of increased instrumental vaginal birth. On the other hand, most methods of non-pharmacological pain management are non-invasive and appear to be safe for mother and baby, however, their efficacy is unclear, due to limited high quality evidence. It remains important to tailor methods used to each woman's wishes, needs and circumstances, such as anticipated duration of labor, the infant's condition, and any augmentation or induction of labor.[(2)]

Administration of Sterile Water Injections (SWI) into the lower back is used in midwifery to provide pain relief to women experiencing lower back pain during labor. The sterile water

causes osmotic and mechanical irritation resulting in a brief (15-30 second) and significant stinging sensation. The onset of pain relief follows almost immediately and may last for up to two hours. The procedure can be repeated a number of times. The most frequently used SWI technique consists of four intradermal injections into the skin surrounding the Michaelis rhomboid over the sacral area.[3]

Intradermal injections of sterile water in the sacral area may be used to decrease back pain in labor (*Figure 1*). Sterile-water injection causes a burning sensation that is much more painful than saline injection and is thought to relieve labor pain by counterirritation. Four RCTs included in one review[4]found a significant reduction in back pain for 45 to 90 minutes based on a visual analog scale. Three of the trials found that women who received injections of sterile water were more interested in receiving the injections in a subsequent labor than women who received saline injections. None of the trials showed a decrease in requests for pain medicines, perhaps because of the limited time of effectiveness or a lack of effectiveness for abdominal labor pain. The therapeutic effect of SWI has been explained by gate control theory of Melzack and Wall [4] whereby the painful stinging stimulates competing nerve fibers, creating a block to the slower visceral signals from uterine contractions and back pain.[5]

The gate theory proposed that signals produced in primary afferents from skin stimulation were transmitted to three regions within the spinal cord: 1) the substantia gelatinosa, 2) the dorsal column, and 3) a group of cells called transmission cells. The theory proposed that the gate in the spinal cord is the substantia gelatinosa in the dorsal horn, which modulates the transmission of sensory information from the primary afferent neurons to transmission cells in the spinal cord. The perception of pain produced by spinal cord signaling to the brain depends on a balance of activity generated in large (non-nociceptive) and small (nociceptive)-diameter primary afferent fibers. The theory proposed that activation of the large-diameter afferent "closes" the gate by engaging a superficial dorsal horn interneuron that inhibits the firing of projection neurons. Activation of the nociceptors "opens" the gate through concomitant excitation of projection neurons and inhibition of the inhibitory interneurons. Activity from descending fibers that originate in supraspinal regions and project to the dorsal horn could also modulate this gate. When nociceptive information reaches a threshold that exceeds the inhibition elicited, it “opens the gate” and activates pathways that lead to the experience of pain and its related behaviors.[6, 7]

A major focus of care for the woman during labor and birth is maintaining control over her pain, emotions, and actions while being an active participant. Nurses can help and support woman to be actively in their child birth by allowing time for discussion ,offering companionship ,listening to worries and concerns ,paying attention to the woman emotional needs ,and actively helping and offering information to assist in her understanding of what is happening in each stage of labor.[8]

Nurses are in ideal position to provide childbearing women with balanced, clear, concise information regarding no pharmacologic and pharmacologic measures to relieve pain. Pain management standard by JCAHO mandate that pain be assessed in all clients admitted to a health care facility. Thus, it important for nurses to be acknowledgeable about the most recent scientific research on labor pain relief modalities to make sure that accurate and unbiased information about effective pain relief measures is available to laboring women, to be sure that the women determines what is acceptable labor pain level for her, and to allow

the woman the choice of pain relief-measures. [9]

Significance of the study:

Management of labor pain by using sterile water injection as non - pharmacological pain relieving measure of the 1st stage of labor was considered a neglected aspect in delivery ward in Egypt, although its important as pain relieving measures. So this first trial to identify the effectiveness of Intradermal Sterile Water Injection for relieving Pain during first stage of labor among primipara women at private obstetric center in Benha City,

Aim of the study:

The aim of the current study was to:

Identify the effect of intradermal sterile water injections on controlling low back pain intensity during first stage of labor

Study Hypothesis:

Laboring women who receive intradermal sterile water injection during the first stage of labour exhibit less low back pain intensity than those who do not receive this intervention protocol

Subjects and Methods:

Research design*:*

A quasi- experimental design (after only) was adopted in this study to achieve the stated aim.

Study setting:

The current study was carried out at Labor and delivery ward at private obstetric center (El hyiaa) center Benha city. All parturient women were observed during labor.

Study subjects:

A purposive sample of 100 primipara women in labor were chosen based on daily admission flow rate on the previous mentioned setting(2-3 cases\day for 4 months, three day \week i.e.: 2-3cases x3 days\week x for 4months) ,were recruited for this study according to the following ***inclusion criteria:***

Women in labor; nulliparous; singleton pregnancy; gestational age between 38 to 40 weeks; can read and write, who agree to participate in the study.

Exclusion criteria:

Infection in the area of injection., Patients not willing for the procedure., Patients who have received any analgesic following onset of labour, high risk or complicated pregnancy.

The sample divided randomly into two groups 50 pregnant mothers each. The first group is study group who received SWI protocol in addition to follow routine labor care; and control group who received routine Labor care only. The researchers determined three days of the week to collect data from study group and other days of the week to collect data from control group (random assignment).

Tools of data collection*:*

Four tools were used for data collection,

1. ***Structured Interviewing schedule:*** *which developed by the researcher after reviewing related literature and included two parts* :a) Socio-demographic data and history as age, educational level, occupation, its type; *medical history* as the presence of medical disorder as anemia, hypertension, diabetes, cardiac disease and history of surgical operations; *present obstetric history* which included gravidity and gestational age……etc b) Maternal physical assessment such as vital signs, weight, height, body mass index, abdominal examination to identify fundal level to determine gestational age , auscultate fetal heart sound , determine fetal position .Face and content validity were done for the tool by five expertise in the field of obstetric nursing and medicine, and necessary modifications were done.
2. ***Partograph:*** It is basically a graphic representation of the event of labor plotted against time. It is a standardized design done by World Health Organization to help in the management of labor. Partograph was used in collecting data related

to maternal condition; labor progress and fetal condition. *Maternal condition*, assessment of the maternal condition was achieved through maternal vital signs, , abdominal and vaginal examinations, complications during first, second and third stages of labor, administration of drugs and intravenous fluids; *labor progress,* included data about uterine contractions, condition of membranes and cervix, augmentation of labor, duration of first, second and third stages of labor, mode of delivery; *fetal condition*, the fetus was monitored closely on the partograph by regular observation of fetal heart rate for any changes and fetal complications during labor.

3. ***Pain rating scale*** & **Visual analogue scale** (0-100)[10]**:** Pain assessment with the help of verbal numerical rating scale .pain relief was graded as none, mild, moderate and excellent. Pain was assessed using an 11-point numeric rating scale (NRS). Visual analogue scale with numbers from 0 to 10 where 0 indicates no pain and 10 indicates worst pain imaginable. Validity and reliability of NRS: is more practical than the graphic visual analogue scale (VAS), easier to understand for most people, and does not need clear vision, paper, and pen. Williamson and Hoggart [11] found all of the three commonly used pain rating scales, the Visual Analogue Scale, the Verbal Rating Scale and the Numerical Rating Scale, are valid, reliable and appropriate for use in clinical practice, although the Visual Analogue Scale has more practical difficulties than the Verbal Rating Scale or the Numerical Rating Scale. Timing of pain assessment: Immediately after injection, 10 minutes, then every 30 minutes for two hours.
4. **Woman Satisfaction inquiry**: woman's satisfaction with SWI analgesic effect was assessed using an 10-point rating scale .A satisfaction scale ranging from 0 (completely dissatisfied) to 10 (completely satisfied) .A score of 7 or more was considered satisfied ,or otherwise dissatisfied. This tool was developed by Shiloh et al. [12] and adopted by researchers. It consists of three questions:

A. "How satisfied are you with the pain relief you received?" (where 0 = very unsatisfied to 10 = very satisfied).
B. "Would you choose the same pain relief method during your next labor?" (0 = definitely no to 10 = definitely yes).
C. "Would you recommend the type of pain relief you got to another parturient?" (0 =definitely no to 10 = definitely yes). An average of the subscale score ranged from 0 to 10, with higher scores indicating greater degrees of satisfaction and a total score for the three questions was calculated.

Scoring system:

The items were judged according to a three point Likert scale continuum from satisfy (3), neutral (2), and not satisfy (1). Summing up the scores of the items then the overall score gave total satisfaction score. women's total satisfaction score was graded as the following; not satisfy when total score was (<15), neutral satisfy when total score was (16-23) and highly satisfy when total score was (24-30).

Validity and reliability:

Face and content validity were done for the tools by five expertises in the field of obstetric nursing and medicine, and necessary modifications were done. The reliability of the tool (4) was tested using the internal consistency method. It proved to be high with Cronbach's alpha reliability coefficients 0.902.

Pilot study:

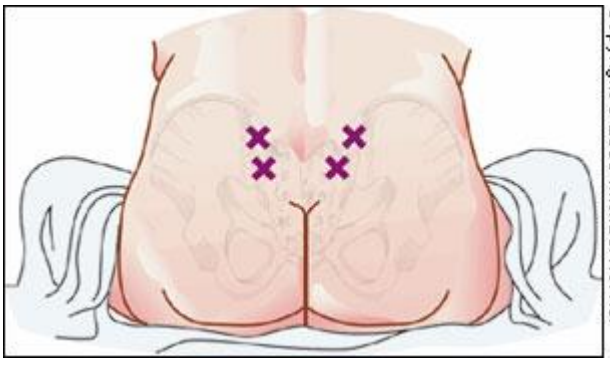
The pilot study was carried out on five women (about ten percent of the total sample) to test the clarity and applicability of the study tools as well as estimation of the time needed to fill the questionnaire. Required

modifications were done in the form of added of some questions as (woman satisfaction about SWI.....etc.). Women involved in the pilot were excluded from the study.

Field work:

Data was collected through a period of six months from November 2014 to April 2015. Three days/week from 9.00 Am to 9.00 Pm. Approvals to conduct the study were taken from participants after explaining the aim of the study and obtaining their acceptance consent to participate in the study. The study was conducted through four main phases: All cases(100) were interviewed assessed and evaluated while the implementation conducted only for the study group. 1) Interviewing; 2) assessment; 3) implementation and 4) evaluation.

1. **Interviewing:** Concentrated on obtaining socio-demographic characteristics and obstetric history of the participants, the researcher met the participant recruited for both groups for the first time at waiting room at previous mentioned setting. All women in both groups were interviewed individually to collect data &asked questions in Arabic, the interview take 10 -15 minutes. The participant was divided into two equal groups (50)each .Group one (control group)receive routine nursing care in the center .While group two(study group) receive the study protocol.
2. **Assessment Phase**: It aims at assessment of women during first stage of labor. Assessment of general condition and labor progress for all participant women, concerning woman general condition, these took about 30 minutes. then women were examined physically as height, and weight and body mass index was calculated through divided the weight in Kg, by height in meters squared (wt/ Ht2m). After that, the researcher taking vital signs., abdominal examination was performed to determine the gestational age ,to detect fetal position, presentation and lie; finally 3) auscultation of fetal heart sound. **Regarding labor progress**, the researcher started to fill the partograph; uterine contractions in relation to frequency, duration and intensity, it was done every 30 minutes in the active acceleration phase (cervical dilatation 4: 7cm) and every 15 minutes in the active deceleration phase (cervical dilatation 8: 10cm). Vaginal examination was performed by on duty obstetrician to identify cervical dilatation, effacement, descent of fetal head and condition of membranes. Using assessment tool (1), (2) and (3).
3. **Implementation Phase:** For the study group only: All the injections were given by the Anesthetist physician & Obstetrician simultaneously for the Study group only, while pain assessment were performed by the researcher. Injection started immediately after general assessment and women agreement. The physician administer the injections between contractions.. Woman received 4 intradermal injections of 0.5 ml sterile water in the lumbar- sacral region in the sitting position. One injection was given at the posterior superior iliac spine(Point.1) on both sides and second injection at 1 cm medial, and 1-2 cm inferior to the first point on both the sides (Point.2) using an insulin needle. These points overlie the area called Michaelis' rhomboid as explained by physician. **(Fig 1)**



During giving the injections the researcher instructed the woman to point on the site of maximum pain she feel when she was lying on the bed during contraction, to breath normally, and didn't try to move legs, buttocks, or abdominal muscles during injection then assessment of pain performed by researcher.

4. **Evaluation Phase:** Regular assessment of pain condition started immediately after injection and at 10min, then every 30 minutes for two hours after giving the injections and throughout the course of labor as well as mode of delivery, duration of the first, second and third stage of labor and complications if occurred were recorded in the labor summary. Finally, women satisfactions were assessed by the researcher using assessment tool 3 and 4.

Administrative and ethical considerations:

An official permission was granted from the directors of the pre mentioned settings. Each woman was informed about the purpose of the study then a written consent was obtained before starting the data collection. Confidentiality was ensured throughout the study process, and the women were assured that all data was used only for research purpose. Each woman was informed that participation is voluntary and free to withdraw from the study at any time.

Limitations of the study:

Sometimes the women were protracted due to labor progress, and the trial need more time that is devoted and effort .Small sample size cannot generalize the results.

Statistical analysis:

Obtained data were presented as mean ± SD, ranges, numbers and ratios. Results were analyzed using paired t-test for inter-group comparisons, Wilcoxon ranked test for unrelated data (Z-test) for comparison versus control group and Chi-square test (X2 test) for comparisons of percentages and numbers. Statistical analysis was conducted using the SPSS (Version 15, 2006) for Windows statistical package. P value <0.05 was considered statistically significant.

Results:

The study included 100 primipara admitted to the labor word during their first stage of labor. Mean age of enrolled women was 22.3±1.7; range: 19-25 years. Mean time lapsed since start of pain till admission was 3.45±1; range: 2-5 hours. Mean extent of cervical dilatation at time of admission was 4.8±1; range: 3-7 cm. Mean at admission back pain NRS score was 7.77±0.8; range: 7-9. Forty-four women had pain NRS score of 7, 35 women had pain NRS score of 8 and 21 women had pain NRS score of 9. There was non-significant ($p>0.05$) difference between studied groups as regards age, time till admission, cervical dilatation and mean NRS score and women distribution among individual scores **(Table 1)**.

Figure (2): Among study group, mean injection site pain VAS score was 3.3±1; range: 2-6, with 14 women had pain score of 2, 17 women had pain score of 3, 11 women had pain score of 4 and 8 women had pain score of 5.

Figure (3): All women of the study group showed significantly ($p<0.05$) decreased back pain NRS score in comparison to their at admission scores and to NRS scores of the control group. The analgesic effect of SWI was manifested early after injection as the mean pain score estimated at 10-min after the end of injection was the lowest score. Mean pain VAS scores estimated at 10-min, 30-min and 60-min after injection showed non-significant ($p>0.05$) difference despite of the minimal steady increase. Pain scores at 90-min and 120-min after injection were significantly ($p<0.05$) higher compared to that reported at 10-60 min with non-significantly ($p>0.05$) higher scores at 120-min compared to at 90-min. However, pain NRS scores at 90-min and 120-min were still significantly ($p<0.05$) lower compared to at

admission and control scores (Table 2). Considering median value of the 11-point scale is 5; among study group, 10 patients had VAS score >5 at 10-min after injection, 14 patients at 30-min, 18 patients at 60-min, 23 patients at 90-min and 26 at 120-min. Thus, despite the low mean NRS score, the regression started early and steadily.

Table (3): At the end of 120-min follow-up, 31 parturient had pain score in range of 4-6 which is less than the inclusion cutoff point and were considered as success for the procedure and did not request for any further analgesia. Nineteen parturient regained their at admission pain NRS score; 10 parturient had pain score of 7 and 9 parturient had pain score of 8 and were considered as failure for the procedure

Table (4): These nineteen patients were asked to choose between repeated SWI and epidural analgesia for management of their pain; 4 parturient found SWI is effective, but of short duration and requested it once again for relief of their pain. Six parturient found SWI weakly effective and requested epidural analgesia for their pain relief. Nine parturient refused to receive any form of analgesia. Four of these 9 parturient found SWI was ineffective as they had suffered their at admission pain NRS score without improvement, while the remaining 5 parturient found SWI is weakly effective and it is to be non-sense to repeat it again and found their pain may be tolerated without the exposure to hazards of epidural injection. As regards control group 13 patients received epidural analgesia, while the remaining 37 parturient completed their labor without analgesia. The frequency of use of epidural analgesia was non-significantly ($p>0.05$) different between control group and those had failure of SWI.

Table (5): Augmentation of progress of labor, using oxytocin infusion (5 IU/500 ml glucose 5%) was required in 30 parturient (30%), 16 in control and 14 in SWI group with non-significant ($p>0.05$) difference between both groups. Also, mean FHR showed non-significant ($p>0.05$) difference between both groups. Fifteen parturient developed spontaneous rupture of membranes (SROM); 15 in control and 17 in SWI group with a non-significant ($p>0.05$) difference between both groups. Time till occurrence of SROM showed non-significant ($p>0.05$) difference among studied parturient. Five parturient; 2 in control and 3 in SWI group had meconium in liquor with a non-significant ($p>0.05$) difference between both groups.

Table (6): Thirteen parturient had cesarean section, while 87 parturient had spontaneous vaginal delivery, 27 parturient had instrumental delivery with non-significant ($p>0.05$) difference between both groups. Mean duration of 1st and 2nd stages of labor and total duration of labor of women had vaginal delivery showed non-significant ($p>0.05$) difference between both groups. Despite the non-significantly shorter duration of the 1st stage of labor, the frequency of women had early full cervical dilatation was significantly ($X2=3.101$, $p<0.05$) higher in SWI group compared to control group **(Fig. 4)**. All parturient had vaginal delivery required episiotomy that was generous for those required instrumental aid, all of these episiotomies were performed with perineal infiltration of local anesthesia except for those received epidural analgesia. During postpartum period, 5 patients had postpartum bleeding with non-significant ($p>0.05$) difference between both groups. In 4 patients bleeding was controlled conservatively and the 5th patient was of SWI group and had anterior cervical tear that repaired and bleeding was controlled.

Table (7): The outcome of SWI was extensively reflected on parturient satisfaction as manifested by high satisfaction scoring of the seventy parturient who found SWI was effective with mean total score of 26.2±1.1; range: 22-28. The four

parturient who requested SWI once again showed a mean satisfaction score of 21.9±1.1; range: 21-24 which was significantly lower compared to the mean score of the seventy parturient. The six parturient who requested epidural analgesia showed a mean satisfaction score of 11.9±2.8; range: 8-15 which was significantly lower compared to that of the 31 and to the 4 parturient women. The five parturient women who refused any further form of analgesia and found SWI was weakly effective showed a mean satisfaction score of 9.1±1.1; range: 8-11 which was significantly lower score compared to the previous parturient' scorings. The remaining 4 women showed a satisfaction score of zero. The total satisfaction score of parturient received SWI was 22.2±7.8; range: 0-28.

Discussion:

Women in Egypt have fewer options for labor pain management than women in other countries **.**The results of the study was expected, despite of the simplicity of SWI and the advantage of being free of medications without probable effect on progress of labor. The current study showed that the concept of non-pharmacological pain relief during 1st stage of labor by intradermal sterile water injection is still underdeveloped. It evidenced by refusal of 50% of parturient included in the study, this results may attributed to fear of trial ,insufficient knowledge provided for women during antenatal regarding effect and safety of this method of pain relief during labor by health care provider. In support of the this finding, the eleven patients who found SWI ineffective or weakly effective refused to receive any other form of analgesia and those who found SWI effective and were satisfied by its analgesic effect did not request repetition once again.These data are in line with previous studies concerned with the frequency of labor analgesia among different ethnic groups. [13-17], wherein Jiménez-Puente et al. [18] observed a different frequency of the use of epidural analgesia in vaginal deliveries, according to the geographic origin of the immigrant women in Spain with a frequency of 52% in women from other European countries and South America, compared with around 45% of the African and 37% of the Asian women. Powers et al. [19] found primiparous women residing in non-metropolitan areas of Australia experienced fewer birth interventions than women residing in metropolitan areas: 43% versus 56% received epidural analgesia; 8% versus 11% had elective caesarean sections; and 16% versus 18% had emergency caesarean sections.

Throughout 120-min follow-up, the total pain score was significantly lower compared to at admission and control pain scores and this analgesic effect was maintained for 60 minute without significant difference between scores determined at 10-min, 30-min and 60-min, thereafter pain scores started to increase but were still significantly lower than at admission scores, despite being significantly higher compared to scores determined at 10-60 minutes. These data spotlight on the efficacy of SWI as analgesic modality for back pain manifested during 1st stage of labor and can replace the more invasive forms of intrapartum analgesia. As regards safety; parturient received SWI showed non-significant difference compared to control parturient regarding labor progress data and outcome.

These findings go in hand with Saxena et al. [20] who reported significant reduction of pain scores in the sterile water group but not in the normal saline group at 10, 45 and 90 minutes after injection with no difference in the progress of labor and fetal outcome between the two groups and concluded that 4 intracutaneous injections of sterile water in the lumbo-sacral region is a simple and effective method to control pain during labor. Studied woman in the report of experience with SWI described that the method provided a powerful pain

relief effect, measured by a visual analog scale, and that her experience was highly positive. [20,21]

Placebo-controlled studies evaluating SWI and found seven studies including 766 participants; all reported 4/10 cm or more reduction in pain, this outcome was significantly more with sterile water (50% to 60%) than with placebo (20% to 25%), but with no significant difference for rates of CS, instrumental delivery, timing of delivery, or Apgar scores; no adverse events were reported other than transient pain with injection, which was worse with sterile water and two studies reported that more women treated with sterile water would request the same analgesia in future. [21,22] Modalities for labor analgesia and documented that strong evidence is available for the efficacy of immersion in warm water during first-stage labor, and sterile water injected intracutaneously or subcutaneously at locations near a woman's lumbo-sacral spine to reduce back-labor pain; also, SWI reduce the incidence of cesarean deliveries. [23]

The degree and duration of analgesia provided by a single injection of sterile water, compared to four injections and found the mean difference in the pre and post (30 mins) injection scores between two groups was -1.48 cm in favor of the four-injection technique, however the injection pain associated with the four-injections was significantly greater than that of the single-injection technique but with no significant differences between the two groups in terms of other analgesic use, mode of birth or maternal satisfaction. Sterile water injections have been shown to be a safe and simple analgesic suitable for most maternity settings, could reduce intervention rates without adversely affecting safety for mother and baby and may have a positive effect on reducing the CS rate and concluded that the technique may be easily applied to maternity populations and would reduce requirements for maternal operating theatre time. [25]

Thirty-one parturient women found SWI is effective analgesic modality and were highly satisfied by its outcome giving a success rate for SWI as analgesic modality of 62%. Out of the remaining 19 parturient women, 4 found SWI was effective but of short duration and requested it once again, thus indicating their satisfaction by the outcome which override the pain of injection even for a second time. Seventeen parturient found SWI weakly effective and 6 requested for epidural analgesia for their continuing pain, while 5 refused any form of analgesia. The remaining 4 parturient found SWI is ineffective and refused to take another form of analgesia.

These findings indicated variance of the effect of SWI among parturient, considering the mechanism of action of SWI was dependent on the gate theory for counter-irritation and deviation of transmission of painful stimuli to the brain, so the effect may be modulated by the ability and response of the brain for such deviation and on pain threshold so it is individually variant. In support of this assumption, Piché et al. [26] found counter-irritation produced robust pain inhibition with residual analgesia persisting during the recovery period, while spinal nociceptive response (RIII reflex) amplitude was significantly decreased by counter-irritation only in a subset of subjects and the modulatory effects of counter-irritation on pain perception and spinal nociception were paralleled by decreased shock-evoked activity in pain-related areas; anterior cingulate cortex and amygdala, and to RIII modulation in supplementary motor area and orbitofrontal cortex.

Conclusion:

In the light of the study findings, it can be concluded that Non-pharmacological analgesia is more interesting to parturient women in the study setting. SWI provided successful and satisfying analgesia .SWI is safe without meaningful effect on progress

of labor, or hazards on the mother or fetus.

Recommendations:

Based on the study results of the current study the following recommendation can be suggested 1- encourage the use Intradermal Sterile Water Injection as Analgesic Modality for relieving Lower Back Pain during labor. 2-Replication of this study on a larger sample at different settings to generalize the results.

Acknowledgements:

The authors express their gratitude and thanks towards all who have directly or indirectly helped them to complete this study and their support in each major step of the study especially to those women who agree to participate in the study and the director of the center.

Table (1): Parturient women distribution according to their admission data of both study and control groups

			Total	Control group	SWI group	p value
▪ Age (years)			22.3±1.7 (19-25)	22.2±1.9 (19-25)	22.4±1.5 (20-24)	>0.05
▪ Time lapsed since start of pain (hours)			3.45±1 (2-5)	3.7±1 (2-5)	3.2±0.9 (2-5)	>0.05
▪ Extent of cervical dilatation (cm)			4.8±1 (3-7)	4.7±0.9 (3-6)	4.9±1 (3-7)	>0.05
▪ NRS pain score	▪ Individual scores	7	44 (44%)	23 (46%)	21 (42%)	>0.05
		8	35 (35%)	18 (36%)	17 (34%)	
		9	21 (21%)	9 (18%)	12 (24%)	
	Total score		***7.77±0.8 (7-9)***	***7.72±0.8 (7-9)***	***7.82±0.8 (7-9)***	***>0.05***

Data are presented as number & mean±SD; percentages & ranges are in parenthesis

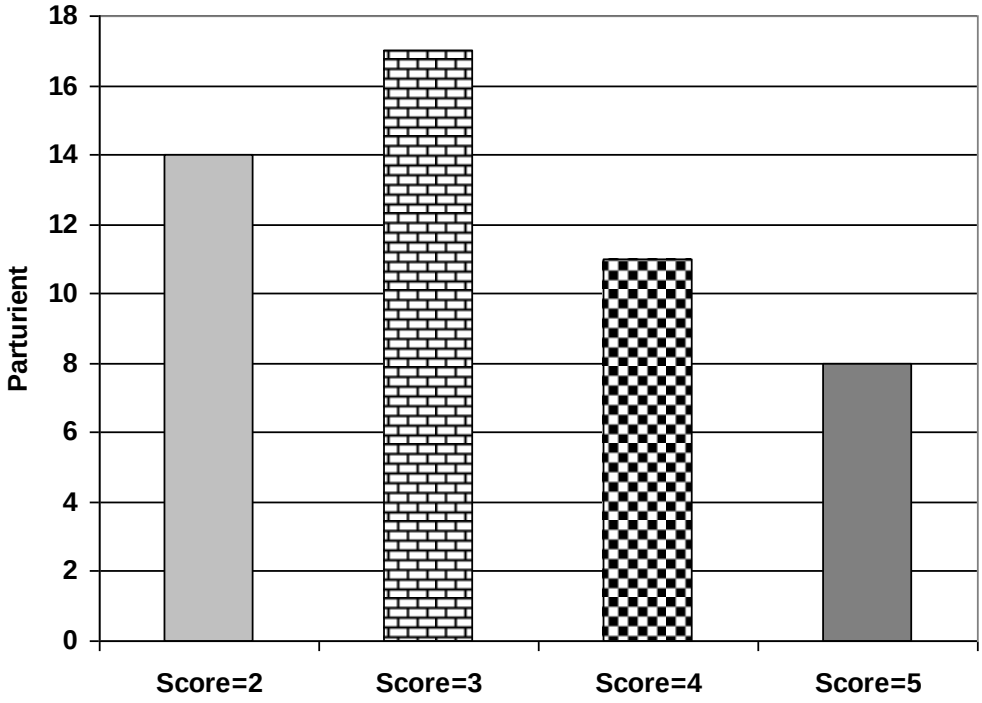


Fig. (2): Parturient's distribution according to SWI site pain

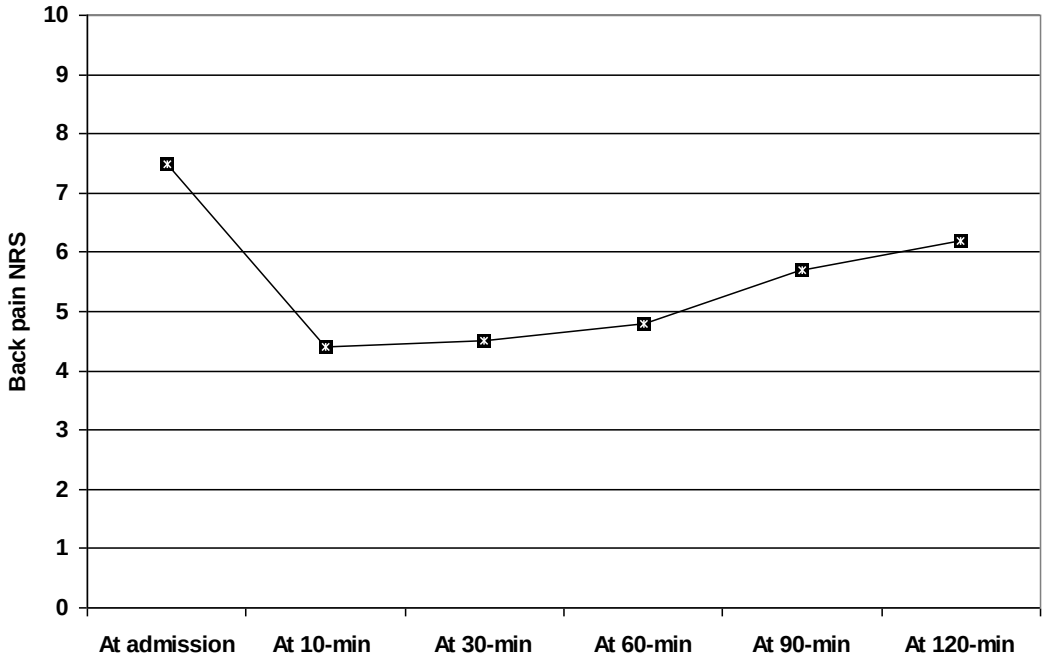


Fig. (3): Mean back pain NRS scores determined through 120-min after SWI compared to at admission VAS

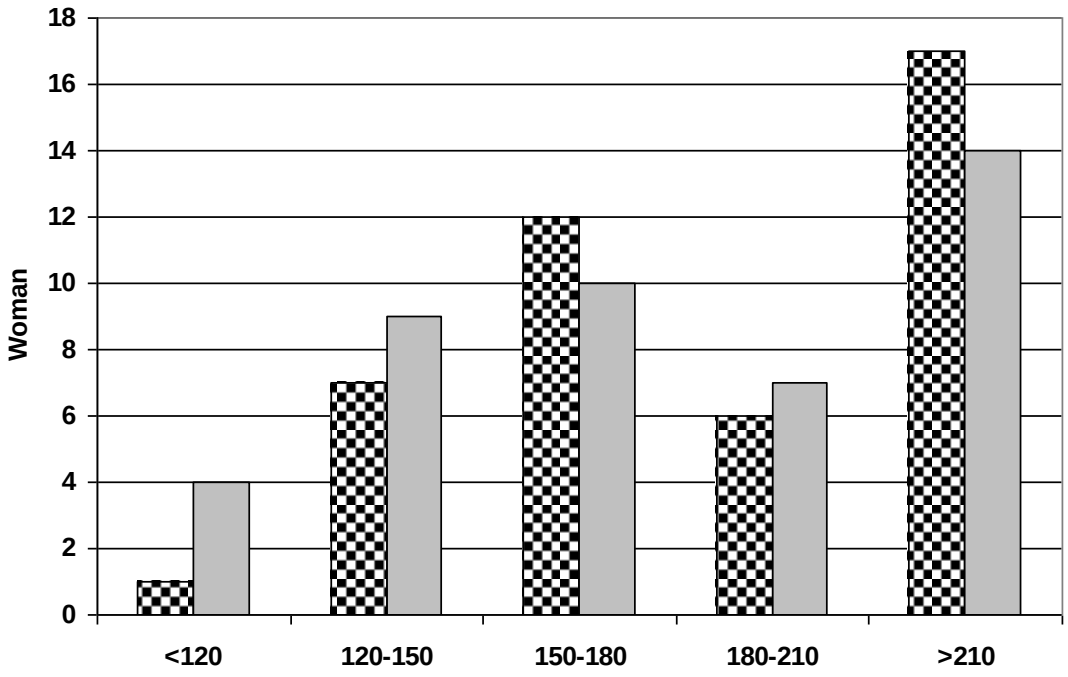


Fig. (4): Distribution of women had vaginal delivery according to time to achieve full cervical dilatation

Table (2): Two-hour back pain Numerical Rating Scale,(NRS) scores of the study group compared to their at admission and control group NRS scores

	Control	At admission	10-min	30-min	60-min	90-min	120-min
	7.6±0.7	7.5±0.5	4.4±1.4	4.5±1.3	4.8±1.3	5.7±0.8	6.2±0.9
▪ P_1		>0.05	0.0002	0.0002	0.0002	0.0005	0.0009
▪ P_2			0.0001	0.0001	0.0001	0.0003	0.0007
▪ P_3				>0.05	>0.05	0.0009	0.0004
▪ P_4					>0.05	0.0009	0.0007
▪ P_5						0.0008	0.0005
▪ P_6							>0.05

Data are presented as mean±SD; P_1: significance versus control pain NRS scores; P_2: significance versus at admission pain NRS scores; P_3: significance versus 10-min pain NRS scores; P_4: significance versus 30-min pain NRS scores; P_4: significance versus 60-min pain NRS scores; P_5: significance versus 90-min pain NRS scores; P_6: significance versus 120-min pain NRS scores

Table (3): parturient women distribution according to their Numerical Rating Scale,(NRS)scores determined throughout two-hour after admission

NRS score	Control	At admission	10-min	30-min	60-min	90-min	120-min
3	0	0	12(24%)	9 (18%)	6 (12%)	0	0
4	0	0	9 (18%)	12(24%)	12(24%)	9 (18%)	3 (6%)
5	0	0	19(38%)	14(28%)	14(28%)	18(36%)	11(22%)
6	0	0	7 (14%)	11(22%)	13(26%)	16(32%)	17(34%)
7	24 (48%)	21 (42%)	3 (6%)	4 (8%)	5 (10%)	7 (14%)	10(20%)
8	20 (40%)	22 (44%)	0	0	0	0	9 (18%)
9	6 (12%)	7 (14%)	0	0	0	0	0

Data are presented as numbers; percentages are in parenthesis

Table (4): Outcome of SWI and opinion of parturient women of the study group and the progress for their pain control

Outcome	Frequency	Opinion and progress		
Success	31 (62%)	Found SWI effective with no need for further analgesia		
Failure	19 (38%)	4 (8%)	Found SWI effective, but of short duration and requested it again	
		6 (12%)	Found SWI weakly effective and requested epidural analgesia for their pain relief	
		9 (%18)	Refused any form of analgesia	4 (8%) Found SWI ineffective
				5 (10%) Found SWI weakly effective

Data are presented as numbers; percentages are in parenthesis; SWI: Sterile water injection

Table (5): parturient women distribution according to their labor data

Parameter		Control group	SWI group
▪ Need for augmentation		32 (32%)	28 (28%)
▪ FHR (beat/min)		130.1±2.8	129.5±1.6
▪ SROM	▪ Frequency (%)	15 (15%)	17 (17%)
	▪ Time of occurrence (min)	246 ±19.5	215.5±28.9
▪ Meconium in liquor		2 (4%)	3 (6%)

Data are presented as mean±SD & numbers, percentages are in parenthesis; FHR: fetal heart rate; SROM: Spontaneous rupture of membranes.

Table (6): parturient women distribution according to their delivery and postpartum bleeding

		Control group	SWI group
▪ Mode of delivery	▪ Spontaneous	29 (58%)	31 (62%)
	▪ Instrumental	14 (28%)	13 (26%)
	▪ CS	7 (14%)	6 (12%)
▪ Time till full cervical dilatation in women had vaginal delivery	▪ <120 min	1 (9.1%)	4 (2.3%)
	▪ 120-150 min	7 (20.5%)	9 (16.3%)
	▪ 150-180 min	12 (22.7%)	10 (27.9%)
	▪ 180-210 min	6 (15.9%)	7 (14%)
	▪ >210 min	17 (31.8%)	14 (39.5%)
	▪ Total	43 (100%)	44 (100%)
▪ Duration of labor (min)	▪ 1st stage	187.6±36.3	181.1±40.9
	▪ 2nd stage	37.3±6.8	36.4±7.2
	▪ Total duration (min)	217.5±41.8	224.9±37.5
▪ Postpartum bleeding	▪ Frequency	2 (4%)	3 (6%)
	▪ Conservative management	2 (4.%)	2 (4.%)
	▪ Repair of cervical tear	0	1 (2.1%)

Data are presented as mean±SD & numbers, percentages are in parenthesis.

Table (7): Total satisfaction score of parturient women of the study group categorized according to SWI outcome and the progress for pain control

Number of parturient	Outcome and progress	Total satisfaction score
▪ 31 (62%)	SWI effective with no need for further analgesia	26.2±1.1 (22-28)
▪ 4 (8%)	SWI effective and requested it again	21.9±1.1 (21-24)
▪ 6 (12%)	SWI weakly effective and requested epidural analgesia	11.9±2.8 (8-15)
▪ 5 (10%)	SWI weakly effective and refused further analgesia	9.1±1.1 (8-11)
▪ 4 (8%)	SWI ineffective and refused further analgesia	0
Total study group (n=50)		***22.2±7.8 (0-28)***

Data are presented as numbers & mean±SD; percentage & ranges are in parenthesis; SWI: Sterile water injection

References

1. Tzeng YL. & Su TJ: Low back pain during labor and related factors. *J Nurs Res*. 2008; 16(3):231-41.
2. Jones L., Othman M., Dowswell T., Alfirevic Z., Gates S., Newburn M., Jordan S, Lavender T. & Neilson JP: Pain management for women in labour: an overview of systematic reviews. Cochrane Database Syst Rev. 2012; 3:CD009234.
3. van der Wouden JC. & Geerdink M.: Pain during labour: sterile water injections. *Ned Tijdschr Geneeskd*. 2013; 157(46):A6847.
4. .Simkin PP. & O'Hara M.: Nonpharmacologic relief of pain during labor: systematic reviews of five methods. *Am J Obstet Gynecol*. 2002; 186 (Suppl 5): S131–59.
5. Mendell LM.: Constructing and deconstructing the gate theory of pain. *Pain*. 2014; 155(2):210-6.
6. Moayedi M. & Davis KD.: Theories of pain: from specificity to gate control. *J Neurophysiol.* 2013; 109 (1):5-12.
7. Braz J., Solorzano C., Wang X. & Basbaum AI.: Transmitting pain and itch messages: a contemporary view of the spinal cord circuits that generate gate control. *Neuron*. 2014; 82(3):522-36.
8. Ricci SS.: *Essentials of Maternity, Newborn and Women's Health Nursing*. Chap.13-14. Philadelphia: Lippincott .Williams &Wilkins; 2008. pp:332-373
9. Pillitteri A.: *Maternal and Child health nursing: care of child bearing and childrearing family*. (4th ed.). Philadelphia.: Lippincott .Williams & Wilkins; 2003
10. Collins S., Moore R. &McQuay H.: The visual analogue pain intensity scale: What is moderate pain in millimetres. *Pain*. 1997, 72:95-7.
11. Williamson A. & Hoggart B.: Pain: a review of three commonly used pain rating scales. *J Clin Nurs*. 2005; 14(7):798-804.
12. Shiloh S., Zukerman B., Butin B., Deutch A., Yardeni I., Benyamini Y.& Beilin B.: Postoperative patient-controlled analgesia (PCA): How much control and how
13. Peart K., James W. & Deocampo J.: Use of sterile water injections to relieve back pain in labour. *Birth Issues*. 2006; 15(1):18-22.
14. Martensson L. & Wallin G.: Sterile water injections as treatment for low-back pain during labour: a review. Australian & New Zealand. *Journal of Obstetrics& Gynaecology*. 2008, 48(4):369–74.
15. Lee N., Coxeter P., Beckmann M., Webster J., Wright V., Smith T.& Kildea S.: A randomised non-inferiority controlled trial of a single versus a four intradermal sterile water injection technique for relief of continuous lower back pain during labour. *BMC Pregnancy and Childbirth.* 2011; 11(1):21
16. Duff MM.: Sterile water injections for back pain in labor. *New Zealand College of Midwives Journal.* 2008 (39): 33-6.
17. Breivik EK., Björnsson GA. & Skovlund E. : A comparison of pain rating scales by sampling from clinical trial data. *Clin J Pain*. 2000; 16:22-8.

18. Jiménez-Puente A., Benítez-Parejo N., Del Diego-Salas J., Rivas-Ruiz F. & Maañón-Di Leo C.: Ethnic differences in the use of intrapartum epidural analgesia. *BMC Health Serv Res*. 2012; 12:207.
19. Powers JR., Loxton DJ., O'Mara AT., Chojenta CL. & Ebert L.: Regardless of where they give birth, women living in non-metropolitan areas are less likely to have an epidural than their metropolitan counterparts. *Women Birth*. 2013; 26 (2):e77-81.
20. Saxena KN., Nischal H. & Batra S.: Intracutaneous Injections of Sterile Water over the Secrum for Labour Analgesia. *Indian J Anaesth*. 2009; 53 (2):169-73.
21. Mårtensson L.: The patient observer: sterile water injections for labor pain. *Birth.* 2010; 37(4):334-6.
22. Derry S., Straube S., Moore RA., Hancock H. & Collins SL.: Intracutaneous or subcutaneous sterile water injection compared with blinded controls for pain management in labour. Cochrane Database Syst Rev. 2012; 1:CD009107.
23. Rooks JP.: Labor pain management other than neuraxial: what do we know and where do we go next? *Birth*. 2012; 39(4):318-22.
24. Lee N., Webster J., Beckmann M., Gibbons K., Smith T., Stapleton H.& Kildea S.: Comparison of a single vs. a four intradermal sterile water injection for relief of lower back pain for women in labour: a randomised controlled trial. *Midwifery*. 2013; 29(6):585-91.
25. Lee N., Mårtensson LB., Homer C., Webster J., Gibbons K., Stapleton H., Dos Santos N., Beckmann M., Gao Y.& Kildea S.: Impact on caesarean section rates following injections of sterile water (ICARIS): a multicentre randomised controlled trial. *BMC Pregnancy Childbirth*. 2013b; 13:105.
26. Piché M., Arsenault M. & Rainville P.: Cerebral and cerebrospinal processes underlying counterirritation analgesia. *J Neurosci*.. 2009; 29(45):14236-46.

فعالية حقن المياه المعقمة داخل الأدمة على انخفاض شدة آلام الظهر خلال المرحلة الأولى من الولادة

سحر فهمى جواد [١] ، **هند صلاح الدين محمد** [٢]
[١]مدرس تمريض النساء والتوليد - كلية التمريض -جامعة جنوب الوادى،[٢] أستاذ مساعد تمريض النساء والتوليد - كلية التمريض - جامعة الزقازيق

مقدمة:
آلام الولادة هي تجربة تمر بها كل السيدات الحوامل أثناء ولادة الطفل. يوجد أكثر من تقنية فعالة لتخيف الآلام أثناء مراحل الولادة مثل حقن الماء داخل الجلد، وحمامات المياه الدافئة.

الهدف من الدراسة:
هدفت الدراسة إلى التعرف على فعالية حقن المياه المعقمة داخل الأدمة على انخفاض شدة آلام الظهر خلال المرحلة الأولى من الولادة.

التصميم البحثى:
تصميم شبه تجريبي (بعد فقط)
مكان الدراسة:
تم تجميع البيانات على مدار ستة أشهر من مركز (الحياه الخاص للتوليد) فى مدينه بنها .
عينة الدراسة :
اجريت الدراسة على ١٠٠ سيدة حامل (بكرية) خلال المرحله الأولى من الولادة واللاتى تتوافر فيهن شروط اختيار العينة فى هذا المكان وقسمت الى مجموعتين متساويتين (٥٠) لكل مجموعة .المجموعه الاولى ٥٠ سيدة تلقت العناية الروتينية للولادة. المجموعة الثانية ٥٠ سيده أخذ ت الحقن داخل الأدمه كتقنية لتقليل الألم أثناء المرحلة الأولى من الولادة.
ادوات جمع البيانات:
استخدمت أربع أدوات لجمع البيانات كالتالى:
١. استبيان لجمع المعلومات الاساسية والديموجرافية.
٢. مخططا بيانيا للمخاض (البارتوجراف)
٣. مقياس الألم البصري و مقياس تصنيف الألم
٤. استبيان لقياس رضا السيدات.

النتائج:
- انخفاض درجات الألم بنسبة ٦٢٪ بعد SWI . مقارنة بدرجات الألم قبل SWI.
- طلبت ٤ سيدات إعاده الحقن ثانية لأن فاعلية SWI ضعيفة ولمدة قصيرة
- طلبت ٦ سيدات التسكين فوق الجافية لأن الفاعلية ضعيفة وعدد٤ سيدات رفضن مزيد من تسكين الألم لأن SWI غير فعال.
- مجموع النقاط لرضا السيدات ٧,٨± ٢٢,٢.

الخلاصة:
حقن الماء المعقم داخل الأدمة أثناء المرحلة الأولى من الولادة (SWI) خفض درجه الألم وأن أكثر من نصف العين' كانت راضي' عن هذه الطريق'.

التوصيات:
اعطاء وتوفير المعلومات عن حقن الماء المعقم داخل الأدمة لتقليل آلام المرحلة الأولى من الولادة خلال متابعة الحمل و خاصة بالنسبة للحوامل للبكريات .إجراء بحوث مستقبلية على عينة كبيرة من السيدات لتعميم النتائج والاستفاده منها.