The effect of Aromatherapy Parent Education in Alleviating Injection Pain Among Children Submitting to Vaccination

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Abstract

Background: Aromatherapy parents' education about pain alleviation during child vaccinations supports family-centered care and has the potency to progress pain care management in children. **Aim of the study:** evaluate the effect of aromatherapy parent education intervention (massage with lavender oil) in alleviating injection pain among children submitting to vaccination. **Subject and methods:** Quasi experimental design two groups have been utilized in this study at vaccination clinics in El-Demerdash health office" affiliated to Abbasis zone and Elkhalij Elmasry primary health center in Hadayek Elkobba Zone, governmental medical centers, Ministry of Health and Population, Cairo, Egypt. It included 120 children Submitting to Vaccination selected by purposive sampling technique according to inclusion criteria, and randomly designate into two groups; register either in control (60) or study (60) group. The data was collected by using 1) Structured interviews questionnaire in Arabic to assess personal data characteristic of children and parent; 2) knowledge assessment tool (pre/post) to assess parent's knowledge regarding aromatherapy treatment and pain management after children vaccination;3) beliefs and attitudes of parent assessment tool;4) procedural pain assessment tools which included two parts, the first portion was Modified Behavioral Pain Scale (MBPS) , developed by (Taddio et al, 1995)and the second portion was Cry duration in seconds. The data was collected between a period of august 2019 and January 2020. **Results:** A significant improvement was in total knowledge about aroma treatment and pain management after vaccination among children's parent in posttest as compared to pretest assessment ($p<0.0001$). A significant improvement was in total mean scores of MBPS components in study group with lavender oil massage during five minutes after vaccine injection as compared to control group with highly statistically significant ($p<0. 001$). A significant improvement was in the total mean cry duration in study group as compared to control group with highly statistically significant ($p<0. 001$). **Conclusion:** Aromatherapy parents' education, leg massage by lavender oil was found efficient in alleviating vaccine injection pain. **Recommendation:** Applying Aromatherapy Education programs for new parents in all pediatric primary health care centers to increase parents' awareness about vaccine injection pain alleviation.

Keywords: Aromatherapy, Parent Education, Pain, Vaccination.

Introduction

Vaccines are one of the greatest advancements in the history of public health. Vaccinations is an essential element of health promotion throughout the life cycle, in addition vaccinations are the uttermost effective way of preventing communicable diseases, some vaccinations that protect children from serious communicable diseases, ***(Vanessa et al ,2015).*** Injected vaccination globally is an invasive way that involves every healthy child. Factually vaccinations are the utmost prevalent excruciating iatrogenic procedures thorough childhood, that is distressing for children, their families, and health care worker**,** for a while child need extra attention of pain management during vaccine injections in childhood, ***(Annaet al ,2015).***

Pain defined as an aware theme's perception of modulated nociceptive pulsations that breed a nasty sensory a nasty sensory and sentimental expertise correlated with present or prospect tissue damage or substantive in terms of this damage ***(Okeson, 2014).*** Pain of vaccine injections is highly prevalent, and disquiets about pain participate in vaccine frequency across the lifespan. Exposure to unmitigated pain precocious in life has instant and far-lasting implications for sensitive perception, stress bearing, and sentimental wellbeing that are described by a hypo -sensibility and/ or hyper-sensibility in response to acute versus persistent and/or intense stimuli, ***(Cohen et al, 2018).***

Actuality, aroma treatment is both science and art. The utilize of aroma treatment to alleviate pain has increase virtually in novel years contrast with another alternative treatment. Aroma treatment is one method of the complementary treatment methods that is ratified to be efficient in alleviating pain, anti-inflammatory, decreasing depression, insomnia, asthma, fatigue, anxiety and efficient in anti-microbial, ***(Meghani et al, 2017).*** Aroma treatment is applied by inhalation therapies and massage with herbal essence oils and mineral substances, ***(Popovic et al, 2016).***

Lavender is commonly one of the primary oils applied in aromatherapy, The prime constituents of lavender are linalyl acetate, linalool,1,8-cineole B-ocimene, camphor, and terpinen-4-ol. However, the proportional level of each of these constituents differ in different species. lavender oil is an essential aromatic herb that belongs to the Lamiaceae family, which manifests anti-bloating, relaxing muscle, anti-fungal, analgesic, and antibacterial, effects ***(Ali et al. 2015)***. There are two recommended technique of lavender oil treatment through inhalation and by topically massage, while the energetic components of essential oil of lavender can speedily be absorbed by skin which can mitigate pain, depression, mental stress, and vital signs improving. Several studies demonstrate to valuable consequence of massage on anxiety, heart rate, blood pressure, negative mood, depression, and pain***, (Bikmoradi et al,2017***).

Parent education regarding aromatherapy intervention for mitigating pain related to vaccine injection supports family-centered care and has credence that promote knowledge , consciousness of healthful Parent' attitude and activities and also improve healthful Parent –child

relation resulting to improve pain care in children, ***(Letourneau et al., 2015).***Parent education intervention which public health nurses can implement to represent a range of activities intended to treat specific learning needs that would improve the psychological, physical, and child social evolution and development***, *(Simpson et al., 2010).***

The management of vaccine injections pain in childhood, which through medication therapy and non-medication methods including complementary therapy, ***(Abbaszadeh et al., 2017).*** Complementary therapies encompass numerous methods such as body relaxation, music therapy, meditation, and aromatherapy, ***(Giordano et al., 2015).***

Aromatherapies point to the therapeutic use of aromatic oils soak up through the skin or olfactory system and medical use, which are low-risk, practical and attainable and existing a cost advantage to the nursing care sector likewise ***(Bikmoradi et al, 2015).***

Community health nurse is the forefront of immunization programs, delivering vaccinations in schools and community settings and planning or managing entire vaccination programs. community health nurse plays a significant role in communicating with, advocating for, and educating child caregivers concerning the usefulness of vaccination, safety of vaccine and pain mitigation ***(Keeling, 2015).*** Nursing role is conclusive in the pediatric vaccination procedure, this role encompasses minimize parental indecision to vaccination procedure, and nurses play a pivotal role in the efficient pain control and management procedures that is essential to the high quality of care child receives. through nursing observation, determination, interpretation, evaluation, and intervention in support of parents and their children in suppressing the pain, ***(Praveen,2015).***

Significance of the Study

Routine vaccination injections are the commonest distressing procedure of childhood, nowadays children receive up to 20 injections by their second birthday, ***(WHO,2019)***. Regrettably, despite an increased concentrate on pain assessment and treatment, child injection related pain remains largely untreated, ***(Crellin, et al., 2017).***

Diverse research studies have explored the impact of adult's education on lavender oil aromatherapy treatment for pain relief in adults, however, there is a few numbers of research studies for children. In addition, there is recommendation for further research studies to be conducted on the pain reduction efficiency of natural essentials aromatic agent such as the lavender oil in children, ***(Vaziri et al., 2019).*** Therefore, based the returns of findings this study, accordingly as well researchers' concern and willingness to educate child' parents about using lavender oil massage as alternative method, in addition children' parents prefer, accept and like use of non-Pharmacological treatment of pain because inexpensive, safe and a practical method to reduce pain of vaccine injection among children.

This study will help the researchers to examine pivotal field of educating child's parents about aromatherapy treatment in alleviating pain of vaccine

injection among children in that may not discovered before, and a new modality for the pain alleviating of vaccine injection among children that may be conducted from pediatric community health nursing perspective.

Aim of the study:

The study aimed to evaluate the effect of parent education about aromatherapy, leg massage together with lavender oil in alleviating injection pain among children submitting to vaccination.

Research hypotheses:

1- Parents who received educational intervention about aromatherapy the study group have better knowledge and positive attitude of vaccination pain mitigation.

2- Children of parents received educational intervention and exposure to leg massage by lavender oil by their parent will have lower total mean score of pain established on M B PS and will show shorter cry duration than children of parents did not receive participation the educational intervention about aromatherapy.

Subjects and Methods:

Research Design: Quasi experimental design two groups have been utilized in this study.

Setting: The present study was conducted among children submitting to vaccination at vaccination clinics in two selected pediatrics primary health care centers ,in two zoneof governmental medical centers, Ministry of health and population, Cairo, Egypt , the first one is "El-Demerdash health office" affiliated to Abbasis zone Which consists of two health offices, and two medical centers, the second center is Elkhalij Elmasry primary health center affiliated to Hadayek Elkobba Zone, Which consists of two health offices, two medical clinics and two medical centers.El Demerdash health office and Elkhalij Elmasry primary health center serve a huge number of resident peoplehood, one of the main authority and responsiblty in both centers is registering newborns and provide all vaccinations for newborns from 24 hours to 18 months old. and they are also responsible about family planning and other services. The researchers selected these places due to a huge number of resident peoplehood which make the more parents willing to commitment of vaccine schedule. The numerical density of children submitting to vaccine at each vaccine office from 4 to 6 child per day.

Sample type: A purposive sample was used

Sample size: sample of 120 children, 40 children from El Demredash office and 80 from Elkhalij Elmasry center, who have four to six months who submitting to Vaccination injection. Calculation of sample size was established on a power analysis of 0.95 (β=1-0.95=0.5) at alpha .05(one – sided) with large effect size (0.5) was used as the significance. The sample was enlisted according to the following inclusion criteria; children in alright condition does not suffer from diarrhea, running nose and fever. Children who is free from disease such as congenital anomaly, diabetes, and vascular disease.

Children who have not history of hospitalization and free from bleeding disorders or hematologic disorders. Exclusion Criteria: any children that had complications associated with vaccine injection like, contusion, bleeding, hematoma, and trauma. any children that suffer from subcutaneous tissue health problem hard for the nurse to give them the vaccine injection regarding presence of skin infection and old hematoma.

Assignment of subject: Subject were randomly designated into two groups; first group determined sixty children, twenty of them from El Demredash office and forty from Elkhalij Elmasry center, were deemed to control group which acquire the standard care and the second group determined sixty children twenty of them from El Demredash office and forty from Elkhalij Elmasry center, were treated as study group who were displayed to leg massage by lavender oil by their parents.

Tools of the study

Four tools for data collection were used in the present study:

The First Tool (pre):

Structured interviews questionnaire in Arabic were used and developed by the researchers based on literature relevant, aim of study and necessary data for collected. It was used to assess personal data characteristic of children, parent it included 8 questions: parent's characteristic such as (parent's age, residence, economic status, education, and telephone no) & child characteristics such as (child's age by days, sex, and weight).

The Second Tool: knowledge assessment tool (pre/post):

It is a self-administered assessment tool developed by the researchers after revising relevant literature. It was designed to assess parent's knowledge regarding aromatherapy treatment and pain management after vaccination, that includes 11 questions multiple choice question 7 of them about aromatherapy treatment (definition, important & usefulness, instruction of uses, how used it and standard safety used of aromatherapy treatment) and 4 of them about pain (definition, important of vaccination pain management, important of parent role in pain relieve and management methods. ***(The National Association for Holistic Aromatherapy,2019).***

concerning scoring system: for knowledge questions were offered scores (zero,1, or 2). It was assigned to each answer representing (poor, average, good) respectively. Total knowledge results were categorized as: poor knowledge (<50%), average knowledge (50%-75%) and good knowledge (> 75%).

The Third Tool: beliefs and attitudes of parent assessment tool (pre/post):

It is a self-administered assessment tool developed by the researchers after revising relevant literature. According to **Ajzen & Fishbein (1980)**, understanding belief is the preliminary step in the development of a fixed response instrument for measuring attitude. It is open-ended instrument was designed to

assess the beliefs and attitudes of parent towards vaccination pain and aromatherapy in pain management, it included (3) questions, to elicit belief statements: (1) What are parent beliefs about importance of vaccination pain management? (2) What are parent beliefs about the use of aromatherapy in pain management by lavender oil massage? (3) What are parent beliefs about the utilize of aromatherapy in pain management by lavender oil massage on alleviating vaccination pain? They were asked to rate belief strengths in relation to these questions as mildly +1 or strongly believe +2 and feeling about the belief on a 5-point scale, from very positive +2, slightly positive +1, no feeling 0, slightly negative -1, and to very negative -2.

The Fourth Tool: procedural pain assessment tools:

Part one:

The Modified Behavioral Pain Scale represent a trustworthy tool to evaluating procedural pain in children. It contained three major denomination; the first is facial expression, the second is cry and the third is movement, developed by Taddio et al, (1995).

Part two: Cry duration in seconds

All children were audiotaped during vaccination and after vaccination injection recovery until a total 6-minute observation. The first cry duration was determined as the period from the performance of cry (from the first audible anguish vocalization after the first needle puncture of the skin to the first stop in crying (absence of audible anguish vocalization less than 3 second). The total cry duration was determined as the total time that the child was exhibit audible anguish vocalizations during 6-minute observation.

Scoring system

Modified Behavioral Pain scale is used to define the acuteness of pain in children submitting vaccination injection, during and after vaccination procedure, based on behavioral responses of children. This scale is three major items, and twelve sub items. The first item is facing (contain 4 sub items) each sub item have one score from 0 to 3; the second item is crying (contain 5 sub items) each sub item has one score from 0 into 4 and the third item is movement (contain 3 sub items) each sub item has one score 0 to the first sub item, 2 to the second sub item, 3 to the third sub item. The total score ranged from 0-10, with 0 indicate no pain and 10 severe worst pain.

Tool Validity:

Tools for data aggregation submitted on panel of four experts of pediatric medicine and community health Nursing professors, who reviewed the tool and test the content validity, modifications were carried out according to the expert's judgment on clarity of sentences and the appropriateness of contents.

Regarding Modified Behavioral Pain scale by ***Taddio et al, (1995)***. A high validity, reliability, and sensitivity tool to assessment of vaccination procedure related pain was proved by ***Crellin et al, (2018).***

Pilot study

It was carried out on 10% of the total subject sample (20 children). It was performed to test study process

and to assess the applicability, objectivity, adequacy, and clarity of the tools, evaluate of feasibility of fieldwork and to detect any possible obstacles and problem that might face the researchers and interfere with data collection. The pilot study results were used to test the suggested statistical and data analysis process. The tools were achieved without any obstacles, adding advocacy to the instrument validity. the pilot study sample was included to the total study sample.

Ethical Consideration:

All official permissions to conduct the study were guaranteed from pertinent authorities. All parents were informed about the significance and aim of this study. Oral consent was obtained from all the parents. All parents were informed that their participation is voluntary and their rights to withdraw at any time, and confidentiality of the information obtained. Also, the parent was informed that the collected data would be used only for objective of the present study, as well as for their benefit. data were gathered at first from children in control group established on the basic moral principles of beneficence.

Procedure:

An official written approval letter which clarifying the objective of present study was approved from the director of the governmental primary health care centers before data collection to conduct this study. Researcher consulted with the accountable nurse before approaching parent about participation, as per institutional practices. The study conducted between august 2019 and January 2020. The existing study was accomplished through three phases: assessment phase (pre-test), implementation phase, and evaluation phase (post-test).

Interviewing & Assessment phase:

Eligible children's parent was approached in nursing room before two months vaccination. Researcher introduced himself to children 'parent and recognized the children 'parent, thereafter the aim and benefits of study were explained by researcher. Acceptance of eligible children's parent was obtained, thereafter parent was filled the self -administered interview structured questionnaire to assess the data related to sociodemographic data, knowledge assessment about aromatherapy treatment in alleviating vaccination pain and assessment of beliefs and attitudes of parent regarding aroma treatment with lavender oil in pain management. The questionnaire took about 15 minutes to be completed. Subjects were assigned randomly to the education study group and control group.

Implementation phase:

After assessing the parent knowledge by pretest self-administered questionnaire regarding the study group the researcher meet the parent before the child have vaccination on Saturdays and Tuesdays in Elkhalij Elmasry primary health center from every week and on Sundays and Wednesdays in El Demerdash health office, for 6 weeks. The overall number of education sessions was 24 sessions, two sessions for each group (two/ day/week), each group ranged from 3-4 parent, each session was conducted for one hour before the time of vaccination, each session take about 20 minutes.

The first session researcher provided discussion about pain topics including pain definition, important of management of vaccination pain, important of parent role in pain relieve and management methods. As regarding the second session researcher provided a discussion of the topics of inclusive about aromatherapy treatment, definition, important and usefulness thereafter describe instruction of uses, how used it and standard safety used of aromatherapy treatment. Before started use lavender oil on study children, the researchers had exposure every study child to specialist physician to ensure the lavender oil using do not interact with child's medications or current condition and to prescribe the correct dosage of lavender oil depending on child's condition and the age/weight according to guidelines of essential oil safety for child from 3 months to 24 months age is beginning with 0.25% to 0.5% in a carrier oil. ***(Buckle J, 2015)***.

The researcher explained how to use of aroma oil (lavender oil) by the massage technique explained by Hashemi et al, (2015). The trained parent performed the intervention for his child and each child received the intervention for 10 minutes. After child vaccination all interventions were performed promptly. the intervention groups received massage in nursing room.

Treatment involved of using the best way effleurage the lavender oil as requisites method on the parent palm which spread totally across the whole parent palm, thereafter, simple effleurage massage employing lavender oil was performed on child leg from the plantar flatness of the foot upward to the knee. On child leg, effleurage massage was started from the plantar flatness of the child foot which massaged with movements of the thumbs from the fingers toward heel. thereafter the posterior sides of the child leg were massaged by passionate pressing with parent palm of hands and thumbs from child ankle upward to the knee and back down to the child foot with sprightly pressure. Massage was performed using enough lavender oil with 0.25% to 0.5% concentration of essence. The researcher distributed pamphlet for everyone and asked subjects to review autonomously the materials after that.

Evaluation phase (post-test)

Two evaluations were carried out for each parent. The first evaluation was at the beginning of the study as a baseline data (pre-test). The second ones were done after two months. And another two evaluation was performed for each child after vaccination using MBPS and cry duration.

Regarding the study group: after the vaccination injection promptly, the researcher using the MBPS. to assess child pain as (baseline) score the leg massage with lavender while the child in parent's lap for 10 minutes. Thereafter the researcher using the MBPS accordingly well as the crying duration in second again to assess the child pain score

Concerning the control group: after vaccination injection promptly, the researcher using the MBPS to assess the child pain as (baseline) score. The child was handed wanting without any intervention in his parent 's lap for 10 minutes, Thereafter the researcher using the MBPS accordingly well as

the crying duration in second again to assess the child pain score.

for a study group or control group the time needed for each child extend from 20-25 minutes inclusive vaccination injection time the assessment of pain by MBPS and cry duration before and after massage with lavender oil.

Statistical analysis

The collected data were marshaled, categorized, tabulated, and analyzed using the statistical package for social studies (SPSS) version 23. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, mean and standard deviations for quantitative variables. Independent T-test was used to assess changes in mean pain between the two groups, and r. test was used to measurement correlational relationship between elected variables. In this study, no statistical significance difference was considered when p-value > 0.05, Statistical significance difference was considered when p-value ≤ 0.05, and high significance when p-value ≤ 0.001.

Results

Table (1): Distribution of children's parent regarding to their socio-demographic characteristics in Control and Study Group (n=120).

Socio-demographic characteristics	Control group (n=60)		Study group (n=60)	
	No	%	No	%
Age /year				
20->30	18	30.0	16	26.7
30->40	28	46.7	32	53.3
≥40	14	23.3	12	20.0
Mean ± SD	33 ± 7.5 years		35± 6.4 years	
Residence				
Urban	44	73.3	48	80.0
Sub Urban	16	26.7	12	20.0
Education				
Read/Write	16	26.7	12	20.0
Secondary	32	53.3	34	56.7
University	12	20.0	14	23.3
Socioeconomic Status				
Low	8	13.3	4	6.7
Moderate	48	80.0	50	83.3
High	4	6.7	6	10.0

Table (***1*** illustrated the children's parent age, 30% ranges from 20->30 years old, 46.7% ranges from 30->40 years and 23.3% ranges ≥40 years with mean age 33 ± 7.5 years in control group, and 26.7% of them they range from 20->30 years old, 53.3% ranges from 30->40 years and 20% ranges ≥40 years with mean age 35 ± 6.4 years in study group. Regarding children's parent education, 53.3.2%, 56.7% has secondary education in control group and study group, respectively. In relation to socioeconomic status 80%, 83.3% in control group and study group, respectively had moderate income.

Table (2) Distribution of children characteristic' regarding to their age (per days), gender, and weight in Control and study Group (n=120).

Children characteristic	Control group (n=60)			Study group (n=60)		
	No	%	Mean ± SD	No	%	Mean ± SD
Children' age (days)						
At four months vaccination	40	66.7%	135± 13	44	73.3 %	138± 15
At six months vaccination	20	33.3%	192± 12	16	26.7%	198± 17
Children' gender						
Male	31	51.7%		32	53.3%	
Female	29	48.3%		28	46.7%	
Children' weight (Kg)						
At four months vaccination	40	66.7%	8.1±0.9	44	73.3 %	8.9 ±0.7
At six months vaccination	20	33.3%	10.9±0.8	16	26.7%	10.8±0.6

Table (*2* revealed that, children age by days at vaccination of four months 66.7% in control group with mean ± SD 135± 13, while children age by days at vaccination of four months 73.3% in study group with mean ± SD 138± 15. And children age by days at vaccination of six months 33.3% in control group with mean ± SD (192± 12) while children age by days at vaccination of six months 26.7% in study group with mean ± SD 198± 17. This table also showed that 51.7% of children were male in control group, while 46.7 % in study group were female.

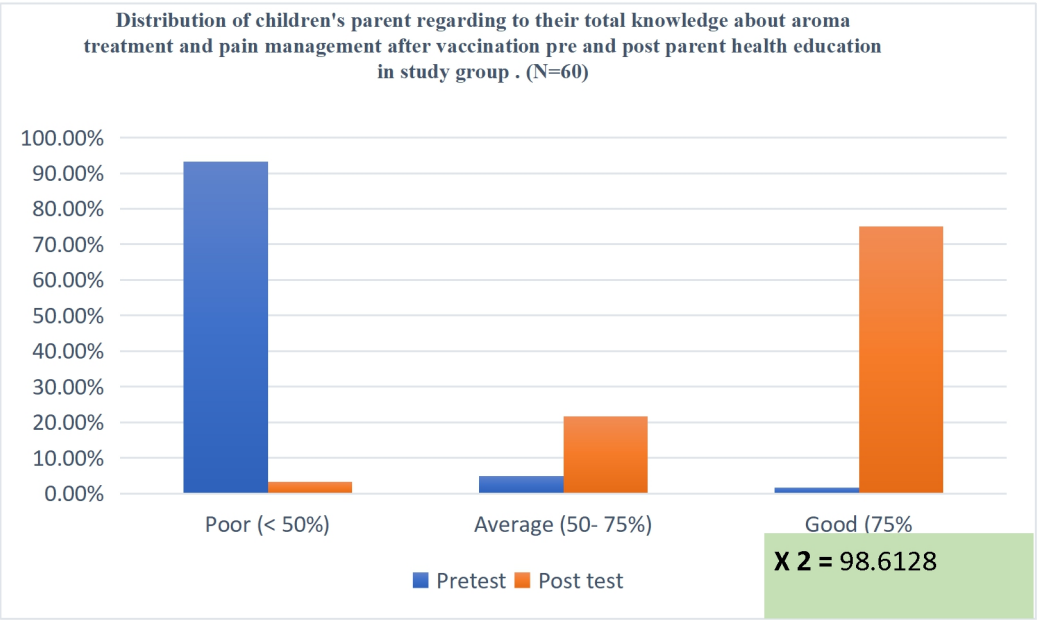

Figure (1) Distribution of children's parent regarding to their total knowledge about aroma treatment and pain management after vaccination pre- and post-parent health education in study group.

Figure (***1*** illustrated that 93.3% of study group the overall knowledge result was poor knowledge in pretest and 75% had a good total knowledge in post-test. There was a significant improvement in total knowledge about aroma treatment and pain management after vaccination among children's parent in posttest as compared to pretest assessment (p<0.0001).

Table (3): Statistical differences of children's parent belief and attitudes towards vaccination pain and aromatherapy pain management by lavender oil massage, in Control group and pre- and post-education study group (n=120).

Item	Control group (n=60)		Study group (n=60) pre-education		Study group (n=60) post -education		Omnibus test p-value
	No	%	No	%	No	%	
Children's parents stated that management of vaccination pain is important	(30)[a, b]	50	(40)[a]	66.7	(59)[b]	98.3	<0.001
Children's parents believed that use of aromatherapy pain management with lavender oil massage helped on alleviating vaccination pain	(20)[b]	33.3	(46)	76.7	(58)[b]	96.6	0.005
Children's parent was satisfied with pain management by lavender oil massage	(10)[a, b]	16.7	(48)[a]	80	(59)[b]	98.3	0.005
Children's parents score of confidence in ability to manage vaccination pain (0-10) Mean ± SD	(38)[a, b]	63.3	(40)[a, c]	66.7	(58)[b, c]	96.6	<0.001
	6.1 ±1.1		7.3±2.1		8.5±1.5		
score of Children's parents reported child vaccination pain (0-10) Mean ± SD	(55)[a, b]	91.6	(56)[a]	93.3	(58)[b]	96.6	0.03
	8.5±1.2		7.6±1.1		4.2±1.1		

Omnibus test (chi-squared test or assorted methods) p value to comparisons among the three groups. post hoc pair wise comparisons with significance value of less than 0.05(p value <0.05) and highly significant at P ≤ 0.001 are indicated by the following symbols: a = control group versus pre - education study group, b= control group versus post-education study group and c =pre- education study group versus post-education study group including lavender oil massage.

SD= standard deviation. *Unless specified otherwise

Table (***3*** revealed that, there are highly significant improvement between control group and post- education in study group (p-value<0.001). The study group had more positive perception about the importance of managing vaccination pain and ability to manage it. There was significant improvement between control group and post- education in study group regarding perceived less child vaccination pain (p-value<0.05).

Table (4): Distribution of children behavior observed according to modified behavior pan scale components Forthwith vaccine injection of children and afterward five minutes in control and study group (n=120).

Behavior observed according to modified behavior pain scale component.	Behavior observed Forthwith after Vaccine injection				Behavior observed five Minutes afterward Vaccine injection			
	Control group (n=60)		Study group (n=60)		Control group With standard care (n=60)		Study group with massage by lavender oil (n=60)	
	No	%	No	%	No	%	No	%
Facial expression								
Definite positive expression (smiling)	0	0.0	0	0.0	0	0.0	25	41.7
Neutral expression	0	0.0	0	0.0	0	0.0	31	51.6
Slightly negative expression(grimace)	0	0.0	0	0.0	0	0.0	4	6.7
Definite negative expression (furrowed brow eyes closed tightly)	60	100	60	100	60	100	0	0.0
Cry								
Laughing or giggling	0	0.0	0	0.0	0	0.0	28	46.7
Not crying	0	0.0	0	0.0	0	0.0	22	36.7
Moaning quiet vocalizing gentle or whimpering cry	0	0.0	0	0.0	2	3.3	9	15.0
Full lunged cry or sobbing	11	18.3	2	3.3	15	25.0	1	1.6
Full lunged cry more than baseline cry (scored only if child crying at baseline)	49	81.7	58	96.7	43	71.7	0	0.0
Movement								
Usual movements and activity or resting and relaxed	0	0.0	0	0.0	0	0.0	26	43.3
Partial movement (squirming arching limb tensing clenching) attempt to avoid pain by withdrawing the limb where puncture is done	2	3.3	1	1.6	6	10.0	34	56.7
Agitation with complex/generalized movements involving the head torso or other limbs or rigidity	58	96.7	59	98.4	54	90.0	0	0.0

Table (***4*** highlighted that Regarding facial expression 100% of children Forthwith and five minutes afterward vaccine injection had definite negative facial expression in control group. Whilst 51.6% were had neutral facial expression after five minutes afterward vaccine injection and massage by lavender oil in study group. Concerning the cry, the table revealed that 81.7 % forthwith vaccine injection and 71.7 % afterward five minutes of it, had full lunged cry more than baseline cry in control group. While 36.7% not crying, and 46.7% had Laughing afterward five minutes after vaccine injection and massage by lavender oil in study group. As regarded movement 96.7% of children were agitated with complex generalized movements or rigid Forthwith vaccine injection and 90% of them afterward five minutes after vaccine injection in control group. While in study group 98.4% had agitation with complex/generalized movements Forthwith vaccine injection and 56.7% had partial movement and 43.3% had usual movements after five minutes after vaccine injection and massage by oil lavender.

Table (5): Statistical differences of total mean scores of children behavior observed according to modified behavior pan scale components Forthwith vaccine injection of children and afterward five minutes in control and study Group (n=120).

Item	Behavior observed Forthwith Vaccine injection		Behavior observed five Minutes afterward Vaccine injection	
	Control group (n=60)	**Study group (n=60)**	**Control group With standard care (n=60)**	**Study group with massage by lavender oil (n=60)**
Total scores of children behaviors observed according to modified behavior pain scale components (0-10) Mean ± SD	9.90 ± 0.302	9.97 ± 0.230	9.50 ± 0.501	2.45 ± 1.34
***X* 2 (*P* – value)**	173.400 **(**0.001**)**	487.000**(**0. 001)	113.825(0.001**)**	7.869**(**0. 001)

Highly significant at P ≤ 0.001

SD= standard deviation. *Unless specified otherwise

Table *(5)* illustrated that total mean scores of children behaviors observed according to modified behavior pain scale components five minutes after vaccine injection 2.45 ± 1.34 in study group with massage by lavender oil was less than in control group 9.50 ± 0.501. There was significant improvement at total mean scores of M B PS components in study group with massage by lavender oil during five minutes after vaccine injection as compared to control group with highly statistically significant (p<0. 001).

Table (6): Statistical differences of the first and total cry duration of children after vaccine injection among control and study group

Item	Control group (n=60)	Study group (n=60)	*P* – value
First Cry duration (second) Mean ± SD	59.5±31.5	20±39.3	0.03
Total Cry duration (second) Mean ± SD	234 ± 116.45	95.5±33.5	0.0001

SD= standard deviation. *Unless specified otherwise
Significant at (p value <0.05)
Highly significant at P ≤ 0.001

Table (***6***) revealed that the total mean first cry duration in study group 20±39.3 was less than the total mean first cry duration in control group 59.5±31.5 there was a significant improvement at the total mean cry duration in research group as accordingly compared to control group with highly statistically significant (p<0. 001).

Table (7): Correlation between age of children, wight of children, total cry duration and total MBPS scores after injection in control and study Group Forthwith and afterward five minutes (n=120).

Item			Total MBPS scores Forthwith after vaccine injection		Total MBPS scores five minutes afterward vaccine injection	
			Control group (n=60)	Study group (n=60)	Control group with standard care (n=60)	Study group with massage by lavender oil (n=60)
Age of Children	**Control group**	**R**	0.029	------	0.225	------
		P	0.968	------	0.175	------
	Study group	**R**	------	0.217	------	0.179
		P	------	0.174	------	0.235
wight of children	**Control group**	**R**	0.062	------	0.254	------
		P	0.835	------	0.074	------
	Study group	**R**	------	0.078	------	0.355
		P	------	0.642	------	0.008
Total cry duration	**Control group**	**R**	0.456	------	0.487	------
		P	0.007	------	0.000	------
	Study group	**R**	------	0.016	------	0.654
		P	------	0.891	-------	0.000

*Correlation is significant at the 0.001 level (2-tailed).

Table (***6*** revealed that a highly significant correlation between MBPS total scores Forthwith and afterward 5 minutes of injection with cry duration in control group r. = 0.456, p. = 0.007, and r. = 0.487, p. = 0.000, respectively.

While in study group there was a highly significant correlation between MBPS total scores afterward 5 minutes after injection with leg massage by lavender oil also and cry duration r. =0.654, p. =0.000.

Discussion

Vaccine injections pain are the most popular painful procedure in childhood, this pain results in child, parents, and health care providers adversity. Community health nurse contemplate the utilize of parent education programs to assist individuals' transition to good parenthood. Directly targeting of parents' health education regarding pain alleviation during children vaccinations injection boost family- concentered care and has the potency to ameliorate pain therein children. In turn pain alleviation in children can promote the cleverness care of vaccination injection pain and boost favorable behaviors about vaccination. ***Betsch et al. (2018).*** furthermore, Parental palliative of children in soreness is a good key countenance of reacting and ensure child-parent attachment ***Letourneau et al, (2015).*** Therefore, enhance pain alleviation in vaccination condition has added capitalize of promote the pivotal role of care granter in controlling child soreness ***Simpson et al, (2016)***. The aromatherapy treatments revealed reduction of pain. Thus, it was considered that receiving aromatherapy (massage with lavender oil) was a benefit for children submitting to vaccination injection**. The current research aimed to** evaluate the effect of aromatherapy parent education intervention (lavender oil massage) in alleviating injection pain among children submitting to vaccination**. Research hypothesis** Parents who received educational intervention about aromatherapy the study group have better knowledge and positive attitude of vaccination pain mitigation. Children of parents received educational intervention and exposure to leg massage by lavender oil by their parent will have lower total mean score of pain established on M B PS and will show shorter cry duration than children of parents who did not receive participation the educational intervention about aromatherapy the control group.

As regard children's parent socio-demographic characteristics the existing study showed that, parental age were generally young adults and utmost of them were educated to secondary and university level. This result is analogous of ***Soner et al, (2018)*** who study the knowledge, behaviors of parent about vaccine in Turkey among families and found in their study regard parental demographic characteristics that the parents were generally young adults, and most were educated to high schooled level and more. Majority of parental socioeconomic feature were moderate so that we believe these parental characteristics benefits in attract the interest of children's parent about aromatherapy education intervention.

The existing study revealed that this consequence could be elucidate and

comprehend the children age of both groups. As we conceive the mean age of children by days was 135± 13 in control group and 138± 15 in study group at four months vaccine. while the mean age of children was 192± 12 in control group and 198± 17 in study group at six months vaccine, this age in agreement to the Egyptian vaccination schedule regarding the four- and six-months vaccination.

Regarding distribution of children's parent according to their total overall score of knowledge about aroma treatment and pain management. There was a highly significant improvement in total knowledge about aroma treatment and pain management among children's parent in posttest as accordingly compared to pretest assessment $p<0.001$. Hence, the finding of present study interpreted that implementing children's parent education regarding aroma treatment and pain management was effective in increasing the level of children's parent " knowledge.

The finding of the current study agrees with ***Anna et al, (2018).*** Who studied that impact of a hospital setup postpartum parent education about management of pain during vaccination of infant and discovered that as regards the overall knowledge result level, there was a highly statistically significant relation $P<0.001$ as regards the pre and posttest overall knowledge score level amongst pain education group.

Moreover, the finding of the existing study regarding children's parent belief and attitudes towards vaccination pain and aromatherapy pain management with lavender oil massage and revealed that, the study group had more positive perception about importance of managing vaccination pain and capability to manage pain. There was significant improvement regarding perceived less child vaccination pain p-value<0.05 in a line with ***Sonner. (2018)*** who studied Parental vaccine knowledge and behaviors and concluded that represent a useful information source concerning Turkish parental knowledge, beliefs, attitudes, and demeanor towards childhood vaccination.

Regarding distribution of children behavior observed according to modified behavior pan scale components as facial expression, cry, and movement, the finding of the existing study noticed that whole children Forthwith and five minutes afterward vaccine injection had definite negative facial expression, most of them had full lunged cry and majority of children were agitated or raged in control group. Likewise, the findings reported by ***Evelyn et al. (2013),*** who studied "The effect, parental acceptance, and feasibility of simple combination infants pain reduction who receive multiple vaccination injection amongst American children and revealed that, children in control group were crying and showed higher pain scores than those in study group.

Furthermore, the finding of the existing study agrees with ***Gad et al. (2019)*** who studied the effect of breast suckling on immunization pain amongst Egyptian infants and showed that infants in control group were crying and showed higher pain scores than those in the breast suckling group.

Meanwhile the finding of the existing study displayed study group who were after the vaccine injection subjected to leg massage together by

lavender oil had showed, the face reaction as neutral face, stumpy crying time, and body locomotion was more at freedom and no abnormal locomotion. These results are supported by ***Sayyed et al. (2015)*** who studied that the impact of massage together by lavender oil on clients with restless leg syndrome in hemodialysis and found that effleurage aroma leg massage utilized lavender oil could effectively reduce the severity of restless leg syndrome in the intervention group. Likewise, the findings reported by **Lee,** ***(2015)*** who studied that the effect of lavender oil on cognitive function, sensation, and offensive behavior of elderly, revealed that, the hand massage together with lavender oil was positively effective on cognitive function, emotion and aggressive behavioral symptoms of elderly with dementia.

In addition, all these studies are proportionate with our results and emphasize the beneficial impacts of lavender oil on anxiety, insomnia, and behavioral agitation.

It appears that relaxant impacts of massage treatment in conjunction with muscle relaxant and palliate impacts of lavender oil were efficient in alleviating vaccine injection pain.

Concerning total means MBPS scores at five minutes afterward injection of vaccine was higher than at promptly injection of vaccine in control group in current study. This result in agreement with ***Chawda, et al, (2019).*** who study of vaccination related pain, and the finding revealed that the mean MBPS scores of control group children before injection higher than after the injection.

The findings of the existing study displayed there was a highly significant improvement in the total mean cry duration in study group as accordingly equated to control group with highly statistically significant p<0. 001. These finding are supported by ***Razaghi et al, (2015)***. who discovered that the essence of lavender is efficient in decreasing the blood sampling pain in neonate.

Moreover, the finding of the exiting study is corroborative by ***Ahmad, et al. (2016)*** who studied the impact of aroma treatment massage together by lavender oil on pain mitigation in clients with knee osteoarthritis and found that aromatherapy massage together by lavender oil was found effective in relieving pain. These results may be due to Lavender oil contains analgesic properties which helps relieve muscle related pain. Lavender is a great essential oil to use to relax sore muscles and wind down at the oneself time.

As regard Correlation between, total cry duration and total MBPS scores after injection in control and study group forthwith and afterward five minutes the findings of the existing study displayed that a significant positive correlation between them this result clear that the longer total cry duration the higher total pain score, this result is of likeness with ***Evelyn et al, 2013*** , who studied "The effective pain reduction for multiple vaccination injection in young infant .and found that significative differences were establish among study and control groups at cry duration while parent described predilection for future use.

Conclusion

The current study concluded that there was highly statistically significant improvement between parent total knowledge P<0.0001 pre- and post-educational program. There was a significant improvement at the total mean cry duration in study group as equated to control group with highly statistically significant p<0. 001. Children who had leg massage together by lavender oil afterward vaccine injection had showed bring down pain scores and shorter cry duration than children in the control group by using the modified behavioral pain scale and cry duration period. Parent education about aromatherapy leg massage by lavender oil was found efficient in alleviating vaccine injection pain. Conclusions of the current study support the research hypotheses.

Recommendations

Applying Aromatherapy Education programs for new parents in all pediatric primary health care centers to increase parents' awareness about vaccine injection pain alleviation.

Further research to evaluate the influence of pain alleviation on vaccination compliance and child attachment, stringent aspects of healthy child development.

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