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Original Research Article

Exploring distraction techniques and parental satisfaction during infant immunization: a pilot study in aspirational district Darrang and non-aspirational districts Karimganj of Assam

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ABSTRACT

Background: In India, the percentage of children aged 12-23 months who have had full immunization coverage (FIC) has increased dramatically from 62% to 76%. UNICEF, 2022. As stated in the WHO report for 2022. Global coverage decreased to 81% in 2021 from 86% in 2019.
Methods: The study's methodology involved studying how the 4 S's technique, oral sucrose, and each of them affect parents' satisfaction and infants' perception of pain after vaccination in Darrang aspirational and Karimganj non-aspirational districts. Eighty infants were involved in the pilot project, split into four groups of ten infants each.
Results: In the study at Civil Hospital Mangaldoi, group C reported the highest parental satisfaction (mean=3.2) with no dissatisfaction and the lowest mean pain intensity (1.3, SD=0.48). Group A had 100% satisfaction (mean=3.1, SD=0.31), group B had 90% satisfaction (mean=3.0, SD=0.47), and the control group had the lowest satisfaction (30%, mean=2.3, SD=0.67) with 70% dissatisfaction. Group C's outcomes demonstrate both the highest satisfaction and the least intense, most consistent pain perception among participants.
Conclusions: This study's conclusion emphasizes how critical it is to overcome vaccine reluctance and enhance immunization experiences by employing efficient pain control strategies. The findings support the implementation of interventions such as sucrose administration and other pharmacological and non-pharmacological approaches to reduce pain associated with vaccinations, particularly in paediatric populations.

Keywords: Child health, Immunization, Parent satisfaction, Vaccination, Vaccine hesitation

INTRODUCTION

According to the WHO 2022 report. In 2021, there were just 25 vaccine introductions reported, excluding the COVID-19 vaccine. Global coverage decreased to 81% in 2021 from 86% in 2019. An estimated 25 million children are thought to have not received the recommended childhood immunizations, which is the largest amount since 2009. Compared to 2019, there were 5 million more youngsters who were completely immunized in 2021 (WHO 2022).[1]

Through its Universal Immunization Programme, India aims to immunize 2.7 crore kids and about 2.9 crore pregnant women each year. According to the most recent NFHS-5 statistics, In India, the percentage of children aged 12-23 months who have had full immunization coverage (FIC) has increased dramatically from 62% to 76%. (UNICEF-2022).[2]

The difficulties encountered in getting life-saving vaccines to the intended beneficiaries must be overcome using existing knowledge and lessons learned from the

past. Typhoid vaccine trials among Indian army soldiers, the extension of smallpox vaccination, and at the beginning of the 20th century, there were challenges associated with the creation of vaccine centers in almost all Indian states. India launched the universal immunization programme (UIP) in 1985 after introducing the expanded programme of immunization (EPI) in 1978.[3]

In India, vaccination initiatives have boosted the proportion of 12- to 23-month-old children who have received all recommended vaccinations from an anticipated 62% in 2015-2016 to 76% in 2019-2020. higher disparities in full immunization and OTV between rich and poor households were caused by the distribution of infrastructure quality, but smaller gaps were caused by poorer households' higher access to immunization sites.[4]

Compared to 62 percent in NFHS-4, 77 percent of children between the ages of 12 and 23 months in NFHS-5 had received all recommended vaccines. 66.4 percent of Assam and 57.1% of Darrang have received every vaccination that was suggested. (NFHS 5).[5]

Vaccination still causes pain, despite the claims of many that newborns and babies lack fully developed pain neurons. As stated by Park.[6]

According to Mohammad et al, infants' pain during vaccinations has both short- and long-term effects. Apart from the enduring consequences of unmanaged pain, such as irreversible impairment in intellectual growth encompassing memory, cognition, IQ, and conduct, unmanaged pain in neonates can also result in hemodynamic instability, elevated intracranial pressure, and reduced oxygenation. In youngsters, pain can also result in physical disability, anxiety, emotional difficulties, hyperactivity, and attention problems.[7]

Need of study

According to Taddio et al, 10% of people avoid needle-related procedures such as immunizations due to a needle phobia that 25% of adults say they have had from infancy.[8]

According to Chattopadhyay et al, parents have acknowledged that vaccine hesitancy is a result of pain experienced during immunization. Since there was no alternative to vaccination, it was necessary to investigate pain-reduction techniques. It has been demonstrated that a variety of pharmaceutical and non-pharmacological therapies can lessen discomfort during immunization. However, experience rather than study was often represented in these professions' literature.[9]

(2010) The American Pain Society, Canadian Pediatric Society, and American Pediatric Society all recommend sucrose for the management of mild procedure pain in newborns. Infants who are calmed by sucrose experience less immediate and long-lasting negative effects from pain[10]

In addressing this issue, the SAGE (2014) discovered that minimizing or eliminating pain during vaccination was the most effective way to follow the recommended vaccination schedule and avoid vaccine reluctance.[11]

Objective

To evaluate parental satisfaction and pain perception in infants receiving immunizations in experimental groups A, B, and C as well as the control group. To compare parental satisfaction and infants' perceptions of pain between experimental groups A, B, and C and the control group among infants receiving immunizations. To determine the relationship between parental satisfaction and infants receiving immunizations in experimental groups A, B, and C as well as the control group's perception of pain. To correlate parental satisfaction and pain perception among infants receiving immunizations in experimental groups A, B, and C with their demographic variables.

Operational definitions

Efficacy

The impact of the chosen interventions on parents' satisfaction and infants' feelings of pain. Parental satisfaction is measured using a 5-point Likert scale, while pain perception is measured with a modified Riley pain scale.

Selected interventions

The interventions are oral sucrose, The 4S technique, and oral sucrose combined with the 4s technique.

The oral sucrose

25% oral sucrose solution, which is commercially available, is utilized, and the unsealed bottle is refrigerated for a further week of usage.

The 4S technique

Swaddling, side-lying, swinging, shushing.

METHODS

Research variables

Independent variables were oral sucrose, the four S's method, and oral sugar combined with the four S's method.

Dependent variables were the pain perception, and the parental satisfaction.

Study area

It was a pilot study at Civil Hospital Mangaldoi, Darrang (aspirational district) and Civil Hospital Karimganj (non-aspirational district), Assam from November 2023 to January 2024.

Study population

Infants receiving immunizations formed the study population.

Sample

newborns who meet the selection requirements and are 6 weeks, 10 weeks, and 14 weeks old at the time of their regular vaccinations.

Sample size

80 infants, 10 in each of four groups, were included in the pilot trial. Based on the pilot study (a pilot investigation on the impact of chosen interventions on pain perception and parental satisfaction among newborns getting immunizations), the sample size was determined using a mean pain score of 0.2, a standard deviation of 0.36, α error, and β error of 5%.

Ethical permission

The study ethical permission given by the JSPH Institutional review board (REF No. JSPH/23/08/01 Dated 29/08/2023) and IRB No. 10032/IRB/20-21.

The procedure of the data analysis

The study used descriptive and inferential statistics. The Statistical Package for Social Sciences (SPSS, version 16) was used for statistical analysis.

Inclusion criteria

Infants age between 6 and 14 weeks. Infants accompanied by mother and father. Infants immunize with the Pentavac vaccine. Infants whose mothers are able to speak either English or Assamese. Infants whose mothers are willing to participate in the study.

Exclusion criteria

Infants having congenital anomalies, gastrointestinal disorders, neurological disorders, fever, and illness.

RESULTS

In group A, 40% of participants reported experiencing no pain, with a mean pain intensity of 1.8 (SD=0.78). Meanwhile, 40% reported mild pain, and 20% reported moderate pain, with no participants reporting severe pain.

In group B, the majority of participants (70%) reported no pain, with a lower mean intensity compared to group A at 1.4 (SD = 0.69). Twenty percent reported mild pain, and 10% reported moderate pain, with no participants reporting severe pain.

The control group displayed a different pattern, with only 20% reporting no pain, 40% reporting mild pain, and 20% reporting severe pain, yielding a mean intensity of 2.4 (SD=1.07). Notably, no participants reported moderate pain in this group.

The statistical comparison reveals several noteworthy observations. Firstly, groups A, B, and C exhibited similar distributions of pain perception, with the majority experiencing no pain and only a minority reporting mild or moderate pain. However, the control group deviated from this trend, with a lower proportion experiencing no pain and a higher proportion experiencing mild and severe pain (Table 1).

In group A, all participants (100%) reported being either satisfied or very satisfied with a mean satisfaction score show 3.1 and a low SD of 0.31. This indicates a high level of consistency in satisfaction within this group.

Group B shows a slightly lower overall satisfaction level compared to group A, with 90% of participants reporting satisfaction and a mean score of 3.0. The SD was slightly higher at 0.47, suggesting a bit more variability in satisfaction levels among participants in this group. Group C demonstrates the most diverse range of satisfaction levels among the groups. While 50% of participants reported being very satisfied, 20% were dissatisfied. The mean satisfaction score falls between the previous two groups at 3.3, with a higher SD of 0.67, indicating greater than variability responses.

The control group exhibits the lowest level of satisfaction among the groups, with only 30% of participants reporting satisfaction and a mean score of 2.3. Interestingly, no participants reported being very dissatisfied in this group, but 50% reported being dissatisfied. The standard deviation is 0.67, similar to group C, suggesting a comparable level of variability in satisfaction scores. Statistical comparisons reveal several noteworthy trends. Firstly, there was a clear distinction between the experimental groups (groups A, B, and C) and the control group in terms of mean satisfaction scores, with the experimental groups generally reporting higher levels of satisfaction. Additionally, group C stood out as having the highest mean satisfaction score, although it also exhibited greater variability compared to the other groups (Table 2).

Table 1: The distribution of pain perception frequency and percentage analyzed within experimental groups A, B, and C, and the control group in Civil Hospital, Karimganj, Assam.

Pain perception												
Variables	**Group A**			**Group B**			**Group C**			**Control group**		
	N	**%**	**Mean±SD**	**N**	**%**	**Mean±SD**	**N**	**%**	**Mean±SD**	**N**	**%**	**Mean±SD**
No pain	4	40	1.8±0.78	7	70	1.4±0.69	7	70	1.3±0.48	2	20	2.4±1.07
Mild pain	4	40		2	20		3	30		4	40	
Moderate pain	2	20		1	10		0	0		2	20	
Severe pain	0	0		0	0		0	0		2	20	

Table 2: The distribution of parental satisfaction frequency and percentage analyzed within experimental groups A, B, and C, and the control group in Civil Hospital, Karimganj, Assam.

Parental satisfaction												
Variable	**Group A**			**Group B**			**Group C**			**Control group**		
	N	**%**	**Mean±SD**	**N**	**%**	**Mean±SD**	**N**	**%**	**Mean±SD**	**N**	**%**	**Mean±SD**
Very dissatisfied	0	0	3.1±0.31	0	0	3±0.47	0	80	3.3±0.67	1	10	2.3±0.67
Dissatisfied	0	0		1	10		0	20		5	50	
Satisfied	9	90		8	80		5	50		3	30	
Very satisfied	1	10		1	10		5	50		0	0	

Table 3: The distribution of pain perception frequency and percentage analyzed within experimental groups A, B, and C, and the control group in Civil Hospital, Mangaldoi, Darrang, Assam.

Pain perception												
Variables	**Group A**			**Group B**			**Group C**			**Control group**		
	N	**%**	**Mean±SD**	**N**	**%**	**Mean±SD**	**N**	**%**	**Mean±SD**	**N**	**%**	**Mean±SD**
No pain	5	50	1.6±0.69	6	60	1.4±0.51	8	80	1.3±0.48	4	40	2±1.05
Mild pain	4	40		4	40		2	20		3	30	
Moderate pain	1	10		0	0		0	0		2	20	
Severe pain	0	0		0	0		0	0		1	10	

Table 4: The distribution of parental satisfaction frequency and percentage was analyzed within experimental groups A, B, and C, and the control group in Civil Hospital, Mangaldoi, Darrang, Assam.

Parental satisfaction												
Variable	**Group A**			**Group B**			**Group C**			**Control group**		
	N	**%**	**Mean±SD**	**N**	**%**	**Mean±SD**	**N**	**%**	**Mean±SD**	**N**	**%**	**Mean±SD**
Very dissatisfied	0	0	3±0.47	0	0	2.8±0.63	0	0	3.2±0.63	2	20	2.2±0.78
Dissatisfied	1	10		3	30		0	0		5	50	
Satisfied	8	80		6	60		6	60		3	30	
Very satisfied	1	10		1	10		4	40		0	0	

Group A comprised 10 participants, with 50% reporting no pain, 40% reporting mild pain, and 10% reporting moderate pain. The mean pain intensity in group A was 1.6, with a standard deviation of 0.69. Group B consisted of 10 participants as well, with 60% reporting no pain, 40% reporting mild pain, and none reporting moderate or severe pain. The mean pain intensity in group B was 1.4, with a standard deviation of 0.51. In group C, which includes 10 participants, 80% report no pain, 20% reported mild pain, and none report moderate or severe pain. The mean pain intensity in group C was 1.3, with a standard deviation of 0.48. Lastly, the control group consists of 10 participants, with 40% reporting no pain, 30% reporting mild pain, 20% reporting moderate pain, and 10% reporting severe pain. The mean pain intensity in the control group was 2, with a standard deviation of 1.05. Statistical comparison across the groups revealed several insights. Firstly, group C had the highest percentage of participants reporting no pain (80%), followed by group B (60%), group A (50%), and the control group (40%). This indicates that group C experienced the least pain, followed by group B, group A, and the control group, respectively.

Additionally, when comparing mean pain intensity, group C again demonstrated the lowest score (1.3), indicating

lower pain perception compared to the other groups. Group B followed with a mean score of 1.4, group A with 1.6, and the control group with the highest mean score of 2. This suggests that participants in group C experienced the least intense pain on average, while the control group experienced the most intense pain. Group C had the lowest standard deviation (0.48), indicating relatively consistent pain perception among its participants. In contrast, the control group had the highest standard deviation (1.05), suggesting greater variability in pain perception within that group (Table 3).

Within group A, 80% of parents expressed satisfaction (10% very satisfied, 80% satisfied), with a standard deviation of 0.47 and a mean satisfaction score of 3.0. Not a single parent expressed extreme dissatisfaction. Group B displayed a similar pattern, with a mean satisfaction score of 2.8 and a standard deviation of 0.63, indicating that 60% of parents were satisfied (10% very satisfied, 60% satisfied). In contrast to group A, there was a discernible rise in the dissatisfied category, with 30% of parents falling into this category.

60 percent of parents in group C reported being satisfied (twenty percent were satisfied and forty percent were very satisfied). With a standard deviation of 0.63, the mean satisfaction score was 3.2. Remarkably, none of the parents in this group expressed dissatisfaction or extreme dissatisfaction.

When compared to the other groups, the control group's satisfaction scores were the lowest. With a standard deviation of 0.78 and a mean satisfaction score of 2.2, just 30% of parents said they were satisfied (30% satisfied). Remarkably, 20% of parents expressed extreme dissatisfaction and 50% expressed dissatisfaction.

Statistical comparison across the groups reveals notable differences in parental satisfaction levels. Groups A, B, and C all had higher mean satisfaction scores compared to the control group, indicating overall higher levels of satisfaction. Additionally, group C had the highest mean satisfaction score among the groups (Table 4).

DISCUSSION

The findings presented in this study shed light on the efficacy of pain-reduction techniques in mitigating discomfort associated with vaccinations. The results indicate that interventions aimed at reducing pain during vaccination, such as the use of sucrose and other pharmacological and non-pharmacological methods, can significantly improve the experience for both recipients and caregivers. Notably, the experimental groups (groups A, B, and C) consistently demonstrated higher levels of satisfaction compared to the control group, which did not receive any pain-reduction interventions.[4,8]

Sucrose, recommended by various pediatric societies, emerged as a promising method for alleviating procedural pain in infants. This aligns with previous research emphasizing the importance of addressing pain perception in children to promote vaccine acceptance and adherence to vaccination schedules. Moreover, the study underscores the significance of pain management not only in improving immediate comfort but also in potentially reducing long-lasting negative effects associated with pain experiences during infancy.

Furthermore, the distribution of pain perception across the experimental groups suggests that interventions effectively reduced the prevalence of moderate to severe pain, with the majority of participants reporting either no pain or mild discomfort. This highlights the feasibility and efficacy of implementing pain-reduction strategies in clinical settings to enhance the vaccination experience.[3,9]

The varying levels of satisfaction observed among the experimental groups warrant further investigation into the factors influencing individual perceptions of pain and satisfaction with pain management interventions. Group C, despite exhibiting the highest mean satisfaction score, also displayed greater variability in satisfaction levels compared to the other groups. Understanding the factors contributing to this variability could inform tailored approaches to pain management and improve overall satisfaction with vaccination experiences.

Parental satisfaction is subjective and can be influenced by factors not directly related to the distraction techniques, such as prior experiences with healthcare services and personal beliefs about immunization. If the study uses various distraction techniques, their application and effectiveness differences may not be adequately accounted for, leading to inconsistent results.

CONCLUSION

In conclusion, this study underscores the importance of addressing vaccine hesitancy and improving vaccination experiences through effective pain management techniques. The findings support the implementation of interventions such as sucrose administration and other pharmacological and non-pharmacological approaches to reduce pain associated with vaccinations, particularly in pediatric populations. By prioritizing pain prevention and mitigation, healthcare providers can enhance patient and caregiver satisfaction, promote vaccine acceptance, and ultimately contribute to improved public health outcomes. Future research should further explore the mechanisms underlying individual differences in pain perception and satisfaction to optimize pain management strategies in clinical practice.

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Conflict of interest: None declared
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