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Impact of Educational Intervention on Knowledge Regarding Household Waste Management among Urban Adults

Jeya Beulah D

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Abstract

Background: Household waste management is the process of collecting, transporting, processing or disposing, managing and monitoring waste materials. By properly managing them, many illnesses can be prevented.

Objectives: Are to assess the pre-test knowledge on household waste management among adult in selected urban community, to assess the impact of educational intervention on knowledge regarding household waste management, to associate the knowledge with socio demographic variables.

Methods: Pre experimental one group pre-test post-test design. Non Probability convenient sampling was used and 50 subjects were selected. Data was collected and analysed by using descriptive and inferential statistics.

Result: This study explained that in pre-test only 5 (10%) subjects had adequate knowledge, after education maximum samples knowledge improved 40 (80%). There was significant difference between pre-test and post-test scores as the 't' value is higher than the tabulated value in the 'p' value at 0.05 level of significance.

Conclusion: These study findings indicated that, people need proper education on waste management.

Keywords: Household waste management, Materials; Illnesses; Urban community; educational intervention.

INTRODUCTION

One of the most significant environmental issues facing the globe today is waste management. Inadequate waste management leads to the

reproduction of infectious diseases, such as plague and cholera. Waste disposal is the process of taking apart, destroying, or storing damaged, used, or undesirable items. This might include packing waste (made of glass, paper, or plastic), as well as waste from homes, businesses, or farms. A study population consisting of 125 rural families selected. The study shows how important it is for individuals to be aware of proper trash management and disposal practices. to evaluate the residents of the Kaiparambu panchayat's knowledge, attitudes, and practices surrounding the disposal of household garbage. The survey involved 125 homes from the Kaiparambu panchayat in Thrissur, Kerala. Simple Random sample was the sample strategy employed in the investigation. A

Author's Affiliation: Associate Professor, Department of Community Health Nursing, SCPM College of Nursing and Para Medical Sciences, Gonda 271003, Uttar Pradesh, India.

Corresponding Author: Jeya Beulah D, Associate Professor, Department of Community Health Nursing, SCPM College of Nursing and Para Medical Sciences, Gonda 271003, Uttar Pradesh, India.

E-mail: jeya.beulah09@gmail.com

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questionnaire given by the interviewer was used to collect information on the knowledge, attitudes, and practices of the Kaiparambu Grama Panchayat about household management. 125 households were surveyed by the interviewer. 62 (49.6%) and 63 (50.4%) males completed the questionnaire. Approximately 101 (80.8%) individuals are unaware of the waste minimization principle. Merely 58 (46.4%) individuals are aware of garbage segregation. Seventy – two percent or about 88 individuals, dispose of their household waste outside. Approximately 103 (82.3%) individuals think that outlawing plastic will help reduce plastic waste.¹

Solid waste generation and poor management represent a global concern. By 2050, trash production is expected to rise by 3.40 billion tons annually. In an academic public health institution in Mexico, this study evaluated the effects of an environmental education intervention (EEI) designed to lessen waste generation and promote pro-environmental behavior. The EEI was put into practice over a 20-month period utilizing a behavior change methodology. Qualitative results indicated a connection between recycling and being a position of authority within the organization. They also showed that a significant portion of the observed impact was attributable to the infrastructure that was in place for waste separation. Through actions focused on institutional policy components, community practice, and physical structure, the EEI enhanced participants' pro-environmental behaviors and perceptions.²

There were one hundred households in the rural area where a cross-sectional survey was conducted. The information was gathered by asking respondents directly about their regular waste disposal practices and using a pre-tested questionnaire. The majority of respondents (72.0%) knew that poor waste disposal has negative effects, whereas 28.0% did not know. 95.0% of people view disposing of rubbish well. In terms of waste disposal practices, the majority of respondents (52.0%) had subpar methods, while 41.0% had satisfactory practices.³

Need for the study

2.6 billion People worldwide do not dispose of their waste in an appropriate manner. Numerous health issues are associated with the 1.1 billion individuals who still dispose of their waste in open areas. Approximately 450 metric tons of solid waste are currently produced in Kathmandu each day, according to the Central Bureau of Statistics.

This study's goal was to evaluate middle-aged adults in Banepa Municipality's knowledge and practices around household waste management. Sixty participants participated in a descriptive cross-sectional study that used a non-probability purposive sample technique. Pre-tested ($r=0.85$) face-to-face interview schedules with semi-structured and structured Nepali version questionnaires were used to gather data. The majority of respondents had solid behaviors but low levels of knowledge, according to the study's findings. According to the study's findings, family members of the community can benefit from a variety of awareness initiatives that aim to avoid various diseases, hence improving household waste management.⁴

In small and large towns alike, the current creation of Indian municipal solid waste ranges from 100 to 500g/person. Just 13–20% of this are made of recyclable materials. Therefore, it is crucial to develop constructive behavioral modifications for home garbage management. Appropriate waste management is essential for both environmental and human safety. We can alter people's health-related behaviors by educating them.

Statement of the problem

Impact of educational intervention on Knowledge regarding household waste management among adults residing in selected urban community.

OBJECTIVES

1. To assess the to assess the pre-test knowledge regarding household waste management among adult in selected urban community.
2. To assess the impact of educational intervention on knowledge regarding household waste management.
3. To associate the knowledge regarding household waste management with socio demographic variables.

Hypothesis

H₁: There is a significant increase in level of knowledge score on household waste management among adults after educational intervention.

H₂: There is a significant association between the pre-test knowledge scores with selected socio demographic variables.

Assumption

- Adults of urban community may have inadequate knowledge about household waste management.
- Educational intervention may improve the knowledge on household waste management.

Delimitations

1. The study is delimited to only the adults of selected urban community area at Deoria.
2. A sample of 50 primary school children selected.
3. The study is delimited to the information obtained through questionnaire developed by the investigator.

Sample selection criteria

Inclusion Criteria

1. Adults who are willing to participate in the study.
2. Adults who are can read/write and understanding Hindi language.

Exclusion Criteria

Adults who cannot follow the instructions.

Adults who are not available during the data collection time.

METHODOLOGY

The research approach used in study was quantitative approach. The investigator adopted a pre-experiment alone group pre-test post-test design. 50 adults were selected from urban community in Deoria district. Samples were selected through non probability convenient sampling technique. Self-administered questionnaire was used to assess the Knowledge. It consists of 30 multiple choices related to household waste management. Validity of the tool was established in consultation with guide and experts from the field of Community Health Nursing. After obtaining consent data was collected, education given and post test conducted. The collected data was organized and tabulated for analysis.

RESULTS

Table 1: Frequency and percentage distribution of knowledge among the children

N=50

Level of knowledge	Pre-test		Post-test	
	frequency	Percentage	frequency	Percentage
Inadequate	34	68	3	6
Moderate	11	22	7	14
Adequate	5	10	40	80

The above table 1 showed the Frequency and percentage distribution of knowledge level among adult and the finding revealed that after teaching 40(80%) of students had adequate knowledge about household management.

Table 2: Impact of educational intervention on knowledge regarding household waste management

N=50

Aspects	Standard Error mean	Mean	SD	df	Students paired t-test
Household waste management basics	.362	2.980	2.559	49	8.233 P<0.05; S
Type of wastes	.291	2.800	2.060	49	9.610 P<0.05; S
Problem related to wastes	.224	1.660	1.586	49	7.402 P<0.05; S
Management of wastes	.545	5.680	3.857	49	10.414 P<0.05; S
Overall	1.256	13.120	8.882	49	10.445 P<0.05; S

The above table reveals that there is significant difference between pre-test and post-test scores as the "t" value is higher than the tabulated value in

the p value at 0.05 level of significance. It shows that there is a significant impact on the administration of educational program.

DISCUSSION

The results of this survey revealed that a maximum of 15 samples (30%) were older than 31 years old; 18 samples (36%), were married; 20 samples (40%) were Hindu, and the majority of them worked for private companies; 41 samples (82%), had individual homes; and so on. Only 5 (10%) of the samples in the pre-test had sufficient knowledge, whereas 40 (80%) of the samples in the post-test had sufficient knowledge following the teaching intervention, demonstrating the effectiveness of the intervention.

The findings also explained that there is significant difference between pre-test and post test scores as the “t” value is higher than the tabulated value in the ‘p’ value at 0.05 level of significance. Hence, there is a significant impact on the administration of teaching intervention. Therefore, H_1 Hypothesis is accepted at 0.05 level of significance.

In Kenya, a similar study was carried out to evaluate the success of a planned awareness program regarding the health risks associated with household garbage. The survey included 100 residents of Mutomo town. To get the data, in-depth interviews were conducted. N Vivo and theme analysis were used to analyze the transcription. Every sample showed a favorable attitude about recycling, reusing, and gathering garbage. The mean post-test knowledge score differed significantly from the mean pre-test knowledge score. The calculated “t” value demonstrated the importance of the intended teaching awareness program’s success in raising awareness.⁵

The chi-square shows that sociodemographic factors like family size and type and knowledge scores are significantly correlated with post-test scores since the chi-square value is greater than the tabulated value at the 0.05 level of significance ($p < 0.05$). Therefore, the H_2 is approved.

CONCLUSION & SUMMARY

The study concluded that adult of selected urban community area needs proper education about household waste management. The main outcome of the study is that after educational intervention knowledge was dramatically increased. Hence proper

education is mandatory for proper disposal of waste.

Recommendations

- ❖ Similar study can be conducted with the more samples to validate and generalize the findings.
- ❖ The study can be conducted as a true experimental design and as comparative study with various IEC materials.
- ❖ A descriptive study can be done to assess the public perception about the household waste management.

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To Study Profile of Hemoglobin and Red Blood Cell Indices during First Week of Life in Normal Term Neonates

Bipin Rathod¹, Neha Muda²

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Abstract

Background: During transition from fetal to neonatal life is related with major changes in hemogram due to homeostatic control. There are very extensive ranges of hemogram levels that seem to be abnormally high or low in healthy term neonate at birth and during first week of life. Those were actually normal for that neonatal period depending upon gestational and post-natal age.

Method: Hemogram was studied in 100 normal term neonates born in our Tertiary centre during June 2023 to Dec 2023.

Results: The ranges of various hemogram indices at birth, 24 hours, 48 hours and 7 days are as follows: Hemoglobin 18.1 ± 2.62 gm%, 17.2 ± 2.62 gm%, 16.6 ± 2.37 gm% and 16.1 ± 2.28 gm% respectively. Hematocrit $52.3 \pm 6.2\%$, $50.1 \pm 6.2\%$, $49.4 \pm 6.3\%$ and $47.3 \pm 6.1\%$ respectively. Mean corpuscular volume (MCV) 100.3 ± 7.20 fl, 98.5 ± 7.2 fl, 98.9 ± 7.3 fl and 99.2 ± 7.3 fl respectively. Mean corpuscular hemoglobin (MCH) 34.1 ± 2.69 pg, 33.4 ± 2.71 pg, 33.6 ± 2.73 pg and 33.8 ± 2.75 pg respectively. MCH concentration (MCHC) 34.8 ± 1.61 g/dl, 33.8 ± 1.57 g/dl, 34.1 ± 1.56 g/dl and 34.6 ± 1.61 g/dl respectively.

Conclusions: Hemoglobin levels naturally decrease in healthy term neonates during early life. Additionally, there is significant variation in red blood cell parameters among healthy term neonates. Notably, normal hemogram values for neonates differ from other age groups and change with postnatal and gestational age. To accurately interpret neonatal hemograms, reference ranges derived from large datasets spanning various gestational and postnatal ages should be consulted, such as those provided here for healthy term neonates.

Keywords: Hemogram; Term neonates; Cord blood; Foetal transition; Hematocrit; MCV; MCH; MCHC; TRBC.

INTRODUCTION

The postnatal changes in tissue oxygenation and erythropoietin production result in a physiologic anemia of infancy with a mean minimal hemoglobin concentration in healthy term infants. Infant growth and development are likely affected by hemoglobin levels, but current evidence is inconclusive regarding optimal target levels of hemoglobin and RBC indices.¹ The importance and difficulty of assessment and management of hemoglobin and RBC indices during the neonatal period can be as great as ever encountered in medicine.² One reason

Author's Affiliation: ¹Associate Professor, Department of Paediatrics, Dr. Panjabrao Deshmukh Memorial Medical College, Amravati 444603, Maharashtra, ²Senior Resident, Department of Pathology, Jawaharlal Nehru Medical College, Wardha 442005, Maharashtra, India.

Corresponding Author: Bipin Rathod, Associate Professor, Department of Paediatrics, Dr. Panjabrao Deshmukh Memorial Medical College, Amravati 444603, Maharashtra, India.

E-mail: bipinrathodamt@gmail.com

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is that the transition from foetal to neonatal life is associated with major changes in RBC mass and transition of fetal hemoglobin to mature hemoglobin A.³ The average Hb at birth is relatively unchanged; however, 48 hours later, after redistribution of plasma volume, Hb values will reflect the lower or higher red cell mass.

The normal reference ranges of hemogram quoted in various textbooks have a very wide range and seem to be abnormal. The normal reference range of these parameters in a term neonate quoted in Rennie textbook of neonatology and Nelson textbook of pediatrics is as follows: hemoglobin: mean-16.8g/dl (14.5-22.5g/dl), Hematocrit: mean-53%, TRBC: mean 5.2×10^{12} /litre.^{3,6} The laboratory value obtained at extreme of these ranges or outside these ranges seems to be abnormal and pathological and may need to be treated accordingly. In neonatal period there are hematological changes in an attempt to maintain homeostasis after transition from foetal to neonatal period. These high hemoglobin levels are common during this period & are a part of that physiological process of transition from foetal to neonatal period.

Study objectives

To approximate normal physiological values of haemoglobin and red blood indices values during first week of life.

To suspect early Haemoglobinopathies and to plan there management.

This study will help to establish trend and changes in values in early neonatal period.

METHODS

This hospital based observational study was conducted at our tertiary institute during January 2023 to June 2023. Total 80 term neonates delivered during the stated study period were randomly selected as per inclusion criteria defined below.

Inclusion criteria

Normal healthy term neonates delivered vaginally or by caesarean section with gestational age ≥ 37 weeks and birth weight > 2500 gm were included in the study.

Exclusion criteria

Gestational age < 37 weeks, birth weight < 2500 gms; neonates with history of birth asphyxia (Apgar score < 5 at 5 min); meconium aspiration syndrome; clinical signs and symptoms of neonatal sepsis or any other neonatal illness; any evidence of any gross congenital or chromosomal malformation; presence of maternal risk factors.

After inclusion of patient in the study a detailed antenatal, natal, postnatal history noted, clinical examination of neonate at birth, 24 hours, 48 hours, 72 hours and 7 days of life. Assessment of gestational age using new Ballard scoring system.⁷ complete hemogram at birth, at 24 hours, 48 hours and 7 days of life using standard method. Complete blood count/hemogram was performed on automated analyser-Sysmex XT-2000i (5 Part analyzer). Collection of cord blood done using the bag method. Venous blood was drawn under strict aseptic precaution from fresh venepuncture site using 24 gauge or 22-gauge needle.

Ethical considerations

Permission of in Written informed consent was obtained from parents/representatives before enrolling to this study.

Statistical analysis

All the data was collected in predesigned format. This data was entered to Microsoft office excels which was used for various calculations. Statistical analyses were performed using the software statistical package for the social sciences (SPSS) version 10.0 for MS-windows. Descriptive frequencies were expressed using mean \pm standard deviation (SD) and median (range).

RESULTS

In this study 55 (55%) cases were male, 45 (45%) cases were female. The 48 (48%) cases were of 37-38 weeks of gestation, 36 (36%) cases were of 39-40 weeks gestation and 16 (16%) were of 41-42 weeks of gestational age (Fig. 1). The mean, median and standard deviation of gestational age of neonates in the study were 39.4

Table 1: Levels of mean, standard deviation and range of hemoglobin

Time of sample	Mean Hb (gm%)	SD (gm%)	Range (gm%)
Cord blood at birth	18.1	2.62	13.6- 24.1
24 hours of life	17.2	2.46	12.3-23.7

Table cont...

48 hours of life	16.6	2.37	12.1-21.9
72 hours of life	16.4	2.31	11.8-21.4
7 days of life	16.1	2.28	11.3-21.1

Table 2: Levels of mean, standard deviation and range of hematocrit

Time of sample	Hematocrit (gm%)	SD (gm%)	Range (gm%)
Cord blood at birth	52.3	6.2	37.7-65.6
24 hours of life	50.1	6.2	36.2-62.3
48 hours of life	49.4	6.3	35.7-61.6
72 hours of life	48.5	6.2	33.5-60.8
7 days of life	47.3	6.1	32.2-60.1

Table 3: Levels of mean, standard deviation and range of MCV

Time of sample	MCV	SD (gm%)	Range (gm%)
Cord blood at birth	100.3	7.2	82.2-126.5
24 hours of life	98.5	7.2	82.5-126.1
48 hours of life	98.9	7.3	82.1-126.3
72 hours of life	99.5	7.2	82.3-126.
7 days of life	99.2	7.3	80.5-126.4

Table 4: Levels of mean, standard deviation and range of MCH

Time of sample	MCH	SD (gm%)	Range (gm%)
Cord blood at birth	34.1	2.69	26.2-40.9
24 hours of life	33.4	2.71	26-39.7
48 hours of life	33.6	2.73	26.1-40.1
7 days of life	33.8	2.75	26.3-41.5

Table 5: Levels of mean, standard deviation and range of MCHC

Time of sample	Mean MCHC (g/dl)	SD (gm%)	Range (gm%)
Cord blood at birth	34.8	1.61	30.1-38.2
24 hours of life	33.8	1.57	28.5-37.7
48 hours of life	34.1	1.56	28.6-38.9
7 days of life	34.6	1.61	29.4-38.5

In this study, highest number of neonates (52%) had birth weight in the range of 2500-2999 grams and the least number of neonates (6%) had a birth weight ≥ 3500 grams. The mean, median and standard deviation of birth weight in this study was 2808 gm, 2780 gm and 306 gm, respectively. The range of birth weight in this study was 2210 to 3900 gm.

DISCUSSION

At birth, term newborns exhibit significantly different hemoglobin values and red blood

cell (RBC) parameters compared to older children and adults. Newborns have relative polycythemia, characterized by macrocytosis (high mean corpuscular volume, MCV) and marked polychromasia with nucleated RBCs. Following birth, dramatic changes in oxygenation occur during the first few days, leading to a rapid decline in erythropoietin levels. Consequently, RBC production decreases by a factor of 2-3 during the first few days and by a factor of approximately 10 during the first week of life. This results in a transient "physiologic" anemia developing at the end of the neonatal period.

At birth, newborns exhibit polycythemia and macrocytosis, followed by a gradual decrease in RBC count, hemoglobin concentration, and MCV during the postnatal period. Although RBC, hemoglobin, and MCV values are higher in newborns, the mean corpuscular hemoglobin concentration (MCHC) is relatively low compared to adult standards.

While the erythrocytes are bigger and contain more hemoglobin relative to their increased size, the hemoglobin within the cells is neither more nor less concentrated than for adults.^{4,5}

In this study the mean \pm SD hemoglobin at birth, at 24 hours, 48 hours and 7 days was 18.1 ± 2.62 gm%, 17.2 ± 2.62 gm%, 16.6 ± 2.37 gm% and 16.1 ± 2.28 gm% respectively. The corresponding figures in other studies were as follows: in study of preterm infants by Thomas *et al.* mean Hb was 17.8 ± 2.7 gm% at 7 days of life.⁷ In study done by Abdurrahman *et al.* mean Hb was 14 gm%.⁸ In study done by Ozyurek *et al.* mean hemoglobin at day 1 and 7 days was 17.0 ± 0.4 gm% and 16.2 ± 0.4 gm% respectively.⁹ The mean Hb values showed a decreasing trend with the postnatal age, it decreased to 1.5 gm% in first 7 days of life in this study as compared to 1 gm% decrement from day 1 Hb to day 7 Hb in study by Ozyurek *et al.*⁹ The range of hemoglobin in our study at birth, at 24 hours, 48 hours and 7 days was 12.2-23.2 gm%, 11.6-22.8 gm%, 11.5-21.3 gm% and 11.3-21.1 gm% respectively. The corresponding figures in other studies were as follows: in study of preterm infants by Thomas *et al.* range of Hb was 11.4-24.8 gm% at 7 days of life.⁷ In study done by Ozyurek *et al.* range of hemoglobin at day 1 and 7 days of life was 13.1-23.0 gm% and 10.3-20.0 gm% respectively.⁹

In this study the mean \pm SD hematocrit at birth, at 24 hours, 48 hours and 7 days was $52.3 \pm 6.2\%$, $50.1 \pm 6.2\%$, $49.4 \pm 6.3\%$ and $47.3 \pm 6.1\%$ respectively. The corresponding figures in other studies were as follows: in study done by Acharya and Payne the mean \pm SD hematocrit at birth, at 24 hours and 48 hours was $54.17 \pm 6.32\%$, $53.09 \pm 7.91\%$ and $49.18 \pm 5.94\%$ respectively.⁵ In study done by Abdurrahman *et al.* mean hematocrit was 42%.⁸ In study done by Ozyurek *et al.* mean hematocrit at 1 day and 7 days was $47.0 \pm 1.0\%$ and $44.6 \pm 1.0\%$ respectively.⁹ The mean hematocrit values showed a decreasing trend with the postnatal age, it decreased to 4.2 % in first 7 days of life in this study as compared to 2.9% decrement from day 1 hematocrit to day 7 hematocrit in study by Ozyurek *et al.*⁹ The range of hematocrit at birth, at 24 hours, 48 hours and 7 days was 36.8-64.3%, 35.2-61.3%, 34.4-60.6% and 32.2-60.1% respectively,

the corresponding figures in other studies were as follows: in study done by Acharya *et al.* the range of hematocrit at birth, at 24 hours and 48 hours was 43-62.0%, 42-64.0% and 36-59.0% respectively.⁵ In study done by Ozyurek *et al.* range of hematocrit at day 1 and 7 days of life was 36.7-62.8% and 28.5-54.7% respectively.

In this study the mean \pm SD MCV at birth, at 24 hours, 48 hours and 7 days was 100.3 ± 7.20 fl, 98.5 ± 7.2 fl, 98.9 ± 7.3 fl and 99.2 ± 7.3 respectively whereas mean MCV in study done by Ozyurek *et al.* at 1 day and 7 days of life was 101.1 ± 0.5 fl and 98.7 ± 0.5 fl respectively. The mean MCV values showed a decreasing trend from cord blood to 7 days of life with slight rise at 48 hours as compared to 24 hours MCV. The range of MCV at birth, at 24 hours, 48 hours and 7 days was 82.2-126.5 fl, 82.5-126.1 fl, 82.1-126.3 fl and 80.5-126.4 fl respectively whereas in study done by Ozyurek *et al.* range of MCV at day 1 and 7 days of life was 94-107 fl and 92.6-105.0 fl respectively.⁹

In this study the mean \pm SD MCH at birth, at 24 hours, 48 hours and 7 days was 34.1 ± 2.69 pg, 33.4 ± 2.71 pg, 33.6 ± 2.73 pg and 33.8 ± 2.75 pg respectively whereas mean MCH in study done by Ozyurek *et al.* at 1 day and 7 days of life was 36.5 ± 0.2 pg and 35.8 ± 0.2 pg respectively.⁹ The mean MCH showed a trend of initial fall at 24 hours to rise again till 7 days of life. The range of MCH at birth, at 24 hours, 48 hours and 7 days was 26.2-40.9 pg, 26-39.7 pg, 26-40.5 pg and 25.4-39.4 pg respectively whereas in study done by Ozyurek *et al.* range of MCH at day 1 and 7 days of life was 33.9-39.2 pg and 32.9-38.4 pg respectively.⁹

In this study the mean \pm SD MCHC at birth, at 24 hours, 48 hours and 7 days was 34.8 ± 1.61 g/dl, 33.8 ± 1.57 g/dl, 34.1 ± 1.56 g/dl and 34.6 ± 1.61 g/dl respectively whereas mean MCHC in study done by Ozyurek *et al.* at 1 day and 7 days of life was 36.2 ± 0.1 g/dl and 36.2 ± 0.1 g/dl respectively.⁹ The mean MCHC showed a trend of initial fall at 24 hours to rise again till 7 days of life but the rise is not more than cord blood value. The range of MCHC at birth, at 24 hours, 48 hours and 7 days was 29.6-38.0 g/dl, 28.5-37.7 g/dl, 28.4-38.6 g/dl and 28.4-38.5 g/dl respectively whereas in study done by Ozyurek *et al.* range of MCHC at day 1 and 7 days of life was 35-37 g/dl and 35-37.4 g/dl respectively.⁹

CONCLUSION

The normal hemoglobin and RBC indices values in healthy term neonates observed in this study showed a very wide range and seem to

be abnormal, but are actually normal for that neonatal period depending upon the postnatal age. Recognizing that any value abnormally high or low can influence many clinical decisions in our day-to-day practice but unfortunately the reference ranges for the various hemoglobin and RBC indices during the neonatal period are not simple, but change considerably with advancing gestational and postnatal age. Any result in neonates must be interpreted according to data for baby's gestational and postnatal age. If this is not done, results may be misinterpreted and diagnosis of many conditions like infection, anemia, polycythemia and others may be missed, over diagnosed or delayed.

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Role of Autologous Platelet Rich Plasma in Management of Pediatric Postburn Web Space Scar Contracture

Anirudh Dwajan¹, Ravi Kumar Chittoria², Amrutha J S³

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Abstract

Burns are one of the most common injuries among the children. Scald injuries tend to be the most common type of burn injury under the age of five, accounting for over 65% of the cases. Despite appropriate initial treatment and compressive therapy, contractures are common after deep burn. The most common and functionally limiting are web space and hand contractures.

Autologous platelet rich plasma (APRP) has gained its importance in medical field since it was found to have wound healing and scar modifying properties.

Hence, use of Autologous Platelet rich plasma (APRP) has been incorporated into the management of this case for a good outcome.

Keywords: Burns; Web Space; Contracture; Autologous Platelet Rich Plasma; Pediatric Burns.

INTRODUCTION

Burns injury is one of the important factors contributing to mortality in a developing country like India. Despite appropriate initial treatment and compressive therapy, contractures are common after deep burn. The most common and functionally limiting are web space and hand contractures.

In recent years skin regenerative techniques such as APRP has been found to give better results in wound management as they reduce inflammation and aid in the healing process.

Platelet rich plasma contains a cocktail of growth factor and cytokines, which are thought to play a role in reducing inflammation and also aid the healing process and scar remodelling.

MATERIALS AND METHODS

This study was conducted in Tertiary Care Centre in Department of Plastic Surgery after getting the department ethical committee approval. Informed consent was obtained. The subject was a 9yr/M with scar contracture of left ring finger and 3rd webspace contracture. Patient came with the complaints of inability to extend his left middle finger for 6 years after suffering scald burns at the age of 2 years following which he developed scar over his left upper limb. He had history of In-hospital admission for the scald burns at 2 years, release of scar contracture at left middle finger with SSG and release of contracture of 2nd, 3rd webspace.

Author's Affiliation: ¹Junior Resident, Department of Orthopaedics Surgery, ²Professor and Registrar (Academic) Head of IT Wing and Telemedicine Department of Plastic Surgery and Telemedicine, ³Senior Resident, Jawaharlal Institute of Postgraduate Medical Education and Research, Puducherry 605006, India.

Corresponding Author: Ravi Kumar Chittoria, Professor and Registrar (Academic) Head of IT Wing and Telemedicine Department of Plastic Surgery and Telemedicine, Jawaharlal Institute of Postgraduate Medical Education and Research, Puducherry 605006, India.

E-mail: drchittoria@yahoo.com

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For the 3rd Webspace contracture, preoperative webspace splinting was done for 2 weeks. The maximum angle of abduction was measured with a goniometer (Fig. 1) and documented. He underwent JESS distractor application (Fig. 2) and APRP injection (Fig. 4) into webspace contracture site. Post-operatively slow distraction was started. When the preoperative angle of maximum abduction was achieved, no further distraction was done. JESS distractor was retained for 3 weeks. After removal, the angle of abduction in 3rd webspace was assessed- the maximum angle was achieved (Fig. 3,5). Patient advised to continue passive and active physiotherapy and splinting.



Fig. 1: Preoperative assessment of reduced webspace angle of 32°



Fig. 2: Application of JESS distractor

RESULTS

Intraoperative and post-operative periods were uneventful for the patient. Deformity due to post burn contractures was found to be decreased

and functional improvement in function of hand was seen. Webspace contracture releases. No complications and side effects were noted during entire procedure.

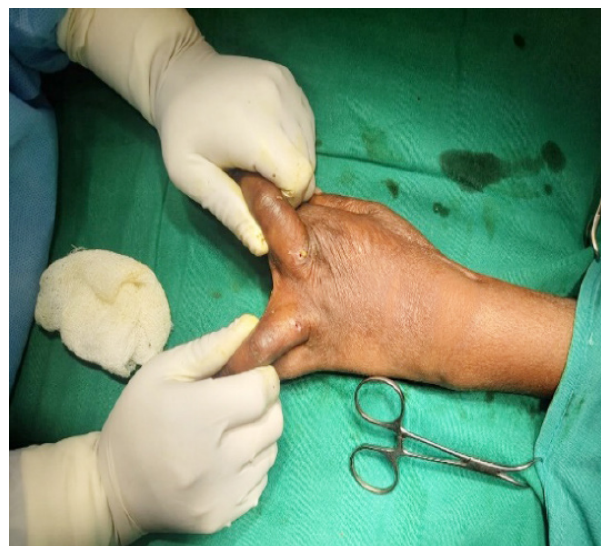


Fig 3: Intraoperative webspace stretching after JESS removal



Fig. 4: APRP injection over webspace contracture

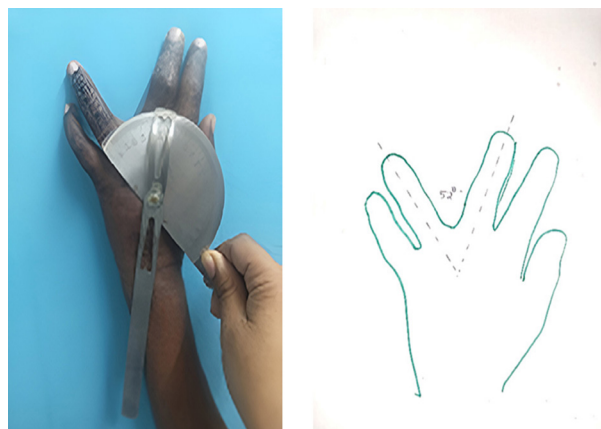


Fig 5: Post JESS removal webspace angle attained is measured using a goniometer

DISCUSSION

The hands account for less than 5 % of total body surface area. Despite this small percentage, many burns requiring hospitalization involve the upper extremity.^{1,2} Hand burns are considered severe injuries by the American Burn Association and should be referred to specialized care centers to minimize sequelae of thermal injury including nail deformities, hypertrophic scars, boutonniere deformity, digit loss, and contractures. The skin on the palmar and dorsal aspects of the hand has distinct properties that make them variably susceptible to contracture formation. Dorsal skin is more thin and pliable and the extensor mechanism lies just deep to a thin layer of subcutaneous tissue. The glabrous skin of the palmar surface contains thicker skin and subcutaneous tissues. Additional fibrous septa, and the palmar fascia, protect the flexor tendons. For these reasons, the dorsal skin and extensor mechanism are more susceptible to contractures than the palmar skin and flexor tendons.³ Postburn contractures which affect the web spaces can lead to substantial functional and aesthetic deformities. Web contractures may involve the dorsal web, palmar web, or interdigital space, so-called burn syndactyly. These contractures affect the normal 45° dorsal slope and palm-to-finger ratio.⁴ Thumb-index web contractures may involve only skin, and in chronic settings may include fibrosis and shortening of the adductor pollicis muscle. In severe and chronic cases, soft tissue contractures may have underlying bony abnormalities; radiographic evaluation facilitates treatment decision making.

Autologous platelet rich plasma used in a chronic wound serves as a source of growth factors and thence has mitogenic, angiogenic and chemotactic properties. Autologous platelet rich plasma has also been shown to stimulate human dermal fibroblast proliferation and thus increasing the deposition of type I collagen, the above mechanism being proposed to its use in scar management. Application of activated Autologous platelet rich plasma also provides 5 to 10 times the normal concentration of growth factors that include PDGF,

VEGF, TGF- β locally also accelerating wound healing and scar remodelling.⁵⁻⁸

CONCLUSION

Post thermal burn scars of hand can be challenging to manage due to scar contracture and loss of functional use of the fingers and hand. We have demonstrated an effective and successful method to manage such a challenging case using APRP injection and JESS distraction.

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Penetrating Injury Over the Back Due to Wooden Stick – Don't Leave the Fragments Behind

Saurav Srivastava¹, Ranjana Rashmi², Digamber Chaubey³

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Abstract

Background: Penetrating injury due to wooden stick is a rare accident in children. Very few such cases have been reported.

Aim: To report a case of 11 years old boy who presented with penetrating injury over back due to a wooden stick.

Result: He received initial treatment with removal of superficial fragments, but deeper pieces were missed causing development of large volume of abscess. This was evaluated and drained after which the child has uneventful recovery.

Conclusion: When promptly investigated and treated, wooden splinter injury have good prognosis.

Keywords: Penetrating injury; Spinal injury; Abscess.

INTRODUCTION

Penetrating injury with sharp objects is a rare accident in which children may get injured. They can be superficial enough to just breach the skin and remain restricted to the muscular plane or can go into the peritoneal or pleural cavity thereby causing injury to the visceral organs. Proper history of the injury, mode of injury, careful inspection of the sharp object, and physical examination of the injured child help to decide about the relevant investigations and further management.

CASE REPORT

An 11-year-old boy sustained an injury to his left para-spinal area as he fell over a wooden bamboo stick while playing. There was abrasion and a clear breach of the skin. He was taken to the nearest Primary Health Centre (PHC) where the stick was taken out, the wound was cleaned and primary stitches were given. As the boy was hemodynamically stable, he was discharged on antibiotics and analgesics. The child developed severe pain at the injury site after two days and spikes of fever the same evening. An Ultrasonography (USG) done the day showed a hematoma at the site of injury and ruled out any visceral organ injury. The child was further treated by physicians for fever with IV antibiotics. On 4th day of injury, there was pus discharge from the stitched site after which a second USG was done suggestive of abscess at the injury site. As the child was not responding to antibiotics, he was referred to our institute where CECT revealed the presence of multiple fragments of foreign body and pus collection. He underwent exploration under GA. Approximately 200 ml of

Author's Affiliation: ^{1,3}Assistant Professor, Department of Pediatric Surgery, All India Institute of Medical Sciences Patna 801507, Bihar, ²Senior Resident, Department of Pediatric Surgery, Indira Gandhi Institute of Medical Sciences, Patna 800014, Bihar, India.

Corresponding Author: Saurav Srivastava, Assistant Professor, Department of Pediatric Surgery, All India Institute of Medical Sciences Patna 801507, Bihar, India.

E-mail: sauravsrii@gmail.com

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pus was drained and multiple pieces of splinters were removed. The abscess collection was in the para-spinal space and was in the muscular plane as

well as deep into it. The drain was removed on the 5th postoperative day and the child was discharged on the 8th postoperative day.

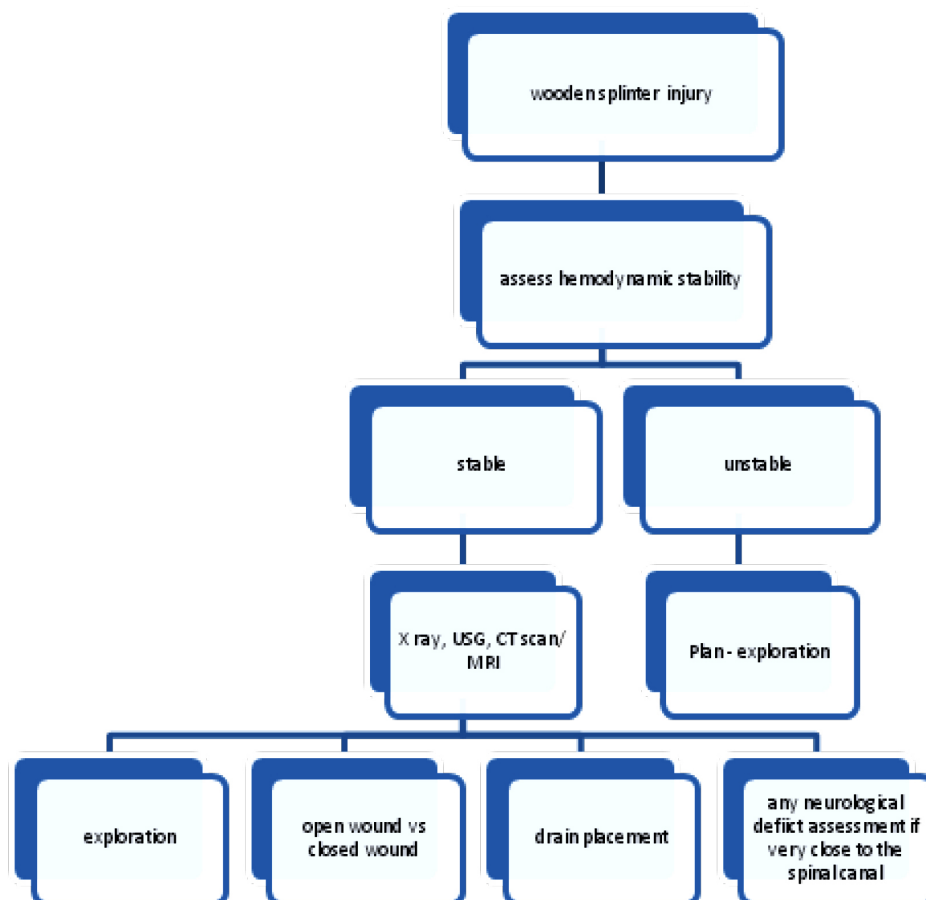


Fig. 1: Algorithm to treat a wooden splinter penetrating injury

DISCUSSION

Wooden Splinter injury is a very uncommon mode of injury in children, more in the rural areas than the urban ones where the children tend to ply with wood sticks. As innocuous as it may seem, if all the pieces of the splinter are not taken out, it serves as a nidus of infection and causes repeated abscess formation and hospitalization. If the wooden pieces are not taken out or countered by the immune system of the body, a localized granuloma to a severe reaction may occur that includes a significant synovitis and osseous lesion.¹ Wooden fragments can even cause penetrating intradural injury which may present with features of central nervous system (CNS) infection.² If a child presents with a wooden stick injury, first the hemodynamic stability of the child should be assessed. Since the wooden splinters are radiolucent, X-ray in the preoperative period or the use of C ARM machine to locate the

fragments intraoperatively is of limited use. In a hemodynamic stable child, USG and X-ray help to rule out any other adjacent visceral injuries. If there is any doubt about the remaining pieces not being visualized, the patient should undergo computed tomography (CT) of the region to localize the fragments. MRI can be very useful in diagnosing the intradural penetration of the wooden splinters into the spinal cord.³

USG-guided marking over the skin, of the foreign body can serve as a useful adjunct during the surgery. Although USG guided removal of the foreign body has been reported but its use is limited in the presence of multiple foreign bodies and the inability to do any lavage or debridement if required.^{4, 5} The wound should be explored under general anesthesia (GA) so that no part is left behind. The decisions regarding the depth of exploration, exploring the spinal canal, any

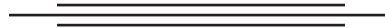
breach of the dura, and its subsequent repair should be taken judiciously as they may have implications on the neurological outcomes. Also, the exploratory wound, in the presence of severely infected, neglected/long standing cases can be left open as the chances of reinfection and abscess formation are high. Perioperative coverage of IV antibiotics and analgesics should be given. With proper management, the recovery in these cases is good with minimal morbidity and post-operative complications. Based on the above observations, following algorithm can be followed.

CONCLUSION

The wooden splinter injury is often overlooked and underreported as it's not considered a sharp penetrating injury. But when hit with sufficient force/velocity, it can cause an injury as severe as it's metallic counterparts. The patients when treated with prompt investigations and treatment have good outcome.

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