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Change in Status of Referred Children to the Pediatric Emergency of a Tertiary Care Teaching Hospital after Introduction of an Educational Module – A Quality Improvement Initiative

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ABSTRACT: Background: The provision of proper and timely care of sick children is vital for better outcome of children. Referral from one health facility to higher facility is quite common but there is a lack of organized transport system. We studied the quality of referral slips and its effect on outcome of children before and after introduction of educational module.

Methods: Our study has three phases- Pre-intervention, Intervention and Post intervention phases. We evaluated the referral slips objectively and classified it into Very Good (>7), good (5-7) and bad < 5 based on scoring system. The quality of referral slips was compared in both pre- and post-intervention phase.

Results: We received majority (90%) of referrals from government hospitals mainly from rural areas (75%). Major mode of transport (90 %) is government run ambulance accompanied by emergency medical technician. The commonest reason for referral was need for critical care (52%). The quality of referral slips significantly improved in post- intervention phase which resulted in better outcome of children.

Conclusion: The education of health personnel had significantly improved the quality of referral slips.The number of patients presenting in decompensated state at casualty decreased significantly after introduction of educational module. This suggests sensitization of health personnel towards better care.Multifaceted approach will be required for sustainedbenefits.

I. INTRODUCTION

In recent years, referral of pediatric patient to a tertiary care center has gained momentum,partly due to better availability of transport system and partly due to willingness to get treatment for even sicker children. Early initiation of treatment for pediatric patients has important role to play in the outcome. At the same time, the monitoring of patients during transport is also crucial.Referral is a process which starts at referring center and end at the referred center. Hemodynamic monitoring, euglycemia and euthermia during transport has good survival outcome [1-4] India lacks an organized system of transport for children. A study done at Chandigarh, India revealed that lack of prereferral communication, lack of hemodynamic monitoring during transport, poor transport facilities and poor quality of referral slips contributes to the poor outcome of pediatric patients.[5] Other studies also supports this bitter fact that poor care during transport andlack of pre- referral communication has bad prognostic outcome.[6,7]

Our hospital is a medical college hospital which receives patients from adjoining districts of Bihar and Uttar Pradesh. We receive patients in our casualty both from government and private hospital. The condition of patients at arrival in casualty is quite critical as these patents are referred in poor transport condition without vitals monitoring during transport and without any pre-referral communication owing to lack of proper referral and transport in the state. We studied the quality of referral slips and their association with outcome of patients before and after introduction of interventional education module.

II. MATERIALSANDMETHODS

This prospective study was conducted at Nalanda Medical college and hospital, Bihar, India. Our study was conducted in three phases – Phase I- Pre- intervention, Phase II- Intervention, Phase III – Post- Intervention. We enrolled all children aged 1 month to 12 years referred to our casualty. At

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arrival in our casualty, triaging is done based on hemodynamic and respiratory parameters.[8] Based on triage classification, treatment was initiated as per our hospital policy. Sick children were initiated on treatment immediately while relatively stable babies were told to wait. Maximum waiting time in our hospital is 1 hour. Pre-intervention phase lasted for 3 months from January 2014 to March 2014. During this period, we enrolled 206 children referred from different hospitals. The referral slips were analyzed for completeness and quality based on quality checklist Performa recommended by World Health Organization (WHO) .[9] Each referral slip was given an objective score ranging from 1 to10. Referred slip was classified as 'very good' if score is > 7, good if score is 5-7 and bad if score is < 5. In intervention phase, we visited the adjoining hospitals. Visit was scheduled at least one week prior to ensure maximum participation from health care workers. We prepared an ideal referral Performa based on WHO guideline and during the visit, we taught how to write a referral slip and the importance of good referral slips. In each hospital, teaching session was conducted for 3 hours. During our teaching session, we emphasized on 'how to identify a sick child', importance of timely referral and need for a good referral slip. Over a period of 2 months (from April 2014 to May 2014), we completed our intervention phase. Printed model referral slips emphasizing the important aspect were also given to them. In the post intervention phase, which lasted for 3 months from June 2014 to August 2014, we enrolled 245 children. The referral slips were analyzed based on the same objective criteria as in Pre-intervention phase. The pre- and post-intervention phase were compared. Chi square test or student t test was used as applicable.

Outcome parameters

1. Primary outcome - Change in proportion of 'very good', good and bad referral slips before and introduction of educational interventional module.

Secondary outcomes

1. Reason for referral
2. Patients transported by trained staff
3. Triage physiological status

III. RERULTS

During our study period, we enrolled 451 children. The demographic and referral details are given in Table 1. The median age and proportion of male children were similar in both phases of study. About 3/4th of all referrals was from rural background. Most of the referrals(90%) came from government hospitals. Main mode of transport was government run 102/108 ambulance in both phases [preintervention phase – 185 (90%)and post-intervention phase 219 (89%)] followed by private ambulance [preintervention phase – 21 (10%) and postintervention phase 27(11%)]. Most of the government ambulance was accompanied by emergency medical technician (EMT). Half of the patients were referred for 'critical care'. Other indication of referral was diagnostic work up, financial constraintsand parental request. Referral details are described in table 1.

Table1: Demographic and referral details

	Preintervention N = 206	Post intervention N = 245
Age Median (IQR) in months	3.6 (1.9–7)	3.8 (2.3–7)
Boys N (%)	124(60)	147(60)
Residence(Indian census 2011[10]) Rural N (%) Urban N (%)	 155 (75) 51 (25)	 187 (76) 59(24)
Type of referring facility Government hospital Private hospital	 185 (90%) 21(10)	 219(89%) 26(11%)
Mode of transport Governmentambulance Privateambulance Others	 185 (90%) 15(08) 06(02)	 219(89%) 12(06%) 14(5)

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Reasons for referral		123(50)
Need for Critical care	108(52)	27(11)
Diagnostic work up	21(10)	79(32)
Financial constraints	62(30)	16(07)
Parents request	15(08)	

The quality of referral slips by majority(n= 196, 95%) in Phase I(pre-intervention phase) wasbad as per our classification which is based on WHO. Only 1%(n=2) was graded very good and 4%(n=8) was graded as good in Phase 1 of the study. Most referral slips had suboptimal information regarding pre-referral stabilization, investigation and treatment. In this era of telecommunication, prereferral communication was not seen in any of the cases.

In phase III(post-intervention phase), The quality of referral letters significantly improved. In phase 1, only 5% of referral slips was of acceptable quality (very good and good) whereas in post intervention phase,this figure went to 33% (n= 81). In post- intervention phase, documentation regarding stabilization, treatment, reason for referral and clinical details were still inadequate but substantially improved.Although counselling of parents/ guardian before referral had improved, but pre-referral communication did not improve in post- intervention phase. The comparison of data on quality of referral slips in phase 1 and phase II is depicted in table 2.

Table 2: Comparison of referral slips

Component of referral	Pre-Intervention n (%)	Post-intervention n (%)
Documentation of Diagnosis	2(1)	52(21)
Documentation of investigation	4(2)	68(28)
Documentationofstabilization/treatment	11(5)	74(30)
Pre-referral communication	0	0
Vitals monitoring during transport	21(10)	98(40)
Score of referral slips		
Very good(>7)	2(1)	61(25)
Good (5-7)	8(4)	20(8)
Bad (<5)	196 (95)	165(67)

The condition of children at arrival in emergency did not improve in post-intervention phase. The ratio of children presenting in decompensated state like decompensated shock, cardiac failure and respiratory failure decreased significantly [pre-intervention phase – (n=160,78%), post-intervention phase- (n=55, 22%)]. But children brought with cardiopulmonary arrest was similar in both phases [pre-intervention phase – (n=8, 4%), post-intervention phase- (n=10, 4 %)]. There is significant drop in children reaching to casualty in decompensated state in phase III however, mortality did not differ in two phases of the study.

IV. DISCUSSION

This prospective study was conducted to assess the quality of referral slips of children who presented to our casualty and subsequently to develop an educational module for health care workers (HCW) who are involved in referral and transport system. We also assessed the effect of introduction of educational module on quality of referral slips and mortality and morbidity of children.

We received majority of patients (90%) from government hospitals who required admission in our hospital. One study conducted at teaching hospital had different finding. They found only 23 % admission rate.[7] The cause of higher admission rate in our study is multifactorial. In our state, peripheral hospitals like district hospitals and community health centers are not equipped to handle sick children. Other factors are lack of transport facilities, poor socioeconomic status,and low educational status in the region.

Referral is a continuous process in which care of the children during transport is crucial as it is a major determinant of outcome. This requires a coordinated referral and transport system and well-equipped ambulance with trained personnel en route to monitor the children. One study from Delhi found several medico-legal issues and barriers for

care during referral.[11]

The proper transfer of information from referring to referred facility is vital for care of sick children. We found that almost all referral slips were incomplete and lack the vital information needed for care of patients.[7] The referral slips in the pre- intervention phase did not mention treatment,stabilization, investigation in the majority. This is in accordance with the other studies who found 1/3rdof referrals from general practitionerlacks this vital information.[12-15] The reason for referral is mentioned in our study in both phases which is consistent with other study.[16] We found that majority of referral letter were unstructured and handwritten. Lack of structured Performa could have been one of the reasons for the poor quality of referral slips similar to that reported by Mains et al.[17-18] Structured Performa is warranted as it ensures complete documentation of information and avoids person to person variation. It forces the clinician to fill all columns and tick check boxes. Various methods have been tried worldwide to improve the quality of referral slips. In the index study, we introduced an educational module which has significant impact on quality of referral slips. The number of children presenting in decompensated state drastically reduced in post-intervention phase.

V. CONCLUSION

The education of health care workers has improved the quality of referral slips which has significant impact on the outcome of children. The morbidity of children decreased in the post-intervention phase. The change is a marker of sensitization of health personnel towards a better referral. For sustained benefits, multifaceted approach is required. This will pave the path for organized referral and transport in the region.

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