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PEDIATRIC RAPID RESPONSE SYSTEMS: A SYSTEMATIC REVIEW AND META-ANALYSIS. THE IMPACT OF PEDIATRIC RAPID RESPONSE TEAMS ON HOSPITAL MORTALITY AND CARDIOPULMONARY ARREST

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Abstract:
Introduction: *Healthcare provision up to the recommended standards still remains difficult to achieve due to inequitable resource distribution, with rapid response systems significantly impacting on mortality reduction. Employed for continuous surveillance of risk factors, monitoring patient progression and prompt response to medical emergencies, for instance need for resuscitation, rapid response teams entail all the mechanisms put up to supplement the routine patient care in bid for a better health outcome, especially in critical and deteriorating patients.*
Study Design: *Descriptive Cross-Sectional Study.*
Place and Duration of Study: *Lahore General Hospital. One year.*
Objective: *We aimed to assess the current state of rapid response protocols and guidelines in Lahore General Hospital.*
Methods: *Questionnaires were used to collect data. The questionnaires were checked for completeness and sample size satisfaction, followed by entry and analysis of the responses using the SPSS version 10.*
Conclusion: *Rapid response teams compose one of the vital teams that define life changing experiences, more so to the in-patient cases and emergency occasions.*

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INTRODUCTION:

Rapid response systems entail the inter-professional healthcare provider teams that are obligated with comprehensive patient care, especially during worsening health state. Health care providers and hospitals employ rapid response teams to promptly address patients with needs that may otherwise receive delayed attention, impacting on the hospital mortality. These rapid response teams compose the key components of most hospital's rapid response systems that were proposed and implemented after many studies identified "failure to rescue" as a key component of the overall health outcome of the involved entities Kemper (2012). Patient management from admission to the last step in signing out on the discharge ought to be handled with the utmost professionalism, with priority to the in-patient quality of care provided. With most admitted patients anticipated to respond to management in a wide range of ways, continuous monitoring and appropriate modifications of the management guidelines ought to be affected to allow for the best outcome Roberts (2014). Progression to worse states of health is possible; however, in the in-patient setting with the pediatric population, particularly susceptible and thus need for more intense monitoring. Rapid response teams in the management of pediatric cases often implement the basic steps towards achieving optimum results in the management that includes prior identification of patients at risk, early notification and assignment of the (rapid) responders, rapid intervention to cases as necessary, and audit of the system's performance.

Study Design.

This was a cross-sectional analytical study that span over one year. The study used a semi-structured questionnaire and key informant interviews to obtain quantitative and qualitative data.

Section II. Materials and Methods.

Introduction.

This chapter contains details on the methods of sampling, data collections, and presentations that were used to achieve the study objectives.

Literature Review.

Pediatric care requires round the hour availability of the staff to monitor and document the progression of such fatal conditions as prematurity, neonatal sepsis, low birth weights, bleeding diathesis, asphyxia, and congenital anomalies. Hospital administrators are, however, faced with challenges of precise appropriation of resources to achieve the best possible patient outcome, including cost efficiency to the patients, the waiting and service time as dictated by the adequacy of human and technical resources for smooth pediatric care service delivery Bonafide (2012). With varying demographic trends, there are increased acuity levels of patients with awareness and information availability prompting for even further advancement in pediatric care to minimize failure to rescue. Rapid admission rates and discharge cycles coupled with financial constraints that reduce healthcare accessibility as well as limitation in the provision of quality care. There has been a significant reduction of mortality rates as well as incidences of cardiopulmonary arrests due to the adoption of rapid response systems and individual team efficiency Massey (2009). These findings can be attributable to the increased monitoring and surveillance of the predisposing factors and identification of cases that need immediate intervention.

The composition of rapid response teams is often inter-professional with a physician and a nurse having the main responsibility assisted by such assistants as respiratory therapists, anesthesiologists, pharmacists and auxiliary interventions like surgical professionals and mental experts. Most of the conditions affecting the pediatric age group are preventable and thus, their progression to detrimental states and even fatalities should be minimized through such interventions as rapid response teams Van Voorhis(2009). These teams ensure prompt management of serious cases, especially cardiac arrest resuscitation, which commands a mastery of procedural and precise resuscitation interventions. The operational organization of basic rapid teams provides for the essential medical supplies and logistical convenience for emergencies of such conditions as cardiopulmonary arrest, positively impacting the rescue attempts in such situations, more especially in pediatric emergencies and thereby reducing the overall hospital mortality. Diagnostic resources also play role in precise identification of the underlying conditions and this impacts the level of success by such teams, coupled by other factors like characteristic patient presentation or ease with which to identify risk signs.

With most countries no being able to achieve the WHOs target of at most 12 infant deaths out of 1000 live births, with the blunt of the burden falling to the low socio-economic countries, there is need for informed policies on measures to reduce in-patient pediatric deaths. Prevention of infant mortality is of great significance in the realization of the Sustainable Development Goal three Sansquist (2018). Education and adoption on the updated guidelines on pediatric care, with respect to the involved health policies and available protocols has to be equitably accessed for any positive impact on child health, with emphasis on

the underdeveloped and developing countries Lyons(2019). Resource scarcity with unstable healthcare systems impacts the general population health indices, with pediatric care hugely impacted in the current health policies. Infant mortality rations remain uncontrolled and high when compared to the WHO's proposed 12/1000 deaths/ livebirths Difonzo (2016), thus presenting need to assess and appropriately modify the rapid response teams in pediatric care in bid to control and lower mortality.

Place and Duration of Study.
Lahore General Hospital provided a centralized location to access the target population. The main objective was to assess the quality of service delivered in the pediatric ward for one year through probing both the system, mainly through applying for information abstraction from the files and key informant interviews of the pediatric ward nurses, attending doctors and caretakers, and the patient factors contributing to the care rendered, for instance, cost efficiency, facility accessibility and attitude on the outcome

Objectives.
Broad Objective.
To assess the current state of rapid response protocols and guidelines in Lahore General Hospital.
Specific Objectives.
- To establish the most prevalent conditions necessitating pediatric admission.
- To determine the prevalence of cardiorespiratory arrests in the study hospital Pediatric Ward over one year.
- To establish the current operational status of rapidly respond teams in study hospital pediatric ward.
- To determine the sociodemographic factors affecting the quality of care rendered to pediatric patients in study hospital pediatric ward.
- To define the challenges towards optimal rapid response in the pediatric ward of Lahore General Hospital.

Study variables.
Dependent Variable.
Pediatric care and hospital mortality as associated with rapid response teams.
Independent Variables.
- Socio-demographic factors: 1. Maternal age 2. Marital status 3. Level of education. 4. Anticipated pediatric care standards. 5. Employment and source of income.
- Facility Factors: human and mechanical (diagnostic) resource availability, physical accessibility, waiting hours, and healthcare providers' professionalism.
- Rapid Response Team state.

Study of Population.
Study population entailed pediatric patients admitted to Lahore General Hospital over one year for the study. A retrospective analysis of reports on Rapid Response Teams and articles on pediatric most prevalent emergency cases like cardiorespiratory arrest provided secondary data on the existing health and response trends. Studies included in this meta-analysis had to satisfy the three inclusion criteria: (1). Provide a cross-sectional view of at least a year facility based study findings on Mother and Child Health. (2). Provide precise recommendations on the main challenges on which the current and future studies will be based on querying pediatric care.

Sampling technique
This study's technique for sampling was systematic random whereby the first respondent was selected randomly and the subsequent determined by the interval bed-tags in the pediatric ward. The information was supplemented by the study's requirement for a detailed retrospective assessment of studies of rapid response in pediatric emergency and general impact on hospital mortality.

Operational Definition: Data collection techniques.
Questionnaires.
Questionnaires were the principal means of data collection from the respondents. The mothers and guardians taking care of pediatric patients were the primary respondents. Confidentiality was assured for through the strict use of non-identifiers in form of serial numbering. Clarification of the language and questions asked was possible through the researcher-administered setting.

Data analysis
The information collected was then analyzed first by ensuring the completeness before the entry and analysis of the variables using the SPSS analytic software. Cross tabulation and assessment for association was done through the generation of descriptive information in form of graphs and basic distribution indices. Hypothesis was tested using a Chi-square to test for the association of the main variables in query.

Logistic and ethical consideration.
This study's ethical approval application to conduct the study was sought from the Public Health Ethical and Responsible Human Research Review Committee. Lahore General Hospital provided logistical convenience through the provision of retrospective studies and reports on the hospital's Rapid Response Teams and Pediatric vital health indices, more especially on cardio-respiratory emergency. Probing service delivery and observing the current state of the Rapid Response Teams

provides validity to the conclusion towards the impact on mortality.

RESULTS:

The following chapter presents the results of the laid out study on the state of the Rapid Response Teams in pediatric emergency and its role in reducing mortality from cardio-respiratory emergencies. The study queried the socio-demographic factors, facility factors and the state of the Rapid Response teams and their interplay in impacting the general hospital mortality. The results are organized based on the objectives of the study: sociodemographic factors, facility factors and state of the Rapid Response Teams. The study determined a sample population of a hundred and forty five in accordance to Fischer et al. formula

Background characteristics of respondents (mothers)

	Frequency	Percentage
Age		
15-24 years	49	33.8
25-34 years	72	49.7
35 years and above	24	16.6
Total	145	100.0
Marital status		
Single/separated/divorced	27	18.6
Married	118	81.4
Total	145	100.0
Level of education		
primary school	40	27.6
secondary school	76	52.4
university/college	29	20.0
Total	145	100.0
Occupation		
unemployed	53	36.6
employed	92	63.4
Total	145	100.0

Facility Factors.

Accessibility of the facility to more than sixty percent of the population sampled was adversely characterized due to troubled accessibility citing long-distance travel and cost-efficiency. The quality of service delivered was not satisfactory to up to 38% of the respondents, citing long waiting hours and professional discontent.

State of Rapid Response Teams.

The pediatric ward in this facility had teams on duty tending to any resuscitation and routine surveillance of the patients of signs classified for immediate assessment, for instance, persistently elevated blood pressure or edema. Lead by a physician who is usually the doctor on call with two nurses and a clinical officer comprise the model used with teams rotating during clearly outlined schedules. This particularly has shown to reduce mortality from failed resuscitation efforts. The quality of care attributable to the rapid response model by the respondents was good at 68%, while the selected retrospective reports revealed up to 86% consistency with reduced mortality due to the rapid response.

CONCLUSION:

Rapid response teams compose one of the vital teams that define life-changing experiences, more so to the in-patient cases and emergency occasions. The facility studied is shown to be providing satisfactory services in pediatric emergencies and the idea of a rapid response team, with a 72% approval. Cardio-respiratory conditions still pose a great risk in pediatric population and the mortality rates from such arrests and associated complications can be addressed through the availability of rapid response teams that tend to not only the emergencies and routine resuscitation, but also ensure early identification of risky cases, examine for possible complications and eventually impact on the pediatric mortality from such cases as cardiac arrest or respiratory failure.

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