"EVALUATION OF THE EFFECTIVENESS OF PEDIATRIC EARLY WARNING SCORE IN RESOURCE LIMITED SETTINGS (PEWS-RL) – A PROSPECTIVE STUDY"

By

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DISSERTATION SUBMITTED TO

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH, TAMAKA, KOLAR, KARNATAKA,

In partial fulfillment of the requirement for the degree of

DOCTOR OF MEDICINE

IN

PEDIATRICS

Under The Guidance Of

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June 2023

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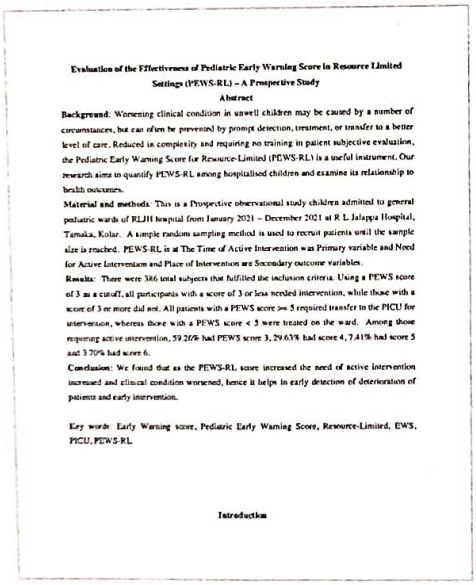

Evaluation of the Effectiveness of Pediatric Early Warning Score in Resource Limited Settings (PEWS-RL) – A Prospective Study

Abstract

Background: Worsening clinical condition in unwell children may be caused by a number of circumstances, but can often be prevented by prompt detection, treatment, or transfer to a better level of care. Reduced in complexity and requiring no training in patient subjective evaluation, the Pediatric Early Warning Score for Resource-Limited (PEWS-RL) is a useful instrument. Our research aims to quantify PEWS-RL among hospitalised children and examine its relationship to health outcomes.

Material and methods: This is a Prospective observational study children admitted to general pediatric wards of RLJH hospital from January 2021 – December 2021 at R L Jalappa Hospital, Tamaka, Kolar. A simple random sampling method is used to recruit patients until the sample size is reached. PEWS-RL is at The Time of Active Intervention was Primary variable and Need for Active Intervention and Place of Intervention are Secondary outcome variables.

Results: There were 386 total subjects that fulfilled the inclusion criteria. Using a PEWS score of 3 as a cutoff, all participants with a score of 3 or less needed intervention, while those with a score of 3 or more did not. All patients with a PEWS score >= 5 required transfer to the PICU for intervention, whereas those with a PEWS score < 5 were treated on the ward. Among those requiring active intervention, 59.26% had PEWS score 3, 29.63% had score 4, 7.41% had score 5 and 3.70% had score 6.

Conclusion: We found that as the PEWS-RL score increased the need of active intervention increased and clinical condition worsened, hence it helps in early detection of deterioration of patients and early intervention.

Key words: Early Warning score, Pediatric Early Warning Score, Resource-Limited, EWS, PICU, PEWS-RL

Introduction

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Date: **Dr. Bindu T**

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ABBREVATIONS

Glossary	Abbreviations
PEWS-RL	Pediatric Early Warning Score for Resource-Limited
U5MR	Under 5 Mortality Rate
NFHS-5	Fifth National Family Health Survey
EWS	Early Warning Scores
AVPU	Alert, Voice, Pain, Unresponsive
PEWS	Pediatric Early Warning Scores
MEWS	Modified Early Warning Score
RL	Resource Limited setting
PICU	Pediatric Intensive Care Unit
HR	Heart Rate
ICU	Intensive Care Unit
RR	Respiratory Rate
SpO2	Oxygen Saturation
supp. O2	Supplemental Oxygen
RRT	Rapid Response Team
SBP	Systolic blood pressure
ViEWS	VitalPAC Early Warning Score
NEWS	National Early Warning Score
NEWS2	National Early Warning Score-2
MET	Medical Emergency Team
HEWS	Hamilton Early Warning score
CRT	Capillary refill time
TREWS	Triage in Early Warning Score
RR	Respiratory rate

WOB	Work of breathing
TCH PAWS	Texas Children's Hospital Pediatric Advanced Warning Score
AUROC	Area Under the Receiver Operating Characteristic curve
CPR	Cardio Pulmonary Resuscitation
ED	Emergency Department
CHEWS	Children's Hospital Early Warning Score
BPEWS	Brighton Pediatric Early Warning Score
QUADAS	Quality Assessment of Diagnostic Accuracy Studies
B-PEWS	Brighton Pediatric Early Warning Score
RLS	Resource limited setting
ITAT	Inpatient Triage, Assessment, and Treatment
BP	Blood pressure
MPEWS	Modified Pediatric Advanced Warning Score
ROC	Receiver Operating Characteristic
DAMA	Discharge against medical advice
GCS	Glasgow coma scale
PG	Postgraduate
SD	Standard Deviation
IVF	Intravenous fluids
HHHFNC	Heated humidified high-flow nasal cannula

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ABSTRACT

Background: Worsening clinical condition in unwell children may be caused by a number of circumstances, but can often be prevented by prompt detection, treatment, or transfer to a better level of care. Reduced in complexity and requiring no training in patient subjective evaluation, the Pediatric Early Warning Score for Resource-Limited (PEWS-RL) is a useful instrument. Our research aims to quantify PEWS-RL among hospitalized children and examine its relationship to health outcomes.

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Conclusion: We found that as the PEWS-RL score increased, the need of active intervention increased and clinical condition worsened, hence it helps in early detection of deterioration of patients and early intervention.

Key words: Early Warning score, Pediatric Early Warning Score, Resource-Limited, EWS, PICU, PEWS-RL

INTRODUCTION

INTRODUCTION

Patients experiencing clinical deterioration should feel comfortable seeking immediate care in a hospital environment; yet, data has shown that these individuals are sometimes not identified and treated in a timely manner. Hospitalized children's clinical deterioration is difficult to detect and respond to, which is a serious safety risk in healthcare.[1] Possible reasons for the delay in diagnosis after hospitalization include complicated issues ailing the children brought to the wards, the problems faced by doctors in detecting the severity of illness, and the paucity of skilled professionals working in the emergency wards.[2]

Failure to recognize the deteriorating clinical indications in children and act swiftly was mostly blamed for hospitalized mortality. As a means of providing an earlier diagnosis of clinical deterioration and better care and appropriate intervention that would improve the outcome, early warning scores are being used in adult population. In light of this, there have been several discussions regarding the need to create instruments that can predict clinical deterioration in hospitalized children at an early stage have expanded since 2005.[3]

By the year 2020, more than five million youngsters have perished before reaching their fifth birthday, according to a new research by the "United Nations Inter-Agency Group" for "Child Mortality Estimation". Another 2.2 million children and young adults will have died between the ages of 15 and 24.[4] Although the worldwide "under-5 mortality rate" (U5MR) decreased to 37 for every 1,000 births in 2020, the risk of death for children in sub-Sahara remained 14 times greater than in Europe and North America.[5] From 93 fatalities per 1,000 new births in 1990, the worldwide U5MR has decreased to 37 in 2020, a 61% decrease. Despite these significant gains, ensuring the survival of children

is still a pressing issue. About 13,800 children under the age of five died per day in 2020; this is an intolerably high and mainly avoidable death toll.[6] For every 1,000 babies born in the United States between 2019 and 2021, 35 did not make it to their first birthday. Reports of newborn and neonatal deaths from the fifth National Family Health Survey (NFHS-5) indicated a U5MR of 42 per 1,000 children.[7]

“Early warning scores” (EWS) are defined as "track and trigger" tools that can be used at the bedside to alert staff to children whose clinical conditions are deteriorating through the regular monitoring of physiological data which is converted into a numerical score, and the establishment of clear criteria for the escalation of urgent assistance and the establishment of a means of communicating this to the appropriate parties.[8] A basic scoring system, EWS utilizes clinical indicators to identify hospitalized patients who may worsen. The “Alert, Voice, Pain, Unresponsive” (AVPU) scale is one of the most widely used clinical characteristics upon which these early warning score systems are built.[9] Vital signs are often regarded as a crucial component of a comprehensive clinical evaluation. They are objective, can be retrieved quickly, and do not need the use of verbal communication, making them ideal for use by medical professionals. Multiple physiological parameters used together show promise as a diagnostic tool for diagnosing severe disease in children. Scoring methods based on physiological indicators called "Pediatric Early Warning Scores" (PEWS) have been developed to detect clinical deterioration in hospitalized children by continuous evaluation and pattern recognition.[10]

Multiple grading methods have emerged in recent years to help find elderly people who may be in decline. The “Modified Early Warning Score” (MEWS), created by Morgan et al., is the most widely used scoring system for adults.[11] However, there is a lack of information on how to implement pediatric early warning score systems. Therefore, a trustworthy scoring system is crucial

among this group of people. In 2005, Monaghan was the first to write up PEWS's impact.[3] In order to prevent unfavourable outcomes and early mortality in hospitalized children, a pediatric "Early Warning System" is being proposed as a patient safety initiative.[12] The implementation of PEWS is on the rise in Western healthcare systems. Evidence shows that PEWS is useful for spotting children who could be in danger (80%) early on, allowing for more timely intervention. [13]

A broad range of PEWS has been suggested by various hospital-based organizations across the globe.[14-16] Primary components include a scoring instrument that generates a PEWS score at regular intervals throughout hospitalization and a response algorithm that uses that score to initiate treatments and/or evaluate providers. “Vital signs, neurologic state, effort of breathing, and perfusion” are some examples of the kind of clinical data frequently used into PEWS rating methods. There is a wide variety of devices available today, and their ability to detect deterioration varies widely.[17]

In his brief 2005 research, Monaghan introduced a three-item measure for detecting pediatric clinical decline, which was the first report of its kind to be published.[3] After being revised by Akre et al., in 2010, this scoring system became known as the Brighton PEWS.[18] A number of studies, both retrospective and prospective, have shown PEWS effectiveness in well-researched contexts.[14,19]

The phrase "resource limited setting" (RL) is used to characterize a broad range of clinical settings, most often those in “poor and middle-income nations”, places where resources are few and workers are few. Identifying at-risk kids before they deteriorate too much is crucial and even more challenging in hospitals operating in humanitarian and RL settings because to unique difficulties. With PEWS in place, medical professionals may be able to pick up

on minute shift in a patient's health before they worsen to the point where they need more severe treatment or transfer to a different hospital. [20]

In RL settings, “some nurses and clinical assistants” may have merely a high school diploma or an associate's degree in nursing, which makes it challenging to administer and calculate these ratings reliably.[21] The majority of these scores also have a substantial quantity of constituents [3,15,22] and are labour intensive, especially in hospitals with high patient loads and inadequate nurse staffing levels.

Need for the study

Children with illnesses of varied severity seek medical attention. Triaging the children is crucial in order to divide them into healthy and sick groups. Early diagnosis of a sick child leads to a positive outcome with lower morbidity and mortality rates. A suitable grading system is necessary in order to give an integral and holistic care.

PEWS are a "track-and-trigger system" that can spot a patient's status deteriorating before the occurrence of any disastrous event. Early warning systems (EWS) may be employed in these settings to recognize children who are at risk of worsening condition and facilitate intervention at an earlier stage. However, these PEWS have only received a scant amount of research in low-resource settings, where nurses and other caregivers frequently have differing staffing ratios and levels of training. Modifiable features include clinical processes like efficient triage and communication with minimal demands on financial resources in healthcare facilities. Whether these data can be gathered consistently and reliably, and whether or not they will add weight to a scoring system, are open questions.

In high-resource settings, PEWS has been prospectively or retrospectively verified in numerous studies. There is comparatively little research in resource limited settings. R L Jalappa Hospital is a tertiary care center, catering to the population in and around Kolar. Most sick children are treated in regular pediatric wards, whereas the PICU is reserved for the few sickest who need the highest level of care. There is an urgent need to establish a PEWS-RL system which can be used by both doctors and nurses to observe the children in wards for early identification of worsening cases and provide prompt treatment. The goal of the present research is to reduce pediatric morbidity and mortality by early detection and care using PEWS-RL charts included in case sheets and documented observations made by nurses and physicians.

AIMS AND OBJECTIVES OF STUDY

AIMS AND OBJECTIVES OF STUDY:

1. To determine Early warning score of Pediatric inpatients

2. To correlate with patient outcomes

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Early warning score (EWS) systems

A significant root cause of serious safety incidents is the failure to identify deteriorating patients in time. This can result in avoidable negative consequences, such as medical emergencies, morbidity, and fatality.[23,24] As a result of these findings, there has been significant enthusiasm for research on methods for detecting people whose health is rapidly worsening. Tools like EWS systems are intended for use in the hospital context to monitor patients progress and escalate treatment if needed. It has become possible to detect changes in patients clinical state using remote monitoring in the outpatient scenario.[23] EWS, also known as track and trigger systems, were designed to help medical staff spot hospitalised patients who are clinically ill and may benefit from supplementary treatment.[23] Both an input and an output are required for an EWS to function.

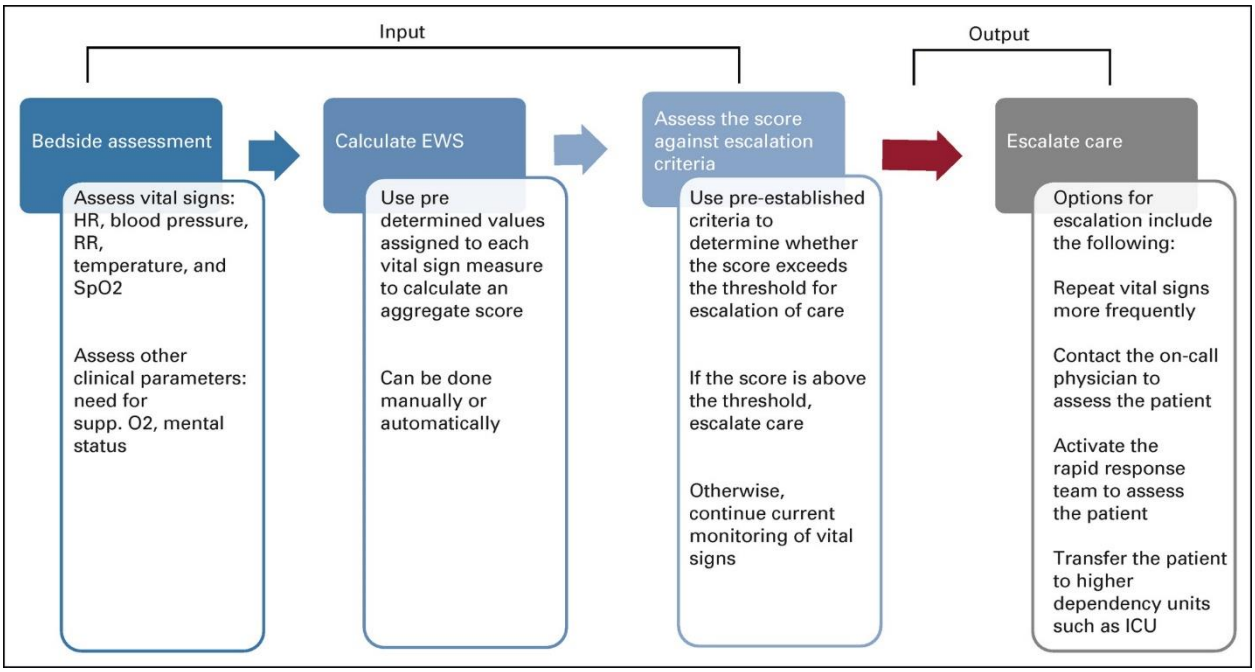


Figure 1: Method for Using the Early Warning System to Detect Patients in Decline.

"EWS, Early Warning Score; HR-heart rate; ICU- intensive care unit; RR-respiratory rate; SpO2- oxygen saturation; supp. O2, supplemental oxygen".[24,25,26]

An input is a patient's deterioration being recognized together with the activation of a reaction to provide a better degree of care. The outcome is the action taken, which may consist of closer observation, evaluation by a "rapid response team" (RRT), or admission to the ICU (Figure-1). The idea upon which these ratings were established is that abnormalities in vital signs often predict serious clinical deterioration in an inpatient environment.[24,25,26] EWS monitors numerous physiological markers to detect incipient changes in patients clinical state before it becomes overtly worse. The goal is to keep tabs on the degree of variation across several vital sign indicators in order to derive a weighted aggregate score. Then, the nursing staff and doctors may utilize the established thresholds and clinical response guidelines to know when to elevate the patient for a more thorough evaluation.

In 1997, the "James Paget University Hospital" in Norfolk, England, created the first organized EWS for its inpatient medical population.[11] The bedside evaluation of five physiological parameters- "heart rate, systolic blood pressure, breathing rate, temperature, and reaction to stimulus"- was used to calculate a simple weighted score. If the patient's score was three or above, urgent action was taken to escalate treatment and bring in more medical help. A number of EWS variants have been developed since then to enhance the input measure's sensitivity and specificity in a variety of clinical contexts.[27]

Input and Output of different EWS systems:

VitalPAC EWS (ViEWS)[28]

Clinical setting of testing: "ICU, medical ward, surgical ward"

Input criteria: "HR, RR, Systolic blood pressure (SBP), supplemental O2, temperature, AVPU"

Outcomes measured: "Mortality, duration of stay"

"National Early Warning Score"(NEWS)[29]

Clinical setting of testing:"ICU, medical ward, surgical ward, pre-hospital communication"

Input criteria: "HR, RR, SBP, supplemental O2, temp, AVPU"

Outcomes measured: "The evaluation of mortality, unanticipated intensive care unit admission, MET review, Cardiopulmonary arrest and acute respiratory failure"

"National Early Warning Score-2" (NEWS2)[30]

Clinical setting of testing: "Emergency ward, medical ward, surgical ward, pre-hospital"

Input criteria: "HR, RR, SBP, supplemental O2, temp, AVPU, hypercapnic respiratory failure"

Outcomes measured: "Experiencing a fatality, being admitted to the intensive care unit, Medical Emergency Team (MET) review, Cardiopulmonary arrest and acute respiratory failure"

Hamilton Early Warning score(HEWS)[31]

Clinical setting of testing: "When admitted to the Surgical or Medical Wards"

Input criteria: "HR, RR, SBP, supplemental O2, temp, neurologic status"

Outcomes measured: **"**Causes of death, emergency room visits, and cardiac arrest"

PEWS[3]

Clinical setting of testing: **"**Pediatric ward"

Input criteria: **"**Activity level (active or sedentary), heart rate (HR), capillary refill time (RT), and pulse rate, as well as respiratory (RR), work of breathing (WOB), and supplementary oxygen (O2)"

Outcomes measured: **"**Rate of death, emergency room visits, and hospital stays"

Triage in Early Warning Score (TREWS)[32]

Clinical setting of testing: **"**Emergency department"

Input criteria: **"**Age, HR, RR, SBP, supplemental O2, temperature, AVPU"

Outcomes measured: **"**Mortality"

Due to differences in sensitivity, specificity, and ease of application, early adoption of many EWS systems in UK hospitals led to discrepancies in the diagnosis of ill patients."The Royal College of Physicians" tasked a multidisciplinary working group with developing a NEWS for the NHS in 2012.[29] Through comprehensive teaching and training, NEWS was developed with the intention of creating uniformity in the process of recognizing deteriorating patients and boosting treatment. In 2017, this same group released an upgraded version of the tool dubbed NEWS2 that included a different "oxygen saturation scale" for patients with "hypercapnic respiratory failure" and adjusted for vital signs as a bedside measure.[30]

Both NEWS and NEWS2 have been thoroughly verified in the research community. In a retrospective study, Smith et al[33]compared NEWS to 33

different EWSs in terms of their ability to reliably identify patients at risk for "cardiac arrest", unexpected Intensive Care Unit admission, and death in the first 24 hours following hospital admission. Researchers compared NEWS to 33 other systems by using a huge database of vital signs and found that NEWS performed the best at predicting which patients will have negative outcomes. In the age of COVID-19, NEWS2 has been extensively employed and proven to have improved sensitivity in estimating the likelihood of dying from a serious disease while hospitalized in patients with COVID-19.[34]

While the majority of EWSs have seen usage in adult patients admitted to hospitals, adaptations have been made to make them useful for children like (Pediatric Early Warning Score[3]) and the ED (TREWS).[32] A reliable early warning system that can track the progression of a child's illness would be much appreciated. This demographic seems to have a greater baseline severity of illness.[35]

Pediatric Early Warning Score (PEWS)

The original intent of the Pediatric Evaluation and Writing Scale (PEWS) was to examine a patient's clinical state to determine whether or not they required intensive care in a "paediatric intensive care unit" (PICU) on the basis of age-related vital signs, clinical presentation, and level of awareness (Table-1).[3] The age-related variation in reference vital signs is a potential obstacle for the early detection of deteriorating "vital parameters" in hospitalized children in the field of pediatrics. Consequently, a transparent PEWS may aid healthcare workers in recognizing developing issues and taking preventative measures.[13]

Table 1: "**Royal Alexandra Hospital for Sick Children, Brighton – Paediatric Early Warning Score".**[3]

	0	1	2	3	Score
"Behavior"	"Playing/ appropriate"	"Sleeping"	"Irritable"	"Lethargic/ confused Reduced response to pain"	
"Cardiovascular"	"Pink or capillary refill 1-2 seconds"	"Pale or capillary refill 3 seconds"	"Grey or capillary refill 4 seconds. Tachycardia of 20 above normal rate"	"Grey and mottled or capillary refill 5 seconds or above. Tachycardia of 30 above normal rate or bradycardia"	
"Respiratory"	"Within normal parameters, no recession or tracheal tug"	">10 above normal parameters, using accessory muscles, 30+% Fi02 or 4+ litres/min"	">20 above normal parameters recessing, tracheal tug. 40+% Fi02 or 6+ litres/min"	"5 below normal parameters with sternal recession, tracheal tug or grunting. 50% Fi02 or 8+ litres/min"	

Two points added for every quarter-hour of nebulizer use or every hour of vomiting after surgery.

The NEWS method has been adapted for use with children.[14] The PEWS system takes into account the patient's "output" (urine, faeces, emesis) as well as their "input" (heart rate, breathing rate, and so on) and "behaviour" (playing, sleeping, irritated, sluggish, etc.)

In order to offer an efficient system for identification of clinically worsening patients and to provide appropriate treatments for those at risk for "cardiac or respiratory arrest", EWS rely on four interdependent components.

(1) A clinical worsening is detected by the afferent component, which then prompts the necessary action.

(2) In reaction to a stimulus, the efferent component includes the people and materials necessary to implement an appropriate action (eg, MET)

(3) Auditing, monitoring, and evaluation are all parts of the process improvement component that contribute to better patient care and security.

(4) Organizational leadership, a culture of safety, training, and the establishment and maintenance of necessary processes are all addressed in the "administrative/governance" section. [8]

A number of teams from different hospitals throughout the globe have presented different PEWS. Patient physiologic measures, patient demographics, and care-related characteristics are the three categories into which Duncan et al., "PEWS" categorizes its Items. These were reorganized into three groups: dynamic, consisting of items like "heart rate, blood pressure, and respiratory rate" that are expected to fluctuate frequently; static, consisting of items like the patient's date of admission to the ICU or the date of their surgery; and staffing-

related (eg, nurse patient ratio). There were a total of 20 components included in the calculated score, 16 of which could be extracted retroactively.[14]

The eight factors and their respective thresholds were taken into account by Edwards et al., Airway risk, oxygen needed to maintain "saturations over 90%, respiratory rate, respiratory observation, heart rate, blood pressure, level of awareness", and nurse or doctor's concern about clinical status were the variables used to determine these metrics. Each set of observations would get a score of 0 if all parameters were normal and a score of 8 if all parameters were aberrant.[15]

The PEWS was validated as a viable and accurate grading method for predicting clinical deterioration risk. Children who need more intensive care were identified using the PEWS instrument, as noted by Tucker et al. (2009). [19] Three evaluation parameters-behavioral, cardiorespiratory, and respiratory-form the basis of the "Texas Children's Hospital Pediatric Advanced Warning Score" (TCH PAWS).

Table 2: "Texas Children's Hospital (TCH) Pediatric Advanced Warning Score" (PAWS)[16,19]

	0	1	2	3
"Behavior"	"Playing/Appropriate"	"Irritable (consolable)"	"Irritable (inconsolable)"	"Lethargic/confused"
"Cardiovascular"	"Pink or baseline color and Cap. refill 1-2 seconds"	"Pale or Cap. refill 3 seconds"	"Pale & Cap. refill 4 seconds or Tachycardia of 20 above baseline or Diaphoresis"	"Grey or Mottled or Cap. refill 5 seconds or Tachycardia 30 above baseline or Bradycardia"
"Respiratory"	"RR and O2 sats within baseline limits and No signs of increased work of breathing"	"RR 10 above baseline or Mild using accessory muscles"	"RR 20 above baseline or O2 sats 5 pts below baseline or Moderate use of accessory muscles"	"Slowing of RR below baseline & increased work of breathing or O2 sats > 5 points below baseline or Grunting or Severe Retractions"

Patients who have recurrent vomiting after surgery or who need respiratory treatments more often than once an hour get an additional 2 points. If you get a score of 3 in one area or 4 overall, you should review the VS and try again. Consider the need for oxygen and its trajectory at the moment of scoring. Worsening clinical condition among hospitalized children can be detected early using the "TCH PAWS" tool, which has been shown to be reliable and valid. (Table - 2).[16]

Algorithms for responding to a high PEWS value might range from just having a more senior nurse or doctor evaluate the patient to activating a fast response team comprised of doctors with critical care expertise or requesting an ICU consultation.[1,36] A quality improvement strategy is essential for successful PEWS implementation, and frequent adjustments to the methodology and score are needed to account for differences in clinical settings and patient demographics. "Area Under the Receiver Operating Characteristic curve" (AUROC) of diverse scoring systems ranged from "0.73 to 0.91", demonstrating that PEWS in high-resource settings has been verified by a large number of research, both systematically and retrospectively. PEWS has been shown to be both reliable and valid, however there is mixed data on whether or not it really improves patient outcomes like "cardiac or respiratory arrest" rates or mortality rates in hospitals, even in well-resourced hospitals.[37]

According to the scholarly literature, many criteria were utilized to characterize clinical deterioration. Transfer to the PICU, as specified by Gold,[38] and Miranda[2]; Tucker[19] considered it as transfer to the PICU and "cardio-respiratory arrest"; Parshuram,[39] defined it as transport to the PICU, volume expansion with "crystalloid solutions at a rate of 60 mL/kg", cardiopulmonary resuscitation, and ultimately death.

Ramteke et al., observed **c**hildren admitted to the PICU prospectively, and their PEWS scores in the behavioural, respiratory, and cardiovascular domains were determined at zero hours after admission. According to the results of the research, differing PEWS scores allow for more accurate mortality predictions. Patients admitted with a PEWS score of 8 had a 100% death rate. A statistically significant relationship exists between the variables, as shown by the odds ratio of 3.34 and the P value of $P < 0.0001$ from the logistic regression study. At a PEWS Score of 3, "specificity was 92.0%", and at a PEWS Score of 7, it dropped to 54.5%. At a PEWS level of 3, "sensitivity was 31.28%, whereas at a score of 7, it was 99.05%.[40]

Chaiyakulsil et al., found AUCs of 0.73, 0.98, and 0.71 for predicting overall admission, to ICU, and to "general ward" admission, respectively, in a research validating PEWS in predicting hospitalization in children attending the ED. With a cutoff of PEWS ≥ 3, the "sensitivity and specificity for predicting ICU admission were 100% and 91% respectively". When predicting ward admission with a cutoff of PEWS ≥ 1, the "sensitivity and specificity were 77% and 59%", respectively. As a result of their findings, they concluded that PEWS has the has the potential to serve as a reliable "screening tool" for determining if a patient needs to be admitted to the ICU in pediatric EDs and is useful in evaluating patient status with acceptable validity.[41]

Miranda et al., tested the "Brighton Pediatric Early Warning Score" (BPEWS) to "Quality Assessment of Diagnostic Accuracy Studies" (QUADAS) to see how well it detects worsening of clinical condition in children under the age of ten. "Sensitivity was found to be 73.9%, specificity to be 95.5%, positive predictive value to be 73.3%, negative predictive value to be 94.75%", area

under the "Receiver Operating Characteristic Curve" to be 0.91, plus the probabilities of a subsequent test result that is positive to be 80% in that it was shown to have genuine performance and to be reliable in identifying clinical deterioration in the children tested. [2]

Breslin et al., conducted a "prospective observational" research at a children's tertiary care centre to examine the relationship between the "PEWS score at the time of ED disposition and level of care". In their research, they found that a PEWS of 3 or more was the most discriminatory for ICU care, whereas a PEWS of 1 or more was the most discriminatory for admission. Despite being linked to care quality as determined by ED disposition, the research found that PEWS lacked sufficient sensitivity and specificity to be employed alone.[42]

Lillitos et al., Researchers looked at the ability of two popular PEWS (Brighton and COAST) to correctly predict hospitalization and serious illness in a retrospective review. The results of the Brighton and COAST PEWS were comparable. However, although a PEWS score of ≥ 3 was "highly specific (93% for admission), it was only 32% sensitive". In terms of serious medical sickness, a PEWS of ≥ 3 was "96% specific but only 44% sensitive", whereas in terms of surgical illness, a PEWS of ≥ 3 was "100% specific but only 10% sensitive". In terms of predicting hospital admission and substantial surgical sickness, PEWS performed poorly, while it was only slightly better than average for predicting significant medical disease. The results of the research showed that a high PEWS (≥ 3) has few "false positives" and should cause one to consider admission to hospital and being checked out for serious illnesses, although it is not safe to assume that low PEWS means the patient would not become critical or would not need hospitalization.[43]

Skaletzky et al., When comparing cases and controls, researchers discovered that the cases had longer hospital stays and higher maximal PEWS scores ($p < 0.0001$). Scores of 2.5 had a "sensitivity of 62% and a specificity of 89%". Researchers discovered that the "modified PEWS might be used to identify patients at risk of worsening clinical condition and in need of further "diagnostic testing, treatment, or transfer to a higher level of care". The "modified PEWS" may aid medical staff in preventing catastrophic events in operating rooms.[44]

McLellan et al., "The Children's Hospital Early Warning Score" (CHEWS) and the PEWS were validated and compared in a retrospective cohort study for early identification of catastrophic worsening clinical condition in hospitalized, children suffering from non-cardiac issues. When comparing the two systems, CHEWS was shown to be superior than PEWS in identifying those with a danger of worsening critical condition thanks to its improved discrimination, sensitivity, and early warning time. Detecting patients who are at danger requires a high level of sensitivity, but early warning scores also need to be precise enough to avoid wasting resources on false positives. When comparing CHEWS and PEWS, the "sensitivity of crucial scores (≥ 5)" was much greater for CHEWS (75.6%) compared to PEWS (38.9%). As a result, there is cause for alarm that children at highest risk of catastrophic worsening clinical condition may go undetected since "critical PEWS" are not very sensitive.[45]

Elencwajg et al., conducted a cross-sectional study to evaluate the "Brighton PEWS" (B-PEWS) for predicting worsening clinical condition among children admitted at a children's hospital; found that PEWS ≥ 4 had sufficient "sensitivity, specificity, and negative predictive value"; This observation is

consistent with the low rate of documented clinical deterioration in B-PEWS values of ≤ 3.[46]

EWS like PEWS seek to enable clinicians to intervene quickly upon spotting clinical worsening in children, therefore their availability, precision, and capability to distinguish changes over time are key to their validity.

Kowalski et al., from a retrospective cohort research to evaluate the reliability of PEWS scores found that in over 20% of instances, no PEWS was recorded and in over 50% of those recorded, the score was underscored, hence failing to account for the whole potential for worsening in the child's condition. Conclusions from the study supported the need for routine assessment of clinical worsening, and the authors urged for further research into the use and effectiveness of "continuous cardio-respiratory monitoring" for patients at risk for emergent transfer.[47]

Chapman et al., Only 35% of samples in a retrospective case-control research had enough data on vital signs to generate a valid PEWS, and of those, roughly 20% had errors in their PEWS calculations. Overestimating was less prevalent than underestimating in their sample, and only 9% of the errors were considered clinically significant.[48]

In addition, a comprehensive examination of the validity and effectiveness of PEWS by Trubeyet al. indicated that there was great variance in the "quality of documentation and interrater reliability of the score", with some studies obtaining only 67% agreement. Larger respiratory and cardiac rates (and hence higher PEWS) may have more "variability in accuracy", while the relative accuracy of higher and lower PEWS has not been determined.[12]

Mills D et al., According to the results of their research, using a PEWS in a "pediatric oncology inpatient unit" in low and medium income nations is possible, and may increase the frequency with which vital signs are collected and yield correct PEWS ratings.[49]

Parshuram et al., 21 hospitals in 7 countries ("Belgium, Canada, England, Ireland, Italy, New Zealand, and the Netherlands") participated in a cluster randomized study comparing the Bedside PEWS intervention to the standard of care. All-cause mortality rates for pediatric hospital patients were not substantially lower when the PEWS was implemented compared to standard treatment.[37]

Niu et al., A prospective nurse research looked at how well PEWS worked and how often it was used in a high-volume pediatric emergency room in a large metropolis. They found that PEWS can be quickly performed in a busy ED setting, and that if it is incorporated into routine clinical evaluation, it has the potential to improve patients' outcomes by allowing for the early identification and initiation of appropriate intervention to prevent patients' deterioration.[50]

Gold et al., analysed how well PEWS worked and how well it fit into the paediatric ED. Patients in the intensive care unit (ICU) group had higher PEWS ratings. According to the results, an increased PEWS is linked to the need for admission into ICU both from the ED and as a transfer, however the test does not have the required features to be employed autonomously in the ED setting.[38]

Solevåg et al., The authors of this study at Norway's Department of Pediatrics and Adolescent Medicine looked at how a slightly altered version of the Pediatric Evaluation of Well-Being Scale (PEWS) correlated with patient demographics. A PEWS score ≥ 3 was related with serious diseases and "surrogate" indications of "cardio-respiratory" impairment. Therefore, it was proposed that people with PEWS ≥ 3 should be closely followed to make sure they do not become any worse. [51]

Seiger et al., discovered that by evaluating the validity of 10 different PEWS in a "paediatric ED", it is possible to use PEWS to identify children presenting to the "ED who need admission to the critical care unit". As opposed to triggering systems, which only required 1 positive parameter, scoring systems, where more physiological values are added to give a number, were more effective in identifying patients at risk.[52]

PEWS -RL (Resource limited settings)

The phrase "resource limited setting" (RLS) refers to a broad range of clinical settings that are frequently observed in low- and middle-income nations and in which there is insufficient access to critical resources and staff. Since there is comparatively little research on RLS, it might be challenging to transfer study findings to different contexts because setting of patient population and capacity can be very different.[20] It is more difficult for hospitals in RLS because of the unique difficulties that exist there to identify children at risk for rapid decline. "As high as 1:50 during the day and 1:100 at night", the nurse to patient ratio may place enormous demands on nurses[53], creating obstacles to the systematic collection of vital signs and the performance of comprehensive clinical evaluations. In addition, it has been mentioned that many nurses caring for

children in RLS may not have much pediatric expertise, making it challenging to rely on clinical judgement.[54]

The PEWS has the potential to be added to clinicians arsenals of objective tools to better characterize clinical state upon ED presentation and track disease progression. However, proof that (a) PEWS can be performed in an ED context despite nurses significant time restrictions and (b) the score is trustworthy is crucial.[50] There is a lot of space for improvement in survival rates, with inpatient paediatric death rates ranging from "5% to 15%" in many hospitals in RL settings. [55]Updates to preexisting PEWS systems in middle-income countries have resulted in improved "sensitivity and specificity".

A research by Olson et al. indicated that an "Inpatient Triage, Assessment, and Treatment" (ITAT) score of > 3, or for death score of 4.8, predicts mortality with an AUROC of 0.76. The study included participants less than 15 years old and was conducted at a major referral hospital from a high dependency unit.[53] Similarly, the same author discovered that vital signs assistants were associated to improved notification rates for clinicians, improved ITAT scores, and a decrease in mortality from 9.3 percent to 5.7 percent.[56]

To properly anticipate the validity of PEWS for unexpected PICU transfer in pediatric cancer patients in a RL context, Agulnik et al., performed a research enrolling children below 18 years of age. A child's disease severity when admitted to the PICU, the requirement for PICU treatment, and death were all predicted by higher scores, and abnormal outcomes were shown starting 24 hours before PICU admission. It was shown that the PEWS score was connected to the probability of an emergency transfer to the ICU. The findings showed that PEWS might benefit in identifying worsening clinical condition in this high-risk group independent of the availability of resources.[57]

Sridhar et al., stated that nurses technical abilities, as well as their confidence and sense of agency, improved when PEWS was implemented; however, this improvement was tempered by difficulties inherent in working in a low-resource environment. However, if the PEWS-RL tool is completely adopted by staff, possibilities exist for it to better prepare nurses and benefit patients.[58]

The original PEWS-RL had seven variables, each of which could be scored between 0 and 1, yielding a total score between 0 and 7, with greater the number, the sharper the perception. "Heart rate, temperature, blood pressure (BP), oxygen consumption, and mental state" were all considered along with "respiratory rate, respiratory distress" ("defined as any increased labour of breathing"), and respiratory rate (normal versus abnormal). [59]"The South Children's Observation" and "Severity Tool Children's Early Warning Score" was used to determine age-appropriate reference intervals for vital signs.[60] Upon analysis, it was noted that recording of BP was omitted frequently due to lack of available cuff sizes. Due to its impact on the results, this variable was taken out of the PEWS-RL, resulting in a total score from 0 to 6. As of recently, the hospital routinely uses the PEWS-RL to record vital signs from all "newly admitted patients".[61]

The PEWS-RL only takes into account the patient's vitals and whether or not they are experiencing aberrant mental state and/or respiratory distress. [59] The score may be easily determined by counting the number of answers (up to 6) that are in the danger zone and adding those numbers together. As a result, one would not run into the issue that plagues current PEWSs, where a large number of elements call for subjective metrics that depend on nursing knowledge and further computation. [1,3,14,15,62]

The PEWS-RL was used in a "case-control" study by Rosman et al. and colleagues to identify children aged 0-18 who were at a danger of worsening clinical condition or death. Patients who are at danger of worsening clinical condition as indicated by a "PEWS-RL score of ≥ 3" were identified with a 96.2% sensitivity and an 87.3% specificity. Despite its apparent lack of complexity, Rosman et al. demonstrated the score's ability to equal or outperform most previously reported PEWS in developed settings. .[1,15,18,19,44,45] Using a threshold of 3, the "sensitivity and specificity improved to 94.1% and 85.7%", respectively. If the threshold score were lowered to 2, more children would be falsely flagged as at risk for deterioration, and more doctors would be contacted without cause. The specificity dropped from 85.7% percent to 75.7 percent. In a healthcare system with few doctors and nurses on staff, this might be a problem. [59]A unique PEWS variant, PEWS-RL, was created by Rosman et al. for usage in low-resource environments.[59]

For example, nurses and nursing aides at Akershus University Hospital in Oslo, Norway, a low resource environment where nurses confront the problems of evaluating children with a broad variety of diseases, looked to the PEWS for guiding in recommendations for escalation in patient care. The percentage of patients who were promoted to a more intensive care unit varied significantly between the two groups, those with a "PEWS score of ≥ 3" and those with a "PEWS score of 0 or 2" ($p = 0.04$). When compared to children with a PEWS score of 0-2, those with a score of ≥ 3 were considerably more likely to get fluid resuscitation, oxygen support, and intravenous antibiotics. Patients with a "PEWS score of ≥ 3" were more likely to be admitted than those with a PEWS score of 0–2. The rate of readmissions did not vary significantly across the groups. Findings suggested that the "modified Brighton PEWS" might be a valuable tool for identifying children at high risk of "cardio-respiratory

decline". it may be concluded that a PEWS score of ≥ 3 indicates the need for close patient monitoring. [51]

Agulnik et al.,evaluated the feasibility and effectiveness of PEWS as a quality assessment instrument for the rapid identification of worsening clinical condition and applied it in a Guatemalan paediatric cancer facility with low resources. The incidence of worsening clinical condition in inpatients decreased from "9.3 to 6.5 per 1000 patient-days", and the use of the PICU decreased by 21%. .[57]

The impact of the "pre-admission PEWS" (P0) and "admission PEWS" (P1) on paediatric ED ICU admission were investigated by Gold et al. Patients in the ICU had substantially higher P0 and P1 values. As measured by PEWS, there was a discernible difference between the groups of patients transferred to the ICU and those who were kept on the ward, as determined by comparing the two sets of data ($p < 0.0001$). The likelihood of being admitted to the ICU was increased by 1.9 times compared to the ward for every one unit rise in P0. Admittance to the ICU was shown to be associated with a "2.9-fold" increase in risk compared to general ward admission for every 1-unit rise in P1 ($p < 0.0001$). As determined by the "ROC analysis, P0 = 1 and P1 = 2" were the best possible cutoffs for the ICU population. There was a 1.6-fold and a 2-fold increase in the likelihood of being transferred to the ICU for every increment in P0 and P1 during the first six hours after being admitted to the floor. ROC analysis indicated that P0 = 1 and P1 = 1 were the best thresholds to use for this population. When P0 and P1 were both raised by one unit, the likelihood of being transferred to the ICU within 6 and 24 hours after admission to the floor rose by "1.4 and 1.7 times" respectively. The study found that because of the dynamic nature of the ED, where patients' physiologic parameters are frequently altered due to the severity of their "illness or injury, medication, pain, fear, and

anxiety", patients at risk of worsening from the ED are not ideally captured by the PEWS alone.[38]

ROC curve demonstrated a significant discriminator for ICU admission when modified PEWS (MPEWS) was applied to children less than 16 years hospitalized with an internal medical condition in the ED of an urban hospital. For the MPEWS, the area under the ROC curve indicated that a cutoff of 5 would be ideal, yielding a "sensitivity of 80% and a specificity of 85%".[62]

Three cohort studies with varying end points were conducted by Fuijkschot et al., to examine the impact of the MPEWS they designed. When they utilised data up to two hours before the end objective (an unscheduled admission to the PICU, the system was 67 percent sensitive and 88 percent specific in identifying patients in a timely manner. As a result, they demonstrated that quicker detection is achievable without sacrificing sensitivity in comparison to existing PEWS systems. The conclusion that MPEWS is also suitable to warn healthcare practitioners that urgent interventions may be required was reached after determining that the sensitivity of PEWS was high for those with the purpose of avoiding the need for invasive emergency medical procedures.[13]

MATERIALS AND METHODS

MATERIALS AND METHODS:

Study place: Pediatrics In patient ward of R L Jalappa Hospital, Tamaka, Kolar

Source of data: All children admitted to general pediatric wards of RLJH hospital during the period of study

Study population: Children from 2 months to 18 years

Study design: A Prospective Observational Study

Sample size: Sample size was estimated based on the sensitivity of 96.2% for PEWS-PL as reported by study done by Rosman SL et al[59] using below formula

n=Z α2) 2 P^(1-P^)/d 2

Where P^ is pre-determined value of sensitivity (or specificity) that is ascertained by previous

published data or clinician experience/judgment and for α = 0.05, Zα2 is inserted by 1.96.

P^ = 96.2% or 0.962

d = 2% or 0.02

Using the above values at 95% Confidence level a sample size of 352 subjects will be included in the study.

Considering Non response rate of 10%, 352 + 35.2 = 386 ≈ 386 subjects will be included

Study period: January 2021- May 2022

Method of collection of data:

- **Inclusion criteria:**

  All patients aged between 2 months and 18 years, admitted to paediatric inpatient ward as per institutional admission protocol were included in the study after obtaining valid, written consent from the parents.

- **Exclusion criteria:**

  a. Refusal of consent
  b. Discharge / Discharge against medical advice (DAMA) within 24 hours.
  c. Patients transferred from PICU

Ethical considerations: Study was approved by institutional ethics committee. Informed written consent was obtained from all the parents/guardians of the study participants and only those participants whose parents or guardians were willing to sign the informed consent were included in the study. The risks and benefits involved in the study and voluntary nature of participation were explained to the parents/guardians of the participants before obtaining consent. Confidentiality of the study participants was maintained.

METHODOLOGY:

- Study tool: Paediatric Early Warning Score for Resource-Limited Settings (PEWS-RL).[59]

- All the postgraduates, nurses and interns of the Department of Paediatrics were sensitized regarding the use of PEWS-RL observational chart. Sensitization was done at repeated intervals for interns and nurses who were posted in paediatric wards according to their rotation postings. Data was collected by postgraduates, interns and nurses posted in paediatric wards.

- All children fulfilling the inclusion criteria were included in the study.

- At the time of enrolment, an informed written consent was obtained from the parents.

- The PEWS-RL charts were included in all patient's files admitted in the paediatric wards.

- Scores were documented at admission, every 6^{th} hourly and at any time of patient deterioration and when family members were worried about the child's clinical status

- Those children requiring active medical intervention were followed up till and observed for the following outcomes: type of medical intervention, length of PICU stay, mortality.

Method of completing the score :

- Age appropriate charts were used: 2-11months, 1-4 years, 5-12years and ≥13years). (figures: 2-5)

Figure 2 :Vital signs and early warning score for age group between 2-11months

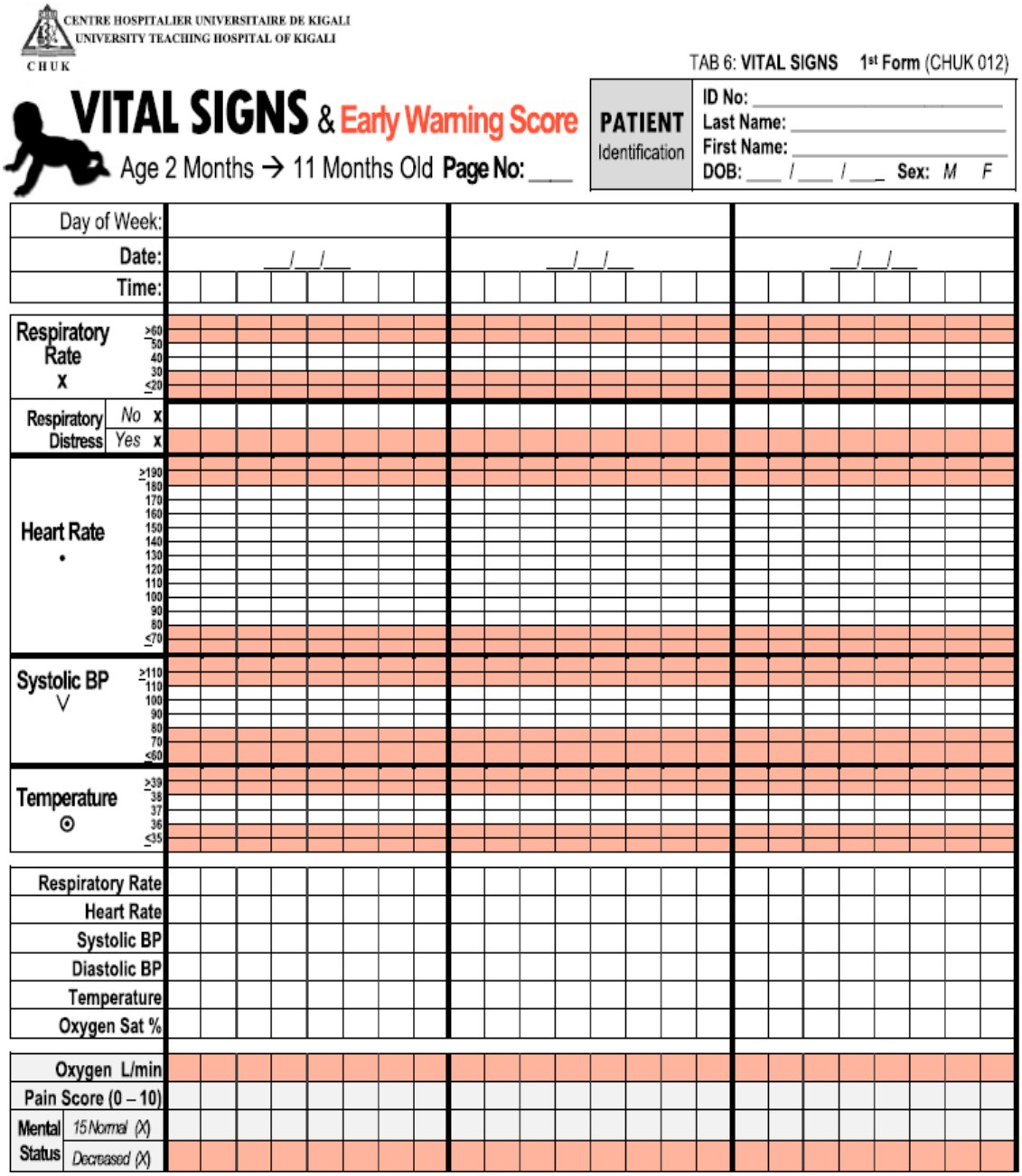


Figure 3 : Vital signs and early warning score for age group between 1-4 years

Figure 4 : Vital signs and early warning score for age group between 5-12 years

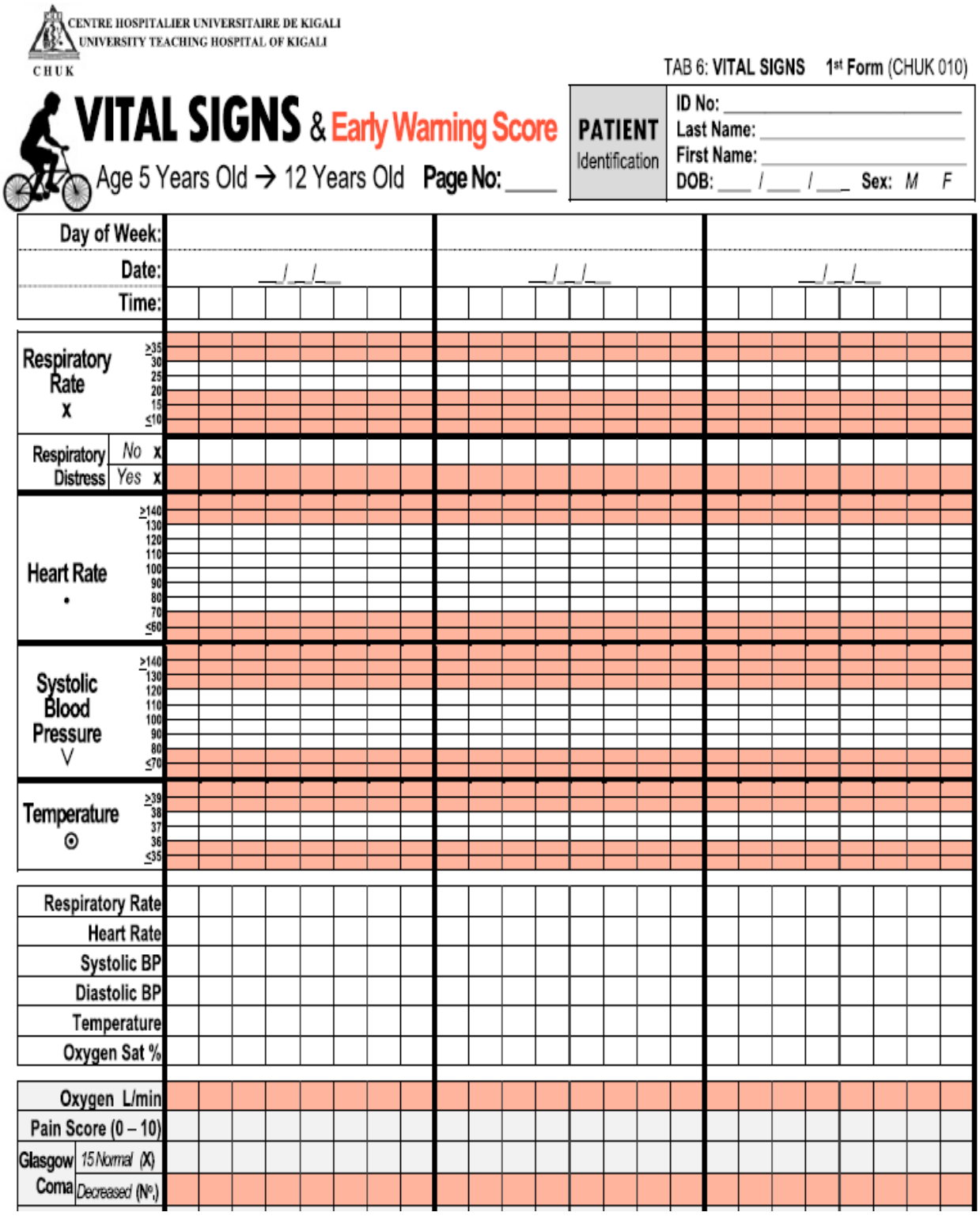
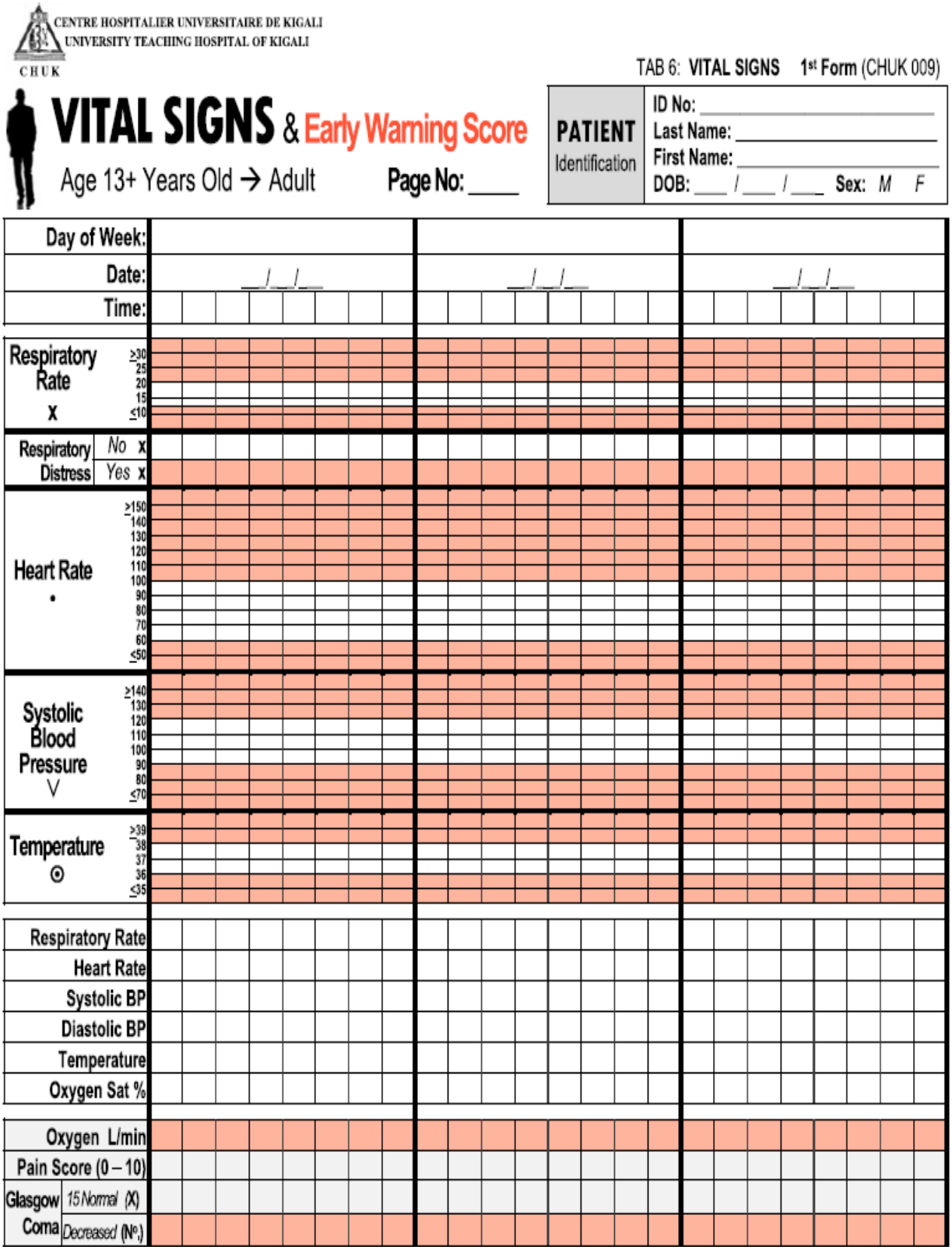


Figure 5 : Vital signs and early warning score for age group ≥ 13years



- The following details were recorded: Name, age, gender, hospital number, address, phone number, presenting complaints, diagnosis.

- The observations were recorded in the chart

-PEWS RL consists of 6 variables with possible score on each variable of 0 & 1, and a cumulative score between 0 and 6 (Table-3)

- Parameters included are:

1. Respiratory rate
2. Respiratory distress
3. Heart rate
4. Temperature
5. Oxygen use
6. Mental state

-The parameters were assessed and recorded in the chart by a (X)

- Table : 3 - Charts based on vital parameters

Variable	Respiratory rate	Respiratory distress	Heart rate	Temperature	Oxygen use	Mental state
Uncoloured area in chart	0	0	0	0	0	0
Coloured area in chart	1	1	1	1	1	1

Method of assessment:

Respiratory rate: It was observed and abdominal movements were counted for 1 full minute and marked in the chart.

Respiratory distress : It indicates abnormal respiratory pattern (nasal flaring, retractions, tachypnea, stridor, grunting, dyspnea, wheezing). Score 0 if no abnormal respiratory patternand if ANY ONE of the above signs was present it was recorded as score 1.

Heart rate: It was counted by clinical examination for 1 minute and marked in chart.

Temperature: It was measured at axilla using digital thermometer and marked in the chart

Mental state: It was assessed by using, Glasgow Coma Scale (GCS). Score was 0 if GCS was 15/15 or score was 1 if GCS was less than 15

Use of oxygen support: Yes (score 1) or No (score 0)

Method of scoring:

- The score was 0, if the recorded observation made in the chart was in the uncolored area

- The score was 1, if the recorded observation made in the chart was in the colored area.

Method of calculating the score :

- The total PEWS-RL score was obtained by adding the scores for each core parameter and entered

- All the post graduates, interns and nursing staff who recorded the observations were given the following instructions:

1. If a child scored 0 - To continue the same and to observe the child as per the chart
2. If a child scored ≥1 - To inform the consultant / PG on call immediately for review and to take action

- All children were monitored till discharge from the hospital.
- The management of children requiring active intervention was as per institutional protocol

Following parameters were furter doccumented for children with PEWS-RL score of ≥ 1:

- Clinical condition of children requiring active intervention
- Place of active intervention
- PEWS score at the time of active intervention
- Time of active intervention since admission
- Clinical condition at the time of active intervention
- Outcome of the patient
- Length of hospital stay

STATISTICAL METHODS:

Need of Active Intervention and Place of Intervention were considered as primary outcome variables. Other variables defined in study were age of participant and sex.

Count and proportion for categorical measures, mean +/- SD for numeric measures denoted as basic analysis.

The variation in proportions for different qualitative indicators was observed with the help of Chi-Square test.

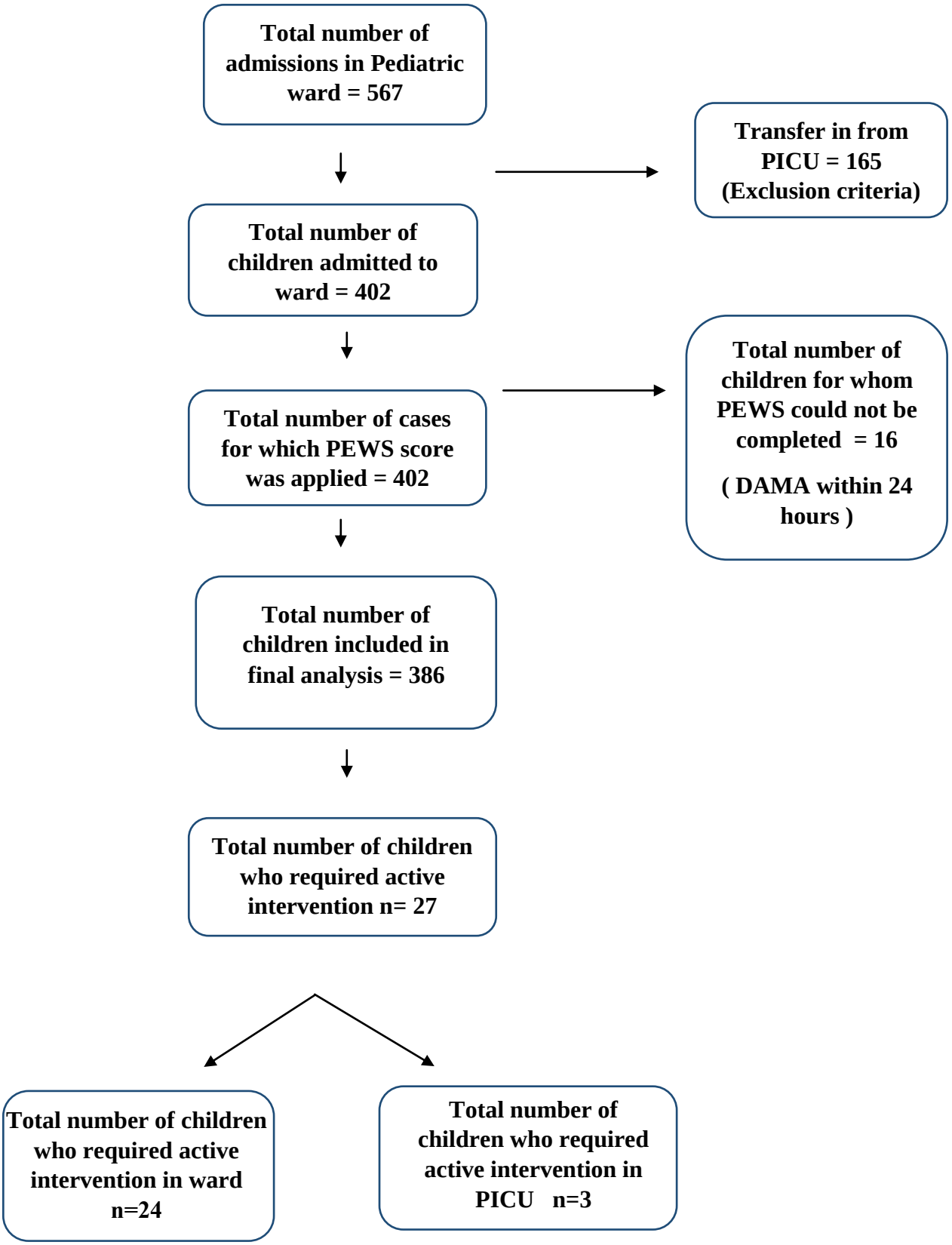
The definition of significance defined by P value<0.05.

Data was analyzed by using co-Guide software:

RESULTS

RESULTS:

Figure 6 :Flow Diagram of recruitment and selection of study participants.



About 386 samples taken into the present study.

Table 4 : Study participants according to age (n=386)

Age	Frequency	Percentage
2-11 months	73	18.91%
1-4 years	143	37.05%
5-12 years	134	34.72%
≥13years	36	9.33%

Majority (37.05%) of children age was 1-4 years followed closely by 5-12 years age group (34.72%). Children age group of 2-11 months constituted 18.91 % while children aged 13years and above were 9.33% (Table - 4)

Figure 7: Study participants according to age (N=386)

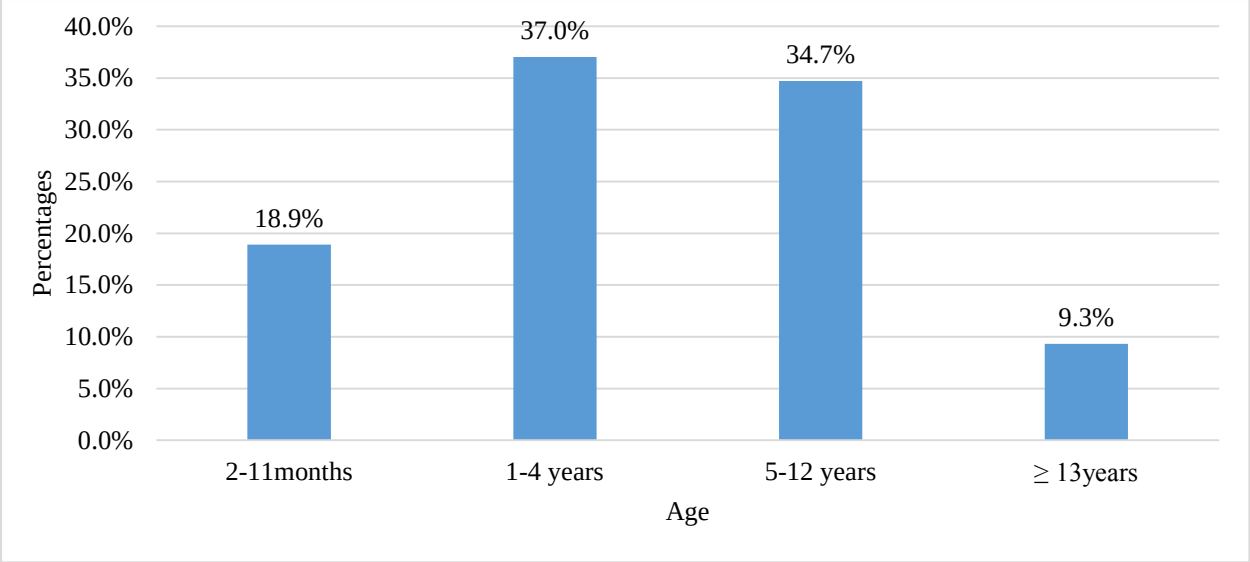
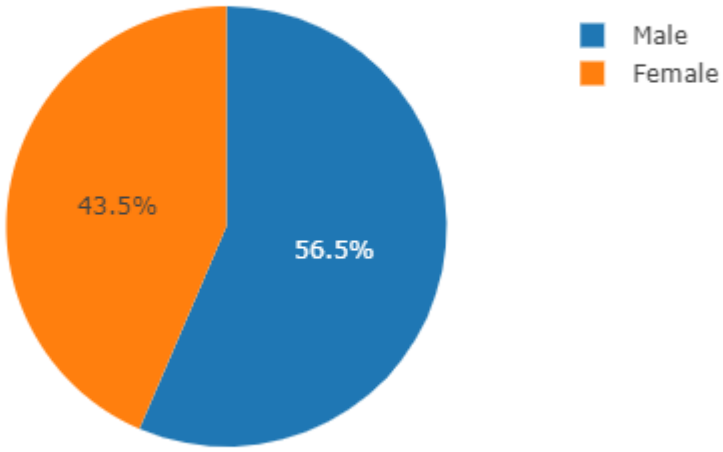


Table 5: Study participants according to Gender (n=386)

Gender	Frequency	Proportion (%)
Male	218	56.48%
Female	168	43.52%

Figure 8: Study participants according to Gender (N=386)

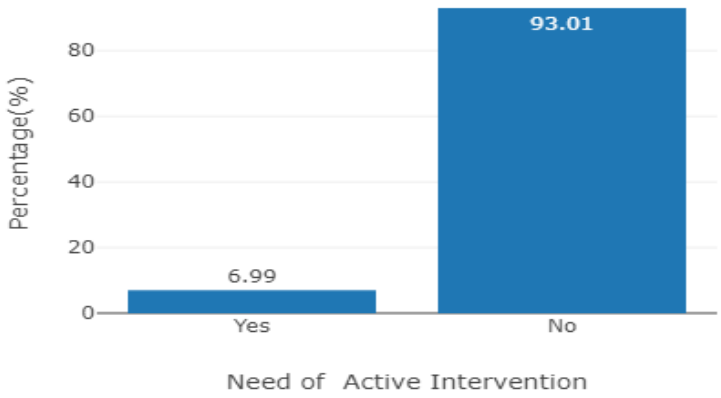


Among the study population, 218 (56.48%) patients were male and remaining 168 (43.52%) were female with male to female ratio was 1.3:1 (Table 5 and Figure 8)

Table 6: Distribution of study participants requiring Active Intervention (n=386)

Need of Active Intervention	Frequency	Percentage
Yes	27	6.99%
No	359	93.01%

Figure 9: Distribution of study participants requiring Active Intervention (n=386)

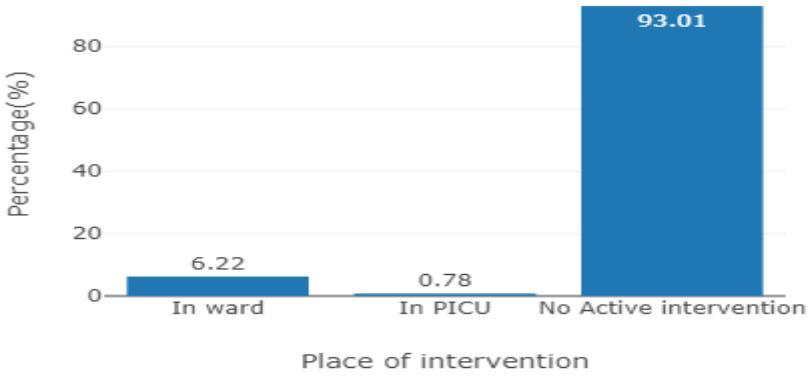


Out of 386 participants, 27(6.99%) required active intervention. (Table 6 & Figure 9)

Table 7: Distribution of study participants based on the place of Active Intervention (n=386)

Place of intervention	Frequency	Percentage
In ward	24	6.22%
In PICU	3	0.78%
No Active intervention	359	93.01%

Figure 10: Distribution of study participants based on the place of Active Intervention (n=386)



Among the study population, 24 (6.22%) participants received active intervention in ward and 3(0.78%) were transferred to PICU. (Table 7 & Figure 10)

Table 8: Clinical Characteristics of patients who required active intervention in Ward (n=24)

Diagnosis	Nature of intervention	Outcome
Dengue fever with shock (n=6)	IVF boluses	Discharged
Bronchopneumonia with respiratory distress (n=16)	Low flow oxygen with nasal prongs	Discharged
Febrile seizures (n=2)	Anticonvulsant	Discharged

Among 27 patients who required intervention, 24 patients were treated in ward

- Dengue fever with shock was diagnosed in 6 patients, received IVF. All 6 patients were discharged.
- Sixteen patients diagnosed with Bronchopneumonia and respiratory distress received treatment with low flow oxygen using nasal prongs
- Two patients had febrile seizures in the ward for whom iv anticonvulsants were administered (Table 8)

Table 9: Clinical Characteristics of patients who required active intervention in PICU (n=3)

Diagnosis	Nature of Intervention	Outcome
Anaphylactic shock (n=1)	-Mechanical ventilation -Inotrope support	Discharged
Bronchopneumonia with respiratory distress (n=2)	-High flow oxygen support using HHHFNC	Discharged

HHHFNC- Heated humidified high flow nasal cannula

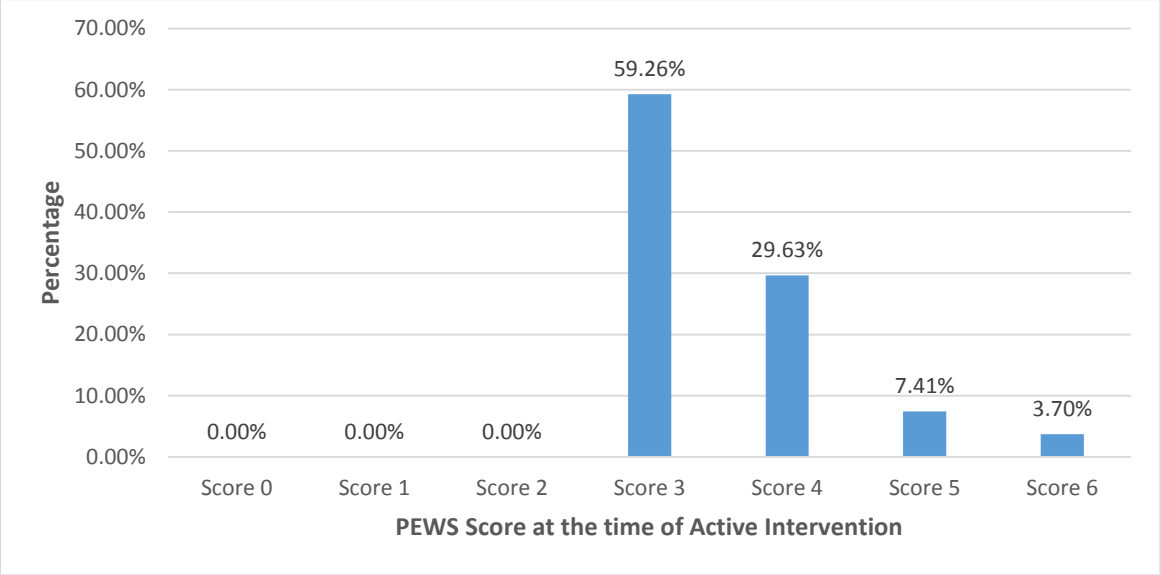
Among 27 patients who underwent active intervention, 3 patients were shifted to PICU and treated

- One patient was shifted for Anaphylactic shock (PEWS=6), required mechanical ventilatory support, inotrope support. Patient required more than 10 days of hospital stay and was subsequently discharged
- Two patients had Bronchopneumonia with Respiratory distress requiring high flow oxygen support with HHHFNC and both were discharged (Table 9)

Table 10: "PEWS Score at the time of" Active Intervention (n=27)

"PEWS Score at the time of" Active Intervention	Frequency	Percentage
Score 0	0	0.00%
Score 1	0	0.00%
Score 2	0	0.00%
Score 3	16	59.26%
Score 4	8	29.63%
Score 5	2	7.41%
Score 6	1	3.70%

Figure 11: Distribution of PEWS Score at the time of Active Intervention (n=27)

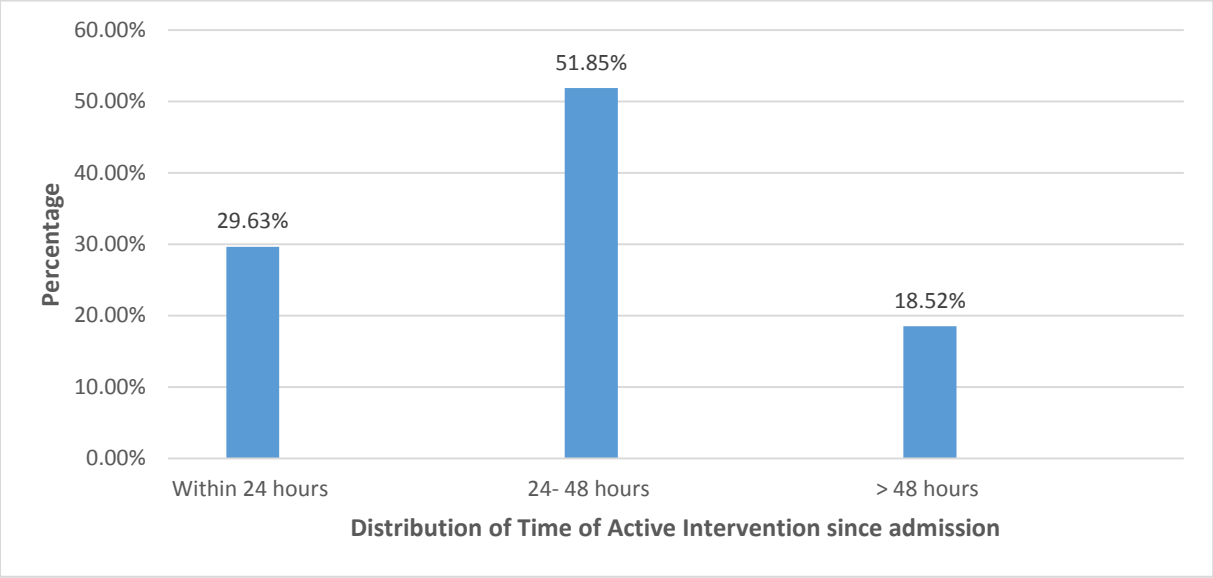


Out of 27 patients requiring active intervention, 16(59.26%) had PEWS score of 3 while 8 (29.63%) had a PEW score of 4. Two patients (7.41%) and 1 (3.70%) patienthad PEWS scores of 5 and 6 respectively. (Table 10 & Figure 11)

Table 11 : Time of Active Intervention since admission (n=27)

Time of active intervention based on admission	Frequency	Percentage
Within 24 hours	8	29.63%
24- 48 hours	14	51.85%
> 48 hours	5	18.52%

Figure 12: Time of Active Intervention since admission (n=27)



It was observed that out of 27 patients who required active intervention, majority (51.85%) required intervention between 24 and 48 hours of admission, while 8(29.63%) patients required intervention within 24hours of admission. Only 5 (18.52%) patients required intervention beyond 48 hours of admission. (Table 11 & Figure 12)

Table 12: Place of active intervention based on PEWS score (n=27)

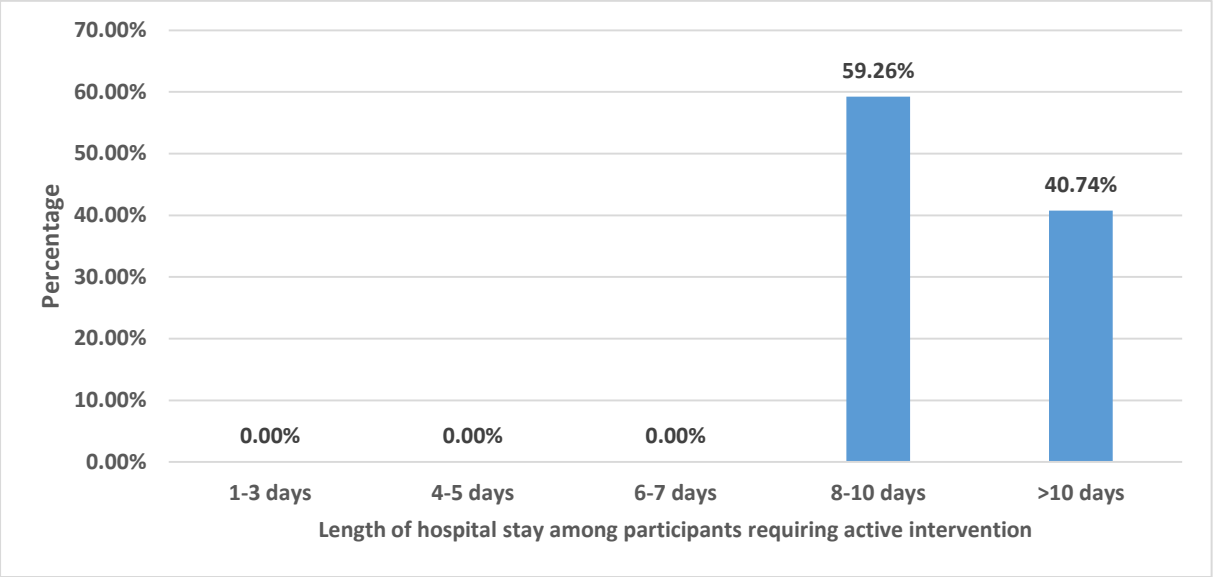
PEWS score at the time of Active Intervention	Place of Active Intervention	
	Intervention in ward (N=24)	Intervention in PICU (n=3)
Score 0	0 (0.00%)	0 (0.00%)
Score 1	0 (0.00%)	0 (0.00%)
Score 2	0 (0.00%)	0 (0.00%)
Score 3	16 (66.67%)	0 (0.00%)
Score 4	8 (33.33%)	0 (0.00%)
Score 5	0 (0.00%)	2 (66.67%)
Score 6	0 (0.00%)	1 (33.33%)

Out of 24 children requiring active intervention in the pediatric ward, 16(66.67%) had a PEWS score of 3 while 8 (33.33%) had a PEWS score of 4. None of the patients had pews score beyond 4. On the other hand all 3 patients requiring PICU intervention had a PEWS score beyond 4, where in 2 (66.66%) children had a score of 5 and 1 child (33.3%) had a score of 6. (Table 12)

Table 13: Length of hospital stay among participants requiring active intervention (n=27)

Length of stay in hospital	Frequency	Percentage
1-3 days	0	0.00%
4-5 days	0	0.00%
6-7 days	0	0.00%
8-10 days	16	59.26%
>10 days	11	40.74%

Figure 13: Length of hospital stay among participants requiring active intervention (n=27)



Out of 27 patients requiring active intervention, 16 (59.26%) patientsstayed for 8 to 10 days in hospital and 11 (40.74%) required more than 10 days of hospital stay. (Table 13 & Figure 13)

DISCUSSION

DISCUSSION

It is regarded to be crucial for patient safety, particularly in packed EDs, to identify those children who need rapid treatment among the big population of children who do not require urgent care. The majority of EDs use some kind of triage to determine the order of care for all patients that come in, including kids. Multiple physiological parameters show promise as a diagnostic tool for spotting sick children.[1] PEWS are "scoring systems" based on "physiological" measures intended to identify worsening clinical condition in hospitalized patients where scores were tallied periodically and trended.[2] PEWS-RL is an observational chart designed for pediatric patients at risk of worsening clinical condition in wards which can be performed and interpreted by nurse and non-specialist doctors.[3] This is a prospective observational study conducted on children admitted to general pediatric wards of RLJH hospital to determine early warning score of pediatric inpatients and to correlate this with the patient outcomes. The utility of PEWS Score at the time of active intervention is assessed.

Age and gender distribution:

A total of 386 subjects meeting the inclusive criteria were included in the final analysis among which 18.91% were aged between 2 to 11 months, 37.05% were aged between 1 to 4 years, 34.72% are aged between 5 to 12 years and 9.33% are 13 years and more of age. In regards to gender distribution, a slightly higher proportion of male subjects were observed in the present study (56.48%VS 43.52%). In a study conducted by Soleva˚g et al. the median inter quartile range (IQR) was 3.5years with a range of 2 to 18 years.[51] Vredebregt et al. compared, not critically ill children (no ICU admission) with critically ill children (ICU admission) median age was 2.1 years for not critically ill and 2.9

years for critically ill children.[62] Ramteke et al. found that 97.7 percent of patients were less than 12 years old, and that males outnumbered females by a 1.6:1 margin among those who were admitted to the hospital. The mortality incidence per cases admitted was almost double in the female patients (23.2%) as compared to the male group (13.9%).[40] In Chaiyakulsil et al. study, 57% were male and mean age was between 2 months to 5 years.[41] Therefore, each study as its own variation in age groups and gender which is based on the admitted population.

Need of active intervention:

In our study, 6.99% required active intervention among which 6.22% received intervention in the ward and 0.78% required to be shifted to the PICU for intervention. Among those who required active intervention, 59.26% had to stay 8 to 10 days in the hospital and 40.74% had more than 10 days stay in the hospital. In a study conducted by Breslin et al.' 33% were admitted to Acute care unit, and 5% were admitted to ICU.[42] In Chaiyakulsil et al.'s study a total of "14.8% were admitted", "14.2% to the general ward" and "0.53% to the ICU".[41]These findings were in accordance with the present study.

Patients with a PEWS score of ≥ 3 were more likely to be admitted than those with a PEWS score of 0–2 as found by Solevg et al.[51] Among the patients hospitalized in Ramteke et al.'s research, those with a PEWS score of 3 or 4 made up the largest group (42.8 percent of all cases).[40] Thus it was similar to our study, which we found that greater proportion of subjects requiring active intervention (59.26% and 29.63%) was with PEWS score of ≥ 3.Hence, from the studies mentioned and this study we find that greater score of PEWS indicate increased admissions and severity of the condition.

In our study population requiring active intervention 59.26% had score of 3, 29.63% had a score of 4, 7.4% had a score of 5 and 3.7% had a score of 6. In comparison to Elencwajget al.'s study population based on the "dichotomized B-PEWS", majority of them had score 0-3 (81.7%) and 18.3 % had ≥ 4.[46] The MPEWS median score was1in non-serious children but in critical children it was 8 in Vredebregt et al.' study.[62] In the research by Ramteke et al., the majority of patients admitted had a PEWS score of 3 or 4. Early release was given to those patients whose PEWS score was 2 upon admission. [40] From Breslin et al.'s study it was also observed that PEWS with higher score was associated with increased admission to ICU and lower score subjects were discharged.[42] In our study we found that majority of the subjects receiving active intervention had ≥ score 3.

Out of the 27 subjects requiring active intervention, 29.63% required intervention within 24 hours of admission, 51.85% 24 to 48 hours of admission and 18.52% after more than 48 hours time of admission. Clinical staff may be missing important changes in the underlying physiology if they rely on intermittent vital sign assessment alone, as noted by Kowalski et al., who found that patients without a continuous monitoring order had higher recorded PEWS scores prior to transfer than those with continuous monitoring.[10] All the subjects receiving active intervention were discharged in our study. Research by Ramteke et al. indicated that patients with a "low PEWS on admission" ("PEWS 0, 1, and 2") had the highest discharge rates, and that the frequency of fatalities increased almost linearly with the patient's PEWS ("100% mortality at a PEWS score of 8, scoring done at admission").[40] Similarly in our study we found that score 0-2 was associated increase discharge with least requirement for intervention.

Among those receiving intervention in the ward, 66.67% had PEWS score 3 and 33.33% had score 4. Among those requiring intervention in PICU, 66.67% had

score 5 and 33.33% had score 6. Hence our study found that subjects with score 3 and 4 can be treated in the ward, but score 5 and 6 required additional care such as PICU. Hence in support to this evidence Breslin et al., showed that even if the score increases by one score point, greater was the risk of admission to Acute care unit and delay in discharge or mortality.[42] In addition, in Ramteke et al.'s research, patients whose PEWS score was "8 on admission" had a 100% fatality rate.[40]

In the present study, using a PEWS score cutoff of 3, all the subjects with PEWS score ≥ 3 required intervention and those with < 3 did not require any active intervention. Similarly, but contrast in Solevåg et al.'s study, 4.9% of the patients with a "PEWS ≥ 3" and "1.4% with a PEWS 0 to 2" were transferred to a higher level of care, patients with PEWS ≥ 3 had a much greater rate of being sent to a more ICU.[51]

The cut off score of 3 and greater than 3 showed good predictive value for the need for active intervention. This was in agreement with Rosman et al.'s study, who noted that by using a cutoff score of 3, the predictive value was good "sensitivity and specificity were 94.1% and 85.7%, respectively". They also reported that at a cutoff score of 2, "specificity decreased to 75.7%", causes more youngsters to be wrongly labelled as being at danger of worsening condition and more doctors to be contacted without need. In a healthcare system with few available doctors and nurses, this might be a serious concern.[59] Therefore in the present study, we found that cut off of score 3 had good predictive value.

Elencwajg et al., in their study used Brighton PEWS (B-PEWS) and on analysis of the PEWS' prognostic value "dichotomized into ≤ 3 versus ≥ 4", they got a "sensitivity of 92.5 %, a specificity of 88.3 %". The optimal cut-point was estimated at 4.[46] Ramteke et al., reported "sensitivity was 92.0% at PEWS Score of 3 and declined to 54.55% at PEWS Score of 7". "Specificity was

31.28% at PEWS score of 3 and rises to 99.05 at PEWS Score of 7".[40] Lillitos et al., in their study found a "PEWS score of ≥ 3" was highly "specific (93%)" for admission, but only "32% sensitive". For significant medical illness, a "PEWS of ≥ 3 was 96% specific but only 44% sensitive" and with relation to surgical illness "PEWS ≥ 3 was 100% specific and 10% sensitive".[43] In order to differentiate between intensive care unit (ICU) and ambulatory care unit (ACU) admission, a PEWS score of 3 or above was shown to be the most discriminative ("sensitivity,56%; specificity, 72%") in Breslin et al.,'s study. Patients with a PEWS score of 3 or higher were "twice as likely to be admitted to the ICU" as patients with a PEWS score less than 3 among the hospitalized patients in our sample. [42] "Sensitivity and specificity" in predicting ICU admission with "PEWS cut-off ≥ 3" were 100% and 90.5%, respectively with a "PPV 4.8% and NPV 100%" in Chaiyakulsil et al.'s study.[41] They also reported that using "PEWS cut-off ≥ 1", they got a "sensitivity and specificity" in predicting general ward admission of "77.2% and 59.1%", respectively with "PPV 23.5% and NPV 93.8%".[41] Hence from the above studies we found that cutoff score of ≥ 3 had good predictive value for the need of active intervention and mortality. This finding was also in accordance with the present study.

In the present study, all those with PEWS score ≥ 5 needed to be shifted to PICU for intervention and those with PEWS score < 5 received intervention in the ward. Results from the research by Vredebregt et al., showed that 80% of the critically sick children and 15% of the non-critically ill children had "MPEWS scores of ≥ 5". The results indicated that a "cutoff of ≥ 5" was most accurate for the modified PEWS ("sensitivity of 80% and specificity of 85%").[62] In the same study 84.6% patients who were not critically ill had MPEWS < 5, 15.4% had MPEWS ≥ 5 where as among the critically ill children, 20% had MPEWS < 5 and 80% had ≥ 5, indicating that the MPEWS was not able to predict hospitalization since no cutoff point was identified as being both

sensitive and specific.[62] According to research conducted by Lillitos et al., a PEWS score of ≥ 3 is "specific but not sensitive" in predicting hospital admission, and the same holds true for the PEWS score in predicting serious illness in the pediatric emergency department. They emphasized that a low PEWS should not be interpreted to eliminate major disease or the necessity for admission, whereas a high PEWS (≥3) has few false positives and must stimulate thinking for hospital admission and the examination of significant illness.[43]

CONCLUSIONS

CONCLUSIONS:

- A total of 386 subjects meeting the inclusive criteria are included in the final analysis among which 18.91% are aged between 2 to 12months, 37.05% are aged between 1 to 4 years, 34.72% are aged between 5 to 12 years and 9.33% are ≥13 years of age. In regards to gender distribution, 56.48% are male and 43.52% are female.
- Among those requiring active intervention, 59.26% had PEWS score 3, 29.63% had score 4, 7.41% had score 5 and 3.70% had score 6.
- All those subjects who required active intervention were discharged.
- In the present study we found that as the PEWS score increased the need of active intervention increased and clinical condition worsened, hence helps in early detection of deterioration of patients and early intervention.

LIMITATIONS
&
RECOMMENDATIONS

LIMITATIONS AND RECOMMENDATIONS:

This study only collected data from one children's hospital, therefore the findings may not be applicable outside that environment. For the PEWS to be validated and then included into the clinical guidelines of the hospital where it will be implemented, studies at a larger scale with a higher level of evidence are necessary.

SUMMARY

SUMMARY

This is a prospective observational study conducted in the Pediatrics Inpatient ward of R L Jalappa Hospital, Tamaka, Kolar on children admitted to general pediatric wards to determine Early warning score of pediatric inpatients and to correlate with patient outcomes. All the postgraduates, nurses and interns of the Department of Pediatrics are sensitized regarding the use of PEWS-RL observational chart and scores are documented at admission, every 6th hourly and at any time of patient deterioration and when family members are worried about the child's clinical status. Those children requiring medical intervention are followed up till discharge. Among the children requiring active intervention, 59.26% had PEWS score of 3, 29.63% had score of 4, 7.41% had score of 5 and 3.70% had score of 6.

This research shows that the PEWS-RL has great test qualities for identifying children at risk of worsening clinical condition and needing assistance, and that it can be readily incorporated into clinical treatment. A PEWS score ≥3 implies close monitoring is essential, and the child requires intervention; a score ≥5 indicates necessity of ICU admission. It is helpful to provide nurses and doctors a resource that will help them come to a consensus on how to interpret physiological changes. To emphasize the significance of routinely documenting clinical measures and the fact that variations from "normal physiological parameters" are essentially unfavourable prognostic indicators, this approach may be of value on its own. Additionally, it is important to remember that the PEWS can only identify early worsening of clinical condition. Adequate resources and a defined quick response strategy must be available to successfully respond in relation to the patient.

BIBLIOGRAPHY

Bibliography:

1. Parshuram CS, Hutchison J, Middaugh K. Development and initial validation of the Bedside Paediatric Early Warning System score. Critcal Care. 2009;13(4):R135.
2. Miranda J de OF, Camargo CL de, Nascimento Sobrinho CL, Portela DS, Monaghan A. Accuracy of a pediatric early warning score in the recognition of clinical deterioration. Rev Lat Am Enfermagem. 2017;25.
3. Monaghan A. Detecting and managing deterioration in children. Paediatr Nurs. 2005;17(1):32-35.
4. World Health Organization (WHO). Latest Child Mortality Estimates Reveal World Remains off Track to Meeting Sustainable Development Goals.; 2021.
5. World Health Organization (WHO). Child Mortality (under 5 Years).; 2020.
6. UNICEF. Under-Five Mortality.; 2021.
7. Welfare M of H and F, India G of. The Fifth National Family Health Survey (NFHS-5).; 2021.
8. Lambert V, Matthews A, MacDonell R, Fitzsimons J. Paediatric early warning systems for detecting and responding to clinical deterioration in children: a systematic review. BMJ Open. 2017;7(3):e014497.
9. Subbe CP, Slater A, Menon D, Gemmell L. Validation of physiological scoring systems in the accident and emergency department. Emerg Med J. 2006;23(11):841-845.
10. Zachariasse JM, Nieboer D, Maconochie IK, Smit FJ, Alves CF, Greber-Platzer S, et al. Development and validation of a Paediatric Early Warning

Score for use in the emergency department: a multicentre study. Lancet Child Adolesc Heal. 2020;4(8):583-591.

11. Morgan RJM, Williams F, Wright MM. An early warning scoring system for detecting developing critical illness. Clin Intensive Care. 1997;8(2):100.

12. Trubey R, Huang C, Lugg-Widger F V, Hood K, Allen D, Edwards D, et al. Validity and effectiveness of paediatric early warning systems and track and trigger tools for identifying and reducing clinical deterioration in hospitalised children: a systematic review. BMJ Open. 2019;9(5):e022105.

13. Fuijkschot J, Vernhout B, Lemson J, Draaisma JMT, Loeffen JLCM. Validation of a Paediatric Early Warning Score: first results and implications of usage. Eur J Pediatr. 2015;174(1):15-21.

14. Duncan H, Hutchison J, Parshuram CS. The pediatric early warning system score: A severity of illness score to predict urgent medical need in hospitalized children. J Crit Care. 2006;21(3):271-78.

15. Edwards ED, Powell CVE, Mason BW, Oliver A. Prospective cohort study to test the predictability of the Cardiff and Vale paediatric early warning system. Arch Dis Child. 2009;94(8):602-06.

16. Bell D, Mac A, Ochoa Y, Gordon M, Gregurich MA, Taylor T. The Texas Children's Hospital Pediatric Advanced Warning Score as a Predictor of Clinical Deterioration in Hospitalized Infants and Children: A Modification of the PEWS Tool. J Pediatr Nurs. 2013;28(6):e2-e9.

17. Chapman SM, Grocott MPW, Franck LS. Systematic review of paediatric alert criteria for identifying hospitalised children at risk of critical deterioration. Intensive Care Med. 2010;36(4):600-11.

18. Akre M, Finkelstein M, Erickson M, Liu M, Vanderbilt L, Billman G. Sensitivity of the Pediatric Early Warning Score to Identify Patient Deterioration. Pediatrics. 2010;125(4):e763-69.

19. Tucker KM, Brewer TL, Baker RB, Demeritt B, Vossmeyer MT. Prospective Evaluation of a Pediatric Inpatient Early Warning Scoring System. J Spec Pediatr Nurs. 2009;14(2):79-85.

20. Brown SR, Martinez Garcia D, Agulnik A. Scoping Review of Pediatric Early Warning Systems (PEWS) in Resource-Limited and Humanitarian Settings. Front Pediatr. 2019;6.

21. McHugh MD, Lake ET. Understanding clinical expertise: nurse education, experience, and the hospital context. Res Nurs Health. 2010;33(4):276-87.

22. Parshuram CS, Dryden-Palmer K, Farrell C, Gottesman R, Gray M, Hutchison JS, et al. Evaluating processes of care and outcomes of children in hospital (EPOCH): study protocol for a randomized controlled trial. Trials. 2015;16:245.

23. Basch E, Deal AM, Kris MG, Scher HI, Hudis CA, Sabbatini P, et al. Symptom monitoring with patient-reported outcomes during routine cancer treatment: a randomized controlled trial. J Clin Oncol. 2016;34(6):557.

24. Hillman KM, Bristow PJ, Chey T, Daffurn K, Jacques T, Norman SL, et al. Antecedents to hospital deaths. Intern Med J. 2001;31(6):343-48.

25. Andersen LW, Kim WY, Chase M, Mortensen SJ, Moskowitz A, Novack V, et al. The prevalence and significance of abnormal vital signs prior to in-hospital cardiac arrest. Resuscitation. 2016;98:112-17.

26. Ridley S. The recognition and early management of critical illness. Ann R

Coll Surg Engl. 2005;87(5):315.

27. Goldhill DR, Worthington L, Mulcahy A, Tarling M, Sumner A. The patient-at-risk team: identifying and managing seriously ill ward patients. ANAESTHESIA-LONDON-. 1999;54:853-860.

28. Prytherch DR, Smith GB, Schmidt PE, Featherstone PI. ViEWS—towards a national early warning score for detecting adult inpatient deterioration. Resuscitation. 2010;81(8):932-37.

29. RCoPo L. National early warning score (NEWS): standardising the assessment of acute-illness severity in the NHS—report of a working party. In: Royal College of Physicians. ; 2012.

30. RCP. Royal College of physicians. National early warning score (news) 2: standardising the assessment of acute-illness severity in the NHS. updated report of a working Party. In: RCP London; 2017.

31. Cand MKBhs, Cand CWBhs, Cand AKBhs. The admission Hamilton Early Warning Score (HEWS) predicts the risk of critical event during hospitalization. Can J Gen Intern Med. 2016;11(4).

32. Lee SB, Kim DH, Kim T, Kang C, Lee SH, Jeong JH, et al. Emergency Department Triage Early Warning Score (TREWS) predicts in-hospital mortality in the emergency department. Am J Emerg Med. 2020;38(2):203-10.

33. Smith GB, Prytherch DR, Meredith P, Schmidt PE, Featherstone PI. The ability of the National Early Warning Score (NEWS) to discriminate patients at risk of early cardiac arrest, unanticipated intensive care unit admission, and death. Resuscitation. 2013;84(4):465-70.

34. Myrstad M, Ihle-Hansen H, Tveita AA, Andersen EL, Nygård S, Tveit A, et al. National Early Warning Score 2 (NEWS2) on admission predicts

severe disease and in-hospital mortality from Covid-19–a prospective cohort study. Scand J Trauma Resusc Emerg Med. 2020;28(1):1-8.

35. Odetola FO, Gebremariam A, Freed GL. Patient and hospital correlates of clinical outcomes and resource utilization in severe pediatric sepsis. Pediatrics. 2007;119(3):487-94.

36. Tibballs J. Reduction of paediatric in-patient cardiac arrest and death with a medical emergency team: preliminary results. Arch Dis Child. 2005;90(11):1148-52.

37. Parshuram CS, Dryden-Palmer K, Farrell C, Gottesman R, Gray M, Hutchison JS, et al. Effect of a Pediatric Early Warning System on All-Cause Mortality in Hospitalized Pediatric Patients. JAMA. 2018;319(10):1002.

38. Gold DL, Mihalov LK, Cohen DM. Evaluating the Pediatric Early Warning Score (<scp>PEWS</scp>) System for Admitted Patients in the Pediatric Emergency Department. Walthall J, ed. Acad Emerg Med. 2014;21(11):1249-56.

39. Parshuram CS, Bayliss A, Reimer J, Middaugh K, Blanchard N. Implementing the Bedside Paediatric Early Warning System in a community hospital: A prospective observational study. Paediatr Child Health. 2011;16(3):e18-e22.

40. Ramteke DS, Tikkas DR, Jain DA. Pediatric early warning score as a prognostic indicator in critically ill children - a prospective study. Pediatr Rev Int J Pediatr Res. 2018;5(2):66-71.

41. Chaiyakulsil C, Pandee U. Validation of pediatric early warning score in pediatric emergency department. Pediatr Int. 2015;57(4):694-698.

42. Breslin K, Marx J, Hoffman H, McBeth R, Pavuluri P. Pediatric early

warning score at time of emergency department disposition is associated with level of care. Pediatr Emerg Care. 2014;30(2):97-103.

43. Lillitos PJ, Hadley G, Maconochie I. Can paediatric early warning scores (PEWS) be used to guide the need for hospital admission and predict significant illness in children presenting to the emergency department? An assessment of PEWS diagnostic accuracy using sensitivity and specificity. Emerg Med J. 2016;33(5):329-37.

44. Skaletzky SM, Raszynski A, Totapally BR. Validation of a Modified Pediatric Early Warning System Score. Clin Pediatr (Phila). 2012;51(5):431-35.

45. McLellan MC, Gauvreau K, Connor JA. Validation of the Children's Hospital Early Warning System for Critical Deterioration Recognition. J Pediatr Nurs. 2017;32:52-58.

46. Elencwajg MMD., Grisolía NAMD., Meregalli CMD., Montecuco MAMD., Montiel MVMD., Gabriela M. Rodríguez MD., et al. Usefulness of an early warning score as an early predictor of clinical deterioration in hospitalized children. Arch Argent Pediatr. 2020;118.

47. Kowalski RL, Lee L, Spaeder MC, Moorman JR, Keim-Malpass J. Accuracy and Monitoring of Pediatric Early Warning Score (PEWS) Scores Prior to Emergent Pediatric Intensive Care Unit (ICU) Transfer: Retrospective Analysis. JMIR Pediatr Parent. 2021;4(1):e25991.

48. Chapman SM, Oulton K, Peters MJ, Wray J. Missed opportunities: incomplete and inaccurate recording of paediatric early warning scores. Arch Dis Child. 2019;104(12):1208-13.

49. Mills D, Schmid A, Najajreh M, Al Nasser A, Awwad Y, Qattush K, et al. Implementation of a pediatric early warning score tool in a pediatric

oncology Ward in Palestine. BMC Health Serv Res. 2021;21(1):1159.

50. Niu X, Tilford B, Duffy E, Kobayashi H, Ryan K, Johnson M, et al. Feasibility and Reliability of Pediatric Early Warning Score in the Emergency Department. J Nurs Care Qual. 2016;31(2):161-66.

51. Solevåg AL, Eggen EH, Schröder J, Nakstad B. Use of a Modified Pediatric Early Warning Score in a Department of Pediatric and Adolescent Medicine. Sun Q, ed. PLoS One. 2013;8(8):e72534.

52. Seiger N, Maconochie I, Oostenbrink R, Moll HA. Validity of different pediatric early warning scores in the emergency department Pediatrics. 2013 Oct;132(4):e841-50.

53. Olson D, Davis NL, Milazi R, Lufesi N, Miller WC, Preidis GA, et al. Development of a severity of illness scoring system (inpatient triage, assessment and treatment) for resource-constrained hospitals in developing countries. Trop Med Int Heal. 2013;18(7):871-878.

54. Agulnik A, Méndez Aceituno A, Mora Robles LN, Forbes PW, Soberanis Vasquez DJ, Mack R, et al. Validation of a pediatric early warning system for hospitalized pediatric oncology patients in a resource- limited setting. Cancer. 2017;123(24):4903-13.

55. Obermeyer Z, Abujaber S, Makar M, Stoll S, Kayden SR, Wallis LA, et al. Emergency care in 59 low-and middle-income countries: a systematic review. Bull World Health Organ. 2015;93:577-586.

56. Olson D, Preidis GA, Milazi R, Spinler JK, Lufesi N, Mwansambo C, et al. Task shifting an inpatient triage, assessment and treatment programme improves the quality of care for hospitalised Malawian children. Trop Med Int Heal. 2013;18(7):879-86.

57. Agulnik A, Mora Robles LN, Forbes PW, Soberanis Vasquez DJ, Mack

R, Antillon-Klussmann F, et al. Improved outcomes after successful implementation of a pediatric early warning system (PEWS) in a resource-limited pediatric oncology hospital. Cancer. 2017;123(15):2965-2974.

58. Sridhar S, Schmid A, Biziyaremye F, Hodge S, Patient N, Wilson K. Implementation of a Pediatric Early Warning Score to Improve Communication and Nursing Empowerment in a Rural District Hospital in Rwanda. Glob Heal Sci Pract. 2020;8(4):838-45.

59. Rosman SL, Karangwa V, Law M, Monuteaux MC, Briscoe CD, McCall N. Provisional Validation of a Pediatric Early Warning Score for Resource-Limited Settings. Pediatrics. 2019;143(5).

60. Sandell DJ. SOUTH COAST CHILDREN's EARLY WARNING SCORE. NHS Institute for Innovation & Improvement PEWS Scoring system. [Internet].

61. B E, J F, Johns Hopkins Hospital. The Harriet Lane Handbook. 20 th. Elsevier Inc; 2015.

62. Vredebregt SJ, Moll HA, Smit FJ, Verhoeven JJ. Recognizing critically ill children with a modified pediatric early warning score at the emergency department, a feasibility study. Eur J Pediatr. 2019;178(2):229-34.

ANNEXURES

ANNEXURES

PROFORMA

1. **NAME:**
2. **AGE:**
3. **GENDER:**
4. **UHID NUMBER:**
5. **ADDRESS:**
6. **PHONE NUMBER:**
7. **PRESENTING COMPLAINTS:**
8. **DIAGNOSIS:**

INVESTIGATOR NUMBER: 9980375055

PEWS-RL consists of 6 variables with possible score on each variable of 0 & 1, and a cumulative score between 0 to 6.

Charts based on vital parameters for different age groups are used:1mth- 12 months, 1-4 years, 5-12 years, and>13yr.

Variable	Respiratory rate	Respiratory distress	Heart rate	Temperature	Oxygen use	Mental state
Uncoloured area in chart	0	0	0	0	0	0
Coloured area in chart	1	1	1	1	1	1

CENTRE HOSPITALIER UNIVERSITAIRE DE KIGALI
UNIVERSITY TEACHING HOSPITAL OF KIGALI
CHUK

TAB 6: **VITAL SIGNS** 1st Form (CHUK 012)

VITAL SIGNS & Early Warning Score

Age 2 Months → 11 Months Old **Page No:** ____

PATIENT Identification

ID No: _____
Last Name: _____
First Name: _____
DOB: ___ / ___ / ___ Sex: M F

Day of Week:																							
Date:			__/__/__						__/__/__								__/__/__						
Time:																							
Respiratory Rate x	≥60																						
	50																						
	40																						
	30																						
	≤20																						
Respiratory Distress	No x																						
	Yes x																						
Heart Rate •	≥190																						
	180																						
	170																						
	160																						
	150																						
	140																						
	130																						
	120																						
	110																						
	100																						
	90																						
	80																						
	≤70																						
Systolic BP V	≥110																						
	110																						
	100																						
	90																						
	80																						
	70																						
	≤60																						
Temperature ⊙	≥39																						
	38																						
	37																						
	36																						
	≤35																						
Respiratory Rate																							
Heart Rate																							
Systolic BP																							
Diastolic BP																							
Temperature																							
Oxygen Sat %																							
Oxygen L/min																							
Pain Score (0 – 10)																							
Mental Status 15 Normal (X)																							
Decreased (X)																							

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CHUK

TAB 6: **VITAL SIGNS** 1st Form (CHUK 011)

VITAL SIGNS & Early Warning Score

Age 1 Year → 4 Years Old **Page No:** _____

PATIENT Identification

ID No: _____
Last Name: _____
First Name: _____
DOB: ___ / ___ / ___ Sex: *M* *F*

Day of Week:			
Date:	__/__/__	__/__/__	__/__/__
Time:			
Respiratory Rate x	≥50, 40, 30, 20, ≤10		
Respiratory Distress	*No* x / *Yes* x		
Heart Rate •	≥170, 160, 150, 140, 130, 120, 110, 100, 90, 80, ≤70		
Systolic Blood Pressure V	≥130, 120, 110, 100, 90, 80, ≤70		
Temperature ⊙	≥39, 38, 37, 36, ≤35		
Respiratory Rate			
Heart Rate			
Systolic BP			
Diastolic BP			
Temperature			
Oxygen Sat %			
Oxygen L/min			
Pain Score (0 – 10)			
Mental Status	*15 Normal (X)* / *Decreased (X)*		

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UNIVERSITY TEACHING HOSPITAL OF KIGALI
CHUK

TAB 6: **VITAL SIGNS** 1st Form (CHUK 010)

VITAL SIGNS & Early Warning Score

Age 5 Years Old → 12 Years Old **Page No:** ____

PATIENT Identification

ID No: _____
Last Name: _____
First Name: _____
DOB: ___ / ___ / ___ **Sex:** *M* *F*

Day of Week:																							
Date:	__/__/__								__/__/__								__/__/__						
Time:																							
Respiratory Rate x	≥35																						
	30																						
	25																						
	20																						
	15																						
	≤10																						
Respiratory Distress	*No* x																						
	Yes x																						
Heart Rate •	≥140																						
	130																						
	120																						
	110																						
	100																						
	90																						
	80																						
	70																						
	≤60																						
Systolic Blood Pressure V	≥140																						
	130																						
	120																						
	110																						
	100																						
	90																						
	80																						
	≤70																						
Temperature ⊙	≥39																						
	38																						
	37																						
	36																						
	≤35																						
Respiratory Rate																							
Heart Rate																							
Systolic BP																							
Diastolic BP																							
Temperature																							
Oxygen Sat %																							
Oxygen L/min																							
Pain Score (0 – 10)																							
Glasgow Coma *15 Normal (X)*																							
Decreased (№)																							

CENTRE HOSPITALIER UNIVERSITAIRE DE KIGALI
UNIVERSITY TEACHING HOSPITAL OF KIGALI
CHUK

TAB 6: **VITAL SIGNS** 1st Form (CHUK 009)

VITAL SIGNS & Early Warning Score

Age 13+ Years Old → Adult **Page No:** ____

PATIENT Identification

ID No: _____
Last Name: _____
First Name: _____
DOB: ___ / ___ / ___ Sex: *M* *F*

Day of Week:			
Date:	__/__/__	__/__/__	__/__/__
Time:			
Respiratory Rate x	≥30, 25, 20, 15, ≤10		
Respiratory Distress	*No* x / *Yes* x		
Heart Rate •	≥150, 140, 130, 120, 110, 100, 90, 80, 70, 60, ≤50		
Systolic Blood Pressure V	≥140, 130, 120, 110, 100, 90, 80, ≤70		
Temperature ⊙	≥39, 38, 37, 36, ≤35		
Respiratory Rate			
Heart Rate			
Systolic BP			
Diastolic BP			
Temperature			
Oxygen Sat %			
Oxygen L/min			
Pain Score (0 – 10)			
Glasgow Coma	*15 Normal* (X) / *Decreased* (№)		

PEWS-RL CHART OBSERVATIONS

HOURS																
TOTAL PEWS-RL SCORE																
INTERVENTION																

INTERVENTION, IF YES.

DETAILS OF INTERVENTION:

PLACE OF ACTIVE INTERVENTION: WARD/PICU
PEWS SCORE AT THE TIME OF ACTIVE INTERVENTION
NATURE OF INTERVENTION:
PROCEDURE DONE:
DURATION OF TREATMENT:
OUTCOME:
TOTAL LENGTH OF HOSPITAL STAY
FINAL DIAGNOSIS

INFORMED CONSENT FORM

Date:

I, Mr/Mrs..... have been explained in my own vernacular language that my child will be included in the study, EVALUATION OF THE EFFECTIVENESS OF PEDIATRIC EARLY WARNING SCORE IN RESOURCE LIMITED SETTINGS (PEWS-RL) – A PROSPECTIVE STUDY

I hereby give my valid written informed consent without any force or prejudice for recording the observations of physical parameters of my child on the PEWS-RL chart. The nature and risks involved have been explained to me to my satisfaction. I have been explained in detail about the study being conducted. I have read the patient information sheet and I have had the opportunity to ask any question. Any question that I have asked, have been answered to my satisfaction. I consent voluntarily to participate my child as a participant in this research. I hereby give consent to provide my child's history, undergo physical examination, undergo the procedure and provide its results and documents etc., to the doctor / institute etc. and all the data may be published or used for any academic purpose. I will not hold the doctors / institute etc., responsible for any untoward consequences during the procedure / study. A copy of this Informed Consent Form and Patient Information Sheet has been provided to the participant.

_____

(Signature & Name of Pt. Attendant)

_____

(Signature/Thumb impression & Name of Patient/Guardian)

(Relation with patient)

Witness:

_____

(Signature & Name of Research person /doctor)

ಒಪ್ಪಿಗೆಪತ್ರ

ದಿನಾಂಕ:

ನನ್ನ ಮಗುವನ್ನು ಅಧ್ಯಯನದಲ್ಲಿ ಸೇರಿಸಲಾಗುವುದು ಎಂದು ನಾನು, Mr/ Mrs,……ಅನ್ನು ನನ್ನ ಸ್ವಂತ ಭಾಷೆಯಲ್ಲಿ ವಿವರಿಸಲಾಗಿದೆ, ಸಾಮಾನ್ಯ ಪೀಡಿಯಾಟ್ರಿ ಕ್ವಾರ್ಡ್‌ಗಳಲ್ಲಿ ಒಂದು ಮುಂಚಿನ ಎಚ್ಚರಿಕೆ ವ್ಯವಸ್ಥೆಯಾಗಿ (ಇಡಬ್ಲ್ಯು ಎಸ್) ಮಾರ್ಪಡಿಸಿದ ಬೈಗ್ಟನ್ಪೀಡಿಯಾಟ್ರಿಕ್ ಎರ್ಲಿವಾರ್ನಿಂಗ್ಸ್ಕೋರ್ಮೌಲ್ಯಮಾಪನ.

ಮಾರ್ಪಡಿಸಿದ ಇಯುಎ ಸ್ಕಾಟ್ಲ್ಯಾಂಡ್‌ನಲ್ಲಿ ನನ್ನ ಮಗುವಿನ ಭೌತಿಕನಿಯ ತಾಂಕಗಳ ಅವಲೋಕನಗಳನ್ನು ದಾಖಲಿಸಲು ಯಾವುದೇ ಬಲ ಅಥವಾಪೂರ್ವಾಗ್ರಹ ವಿಲ್ಲದೆನನ್ನ ಮಾನ್ಯಲಿಖಿತತಿಳುವಳಿಕೆಯ ಒಪ್ಪಿಗೆಯನ್ನು ನಾನು ಈ ಮೂಲಕನೀಡುತ್ತೇನೆ. ಒಳಗೊಂಡಿರುವಸ್ವರೂಪ ಮತ್ತು ಅಪಾಯಗಳನ್ನು ನನ್ನ ತೃಪ್ತಿಗೆ ವಿವರಿಸಲಾಗಿದೆ. ನಡೆಸುತ್ತಿರುವ ಅಧ್ಯಯನದ ಬಗ್ಗೆ ನನಗೆ ವಿವರವಾಗಿ ವಿವರಿಸಲಾಗಿದೆ. ನಾನು ರೋಗಿಯ ಮಾಹಿತಿಹಾಳೆಯನ್ನು ಓದಿದ್ದೇನೆ ಮತ್ತು ಯಾವುದೇಪ್ರಶ್ನೆ ಕೇಳುವಅವಕಾಶನನಗೆಸಿಕ್ಕಿದೆ. ನಾನು ಕೇಳಿದಯಾವು ದೇಪ್ರಶ್ನೆಗೆನನ್ನ ತೃಪ್ತಿಗೆ ಉತ್ತರಿಸಲಾಗಿದೆ. ಈ ಸಂಶೋಧನೆಯಲ್ಲಿ ನನ್ನ ಮಗುವನ್ನು ಭಾಗವಹಿಸಲು ನಾನು ಸ್ವಯಂಪ್ರೇರಣೆಯಿಂದ ಒಪ್ಪುತ್ತೇನೆ. ನನ್ನ ಮಗುವಿನ ಇತಿಹಾಸವನ್ನು ಒದಗಿಸಲು, ದೈಹಿಕಪರೀಕ್ಷೆಗೆ ಒಳಗಾಗಲು, ಕಾರ್ಯವಿಧಾನಕ್ಕೆಒಳಗಾಗಲು,
ತನಿಖೆಗೆಒಳಗಾಗಲುಮತ್ತುಅದರಫಲಿತಾಂಶಗಳುಮತ್ತುದಾಖಲೆಗಳನ್ನುಇತ್ಯಾದಿಗಳನ್ನುವೈದ್ಯರಿಗೆ / ಸಂಸ್ಥೆಗೆ ಒದಗಿಸಲು ನಾನು ಈ ಮೂಲಕ ಒಪ್ಪಿಗೆ ನೀಡುತ್ತೇನೆ ಮತ್ತು ಎಲ್ಲಾಡೇಟಾವನ್ನು ಯಾವುದೇಶೈಕ್ಷಣಿಕ ಉದ್ದೇಶಕ್ಕಾಗಿ ಪ್ರಕಟಿಸಬಹುದು ಅಥವಾ ಬಳಸ ಬಹುದು. ಕಾರ್ಯವಿಧಾನ / ಅಧ್ಯಯನದ ಸಮಯದಲ್ಲಿ ಯಾವುದೇ ಅಹಿತಕರ ಪರಿಣಾಮಗಳಿಗೆ ನಾನು ವೈದ್ಯರು / ಸಂಸ್ಥೆಇತ್ಯಾದಿಗಳನ್ನುಹೊಂದಿಲ್ಲ. ಭಾಗವಹಿಸುವವರಿಗೆ ಈ ತಿಳುವಳಿಕೆಯುಳ್ಳ ಒಪ್ಪಿಗೆ ನಮೂನೆ ಮತ್ತು ರೋಗಿಯ ಮಾಹಿತಿ ಹಾಳೆಯನಕಲನ್ನು ಒದಗಿಸಲಾಗಿದೆ.

_____

(ರೋಗಿಯ ಅಟೆಂಡೆಂಟ್‌ನ ಸಹಿ ಮತ್ತು ಹೆಸರು)

_____

(ಸಹಿ / ಹೆಬ್ಬೆರಳುಮುದ್ರಣಮತ್ತುರೋಗಿಯಹೆಸರು / ರಕ್ಷಕ)

(ರೋಗಿಯೊಂದಿಗೆಸಂಬಂಧ)

ಸಾಕ್ಷಿ:

_____

(ಸಹಿಮತ್ತುಸಂಶೋಧನಾವ್ಯಕ್ತಿ / ವೈದ್ಯರಹೆಸರು)

EVALUATION OF THE EFFECTIVENESS OF PEDIATRIC EARLY WARNING SCORE IN RESOURCE LIMITED SETTINGS (PEWS-RL) – A PROSPECTIVE STUDY

PATIENT INFORMATION SHEET

I, Dr Bindu T, post-graduate student in Department of Pediatrics at Sri Devaraj Urs Medical College, will be conducting a study titled "EVALUATION OF THE EFFECTIVENESS OF PEDIATRIC EARLY WARNING SCORE IN RESOURCE LIMITED SETTINGS (PEWSRL)– A PROSPECTIVE STUDY" for my dissertation under the guidance of Dr. Sudha Reddy V R, Professor and Head of the Department, Department of Pediatrics. The participants of this study i.e., children (from 2 months -18years) will be included in observational study where in the vital parameters of the participants i.e., children will be monitored at serial intervals and recorded in PEWS-RL. You will not be paid any financial compensation for participating in this research project.

All the data will be kept confidential and will be used only for research purpose by this institution. You are free to provide consent for participation of your child in the study. You can also withdraw your child from the study at any point of time without giving any reasons whatsoever. Your refusal to participate will not prejudice you to any present or future care at this institution.

Name and Signature of the Principal Investigator

Date:

Place:

KEY OF THE MASTER SHEET:

Variable Name	
Age	1=2-11 months, 2=1-4 years, 3=5-12 years, 4=≥13 years
Gender	1=Male, 2=Female
Need of Active Intervention	1=Yes, 2=No
Active intervention in Ward	1=Yes, 2=No
Active intervention to PICU	1=Yes, 2=No
Place of intervention	1=In ward, 2=In PICU, 3=No Active intervention
PEWS score at the time of Intervention	0=Score 0, 3=Score 3, 4=Score 4, 5=Score 5, 6=Score 6
Time of active intervention based on admission	1=Within 24 hours, 2=24- 48 hours, 3=> 48 hours, 4=Not applicable
Outcome During Hospital stay	1=Discharge
Deterioration at the time of transfer	1=Deterioration, 2=No deterioration
Length of stay in hospital	1=1-3 days, 2=4-5 days, 3=6-7 days, 4=8-10 days, 5=>10 days

Dr.Bindu Master sheet

Serial number	Age	Gender	Need of Active Intervention	Active intervention in Ward	Active intervention to PICU	Place of intervention	PEWS score at the time of Intervention	Time of active intervention based on admission	Outcome During Hospital stay	Deterioration at the time of transfer	Length of stay in hospital
1	2	1	2	2	2	3	0	4	1	2	2
2	1	1	2	2	2	3	0	4	1	2	3
3	3	2	2	2	2	3	0	4	1	2	3
4	2	2	2	2	2	3	0	4	1	2	2
5	4	2	2	2	2	3	0	4	1	2	2
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