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RESEARCH ARTICLE

ENHANCING PATIENT OUTCOMES: THE IMPACT OF EARLY IDENTIFICATION AND ACTIVE SURVEILLANCE OF REDUCING SEPSIS MORTALITY RATES THROUGH THE USE OF MODIFIED EARLY WARNING SCORE (MEWS)

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Abstract

The study aims to determine the effectiveness and efficiency of Modified Early Warning Scores (MEWS) in reducing at least 20 percent of sepsis-related mortality rates. The scope of the study to determine the effectiveness and efficiency covered a whole year of 2023 with a total participants of 272 with sepsis-related cases. The participants were selected using total enumeration sampling wherein all of them were participated in the in the experiments of early detection of sepsis symptoms and provide a timely interventions to prevent sepsis deterioration. This study utilized an experimental research design in order to answer the objectives that could provide clear and thorough data on the effectiveness and efficiency of MEWS. Based on the findings, the MEWS were found effective and efficient in assessing sepsis-related signs and symptoms towards early detection and can provide intervention to reduce mortality rate. The project helped in reducing healthcare costs by decreasing mortality rate from 50% to 20% and LOS was shortened from 12.2 to 5.04 after implementation. Improving sepsis pathway sustained a mortality rate below 25% for 6 months' post-implementation, also successfully identifying and intervening with more patients exhibiting early symptoms of sepsis. Moreover, the decreased LOS accommodated 53% more ICU patients than the same period in 2022. Systematic sepsis evaluation is proven to improve patient outcomes delivering efficient, value-based, and high-quality care in a government hospital in Riyadh Saudi Arabia- Imam Abdulrahman Al Faisal.

Introduction:-

Sepsis-related cases is a critical medical issues because the body parts are infected by infection resulting to improperly respond that causing the organs to work poorly. The infected body parts cause by septic shock can damage the human organs because of septic shock in blood pressure (Mayo Clinic, 2023).

Health care practitioners specifically in one of the government hospital in Riyadh Saudi Arabia- Imam Abdulrahman Al Faisal had optimizing the pathway and plays an essential role for identification, management and treatment towards continuous healthcare delivery commitment and excellence.

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Clinical Audit Department observed a significant increase rate of sepsis in the year 2023. The increase of sepsis rate is alarming, that is why they find ways to prevent and reduce sepsis-related cases through the use of Modified Early Warning Score (MEWS).

This MEWS is a device that use to have a systematic sepsis evaluation and immediately assess admitted patients if there are presents signs and symptoms of sepsis. Through the use of MEWS healthcare practitioners in the hospital could immediately helped patients for fast healing and recovery.

The used of devices such as Early Warning Scores (EWS) for sepsis was significant for quickrecognition and identification of sepsis is important in general ward settings, (Yu, Shivakumar, Betthauser, et al., 2021).

Immediate identification and cureof action are play significant role to prevent and or reduce septic cases. The use of MEWS is very essential because the modification of the projects features early warnings scores of sepsis measurement vital signs and symptoms to immediately address and response to the sepsis patients for life – threatening disease.

An early warning scores obtained from MEWS can be used by health practitioners to quickly provide medical services for sepsis patient based on the degree of illness obtained. The used of MEWS can be a great help especially for sepsis host for their immediate curing stage and save them from death.

Due to the alarming rate of sepsis patient in Imam Abdulrahman Al Faisal Hospital, the Clinical Audit team was immediately utilized MEWS to monitor, evaluate and assess patient in daily round basis.

Based on their assessment in Year 2023, on the first month about 50% of sepsis-related mortality was recorded. Therefore, the Sepsis-Task Force was immediately formed to lead in the initiation of using MEWS projects to accurately management and immediately response in treatment of sepsis-related case and ensure to improve pathway activation of the project to achieve at least 20% reduction in the mortality rates.

According to Gauer, Forbes, & Boyer (2020), the used of important tool such as sepsis diagnostic device found a significant role for early diagnosis so that for fast action treatment focusing management and preventing continuing rates of septic patients and death, physical disability, cognitive impairment and improve quality of life of sepsis patient.

The Clinical Audit Department observed a significant growth in the mortality rate cases of sepsis are due to low compliance with sepsis care bundles. Moreover, we observed a breach in the aseptic technique and a major delay in activating sepsis pathways. These issues caused overcrowding in the Emergency Department and gaps in sepsis management. During daily rounds to various departments, we encountered healthcare staff who weren't fully aware of sepsis policies and proper assessment and documentation of MEWS scores in patient files. We have discovered that some of the VBG machines are malfunctioning, whereas other departments do not have any machines at all

By this alarming sepsis rate, the improvement of the project was started in February 2023 after the initial investigation on January 2023. The project MEWS aims to determine the effectiveness and efficiency in transforming patient outcomes by enhancing adherence to sepsis bundles and optimizing pathway activation to achieve 20% reduction in mortality rates.

Methodology:-

This study project assess the sepsis-related signs and symptoms through the use of MEWS utilized an experimental research design to determine the effectiveness and efficiency as an early detection that optimizing time intervention and optimizing pathway activation to achieve 20% reduction in mortality rate.

Figure 1 shows the Fishbone-Sepsis mortality rate processes:

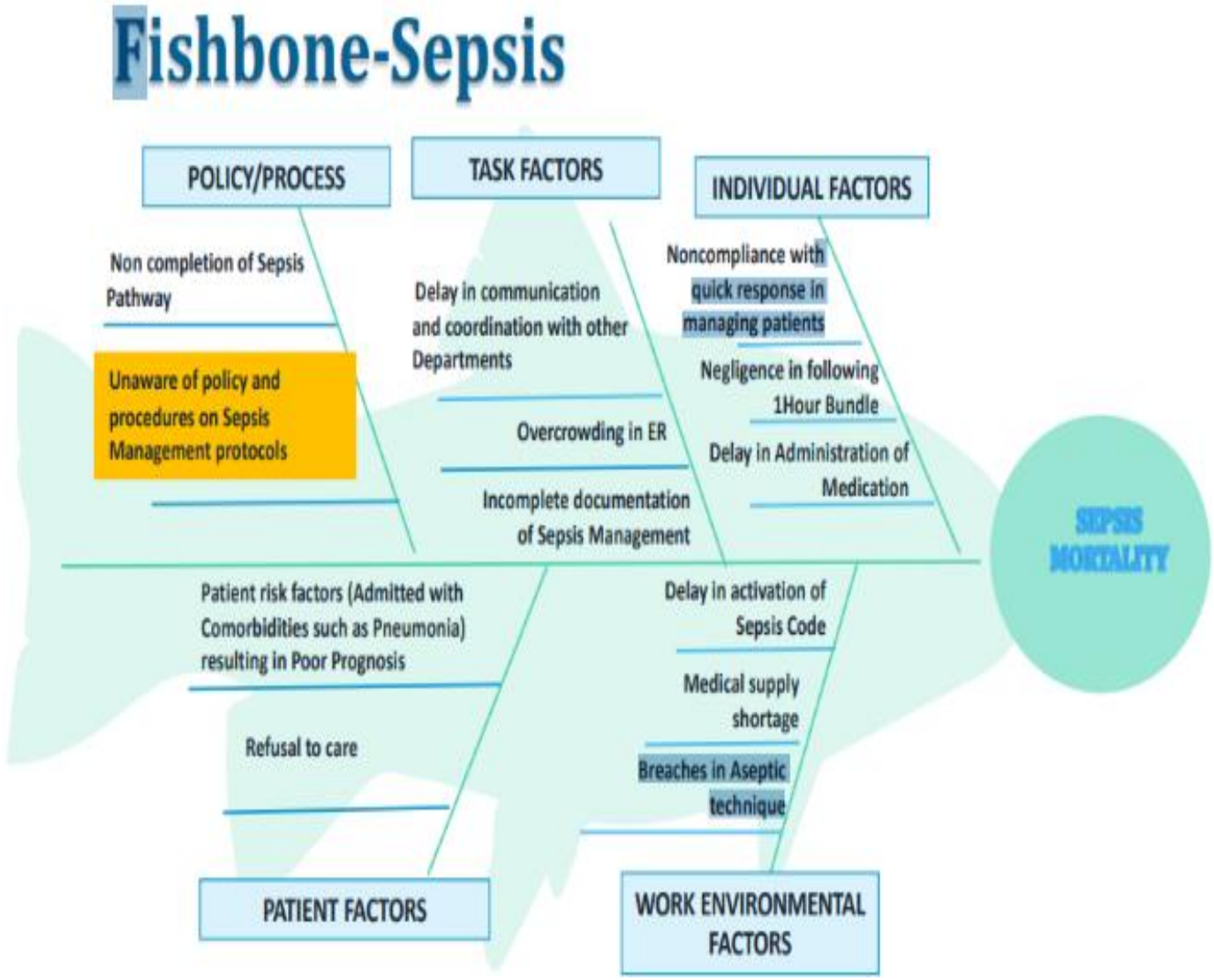

Figure 1:- Fishbone of MEWS Project.

This project established a Sepsis Committee that monitors the sepsis protocols, OVRs, and compliance with sepsis pathways recognizing the significance of timely intervention to prevent the deterioration of the condition and reduce the length of hospital stay while providing value-based care and overall satisfaction

The project aims to accomplish several goals. First, the researchers aim to increase the compliance rate to sepsis bundles and the activation of sepsis pathways by assessing all patients both in ED and admitted using MEWS. Second, to improve the early identification of sepsis, as well as timely management. Third, to raise awareness among healthcare staff about sepsis. Fourth, to increase the number of reported and resolved sepsis cases. Ultimately, we aim to reduce the sepsis-related mortality rate in IAFH by 20% to enhance patient safety and align with the latest evidence-based practices.

Figure 2 shows the latest evidence-based sepsis mortality rate in year 2023.

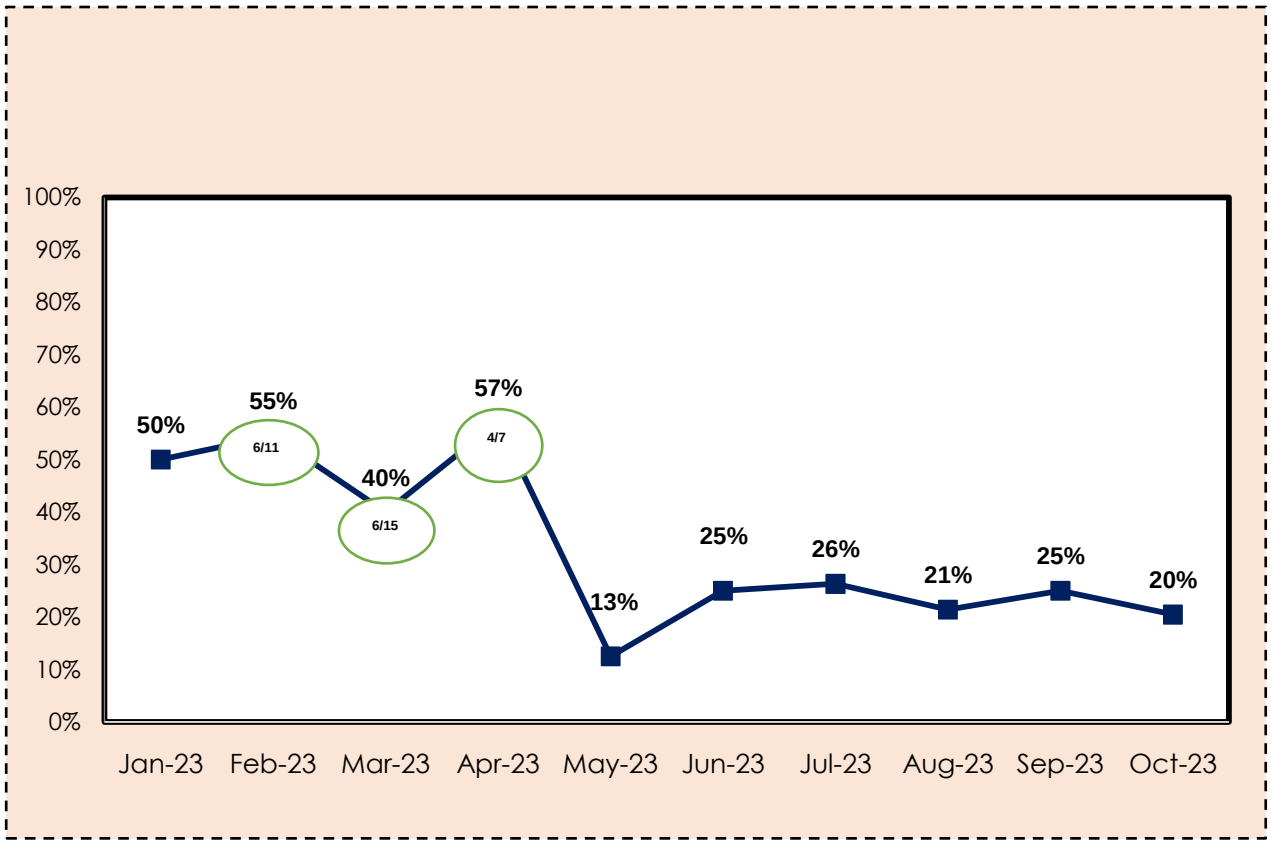

Figure 2:- Evidence-Based Sepsis Mortality 2023.

Methods and Procedures:-

The following methods and procedures were followed with engagement activities conducted on the determination of effectiveness and efficiency of MEWS on sepsis-related cases on reducing mortality rate as shows in figure 3.

Analysis of Data:

Understood the current state of sepsis-related mortality rates.

1. Analyzed historical data to identify trends and patterns in sepsis-related mortality.
2. Conducted a thorough examination of patient records to determine common risk factors and characteristics associated with sepsis-related fatalities.

Root Cause Analysis:

Identified the underlying causes contributing to the increase in sepsis-related mortality.

1. Utilized root cause analysis techniques, such as Fishbone diagrams to pinpoint factors leading to unfavorable outcomes.
2. Engaged with frontline staff to gather insights into challenges and gaps in the current sepsis pathway.
3. Identifying internal and external factors through utilization of SWOT analysis are one of the factors influencing the project's success.

Sepsis Committee Taskforce:

We created a committee that will be the facilitators for the planned improvement. The team includes all hospital leaders, coordinators, Clinical Excellence team, HOD, and data collectors.

1. We analyzed the previous months' data to gather information as to why there was an increase in the Mortality Rate caused by sepsis and delays in activation of the sepsis pathway.
2. Collaborated with the project team to establish clear and quantifiable goals for reducing sepsis-related mortality.

Communication Planning:
Developed a communication plan to ensure transparent and effective dissemination of information.
1. We've collaborated with all healthcare professionals to guarantee that on-time and appropriate interventions are provided and to ensure patient safety.
2. Immediate reporting to physicians for evaluation of patients with high MEWs scores to determine if they have sepsis or not.

Project Activities and Implementation:
1. During rounds, any patient who displays signs of an infection, but is not a confirmed case of sepsis, is closely monitored by the team especially those who are at risk of developing sepsis with deteriorating conditions.
2. Malfunctioning VBG machines were found and other VBG machines were redistributed to other departments in need specifically Emergency Department.

Planning and development of project
The researchers utilized the lean methodology and worked as one in setting objectives and planning implementation to attain the project goals. Conducted a thorough assessment of current sepsis-related data, mortality rates, and existing pathway inefficiencies. The used of SMART- specific, measurable, achievable, relevant, and time-bound are contributing factors to identify and observed the increase of sepsis-related mortality rate. The researchers-health practitionerswork together with the pharmacy to ensure the availability of the antibiotics and fluids needed to guarantee timely interventions are provided.

Education and Training:
At IAFH, sepsis management is a priority, and various strategies have been implemented to improve patient outcomes. One such strategy is increasing education for healthcare providers on sepsis management. This report will examine the importance of education in sepsis management and how it can benefit the hospital. Implemented evidence-based best practices for sepsis management.

Training Activities:
IAFH has implemented training activities for healthcare providers to increase their knowledge and skills in sepsis management. Developed comprehensive training programs for healthcare professionals to enhance awareness, early detection, and intervention in sepsis cases. The education sessions cover topics such as the use of the MEWS score, the sepsis bundle, and the importance of hand hygiene.

Education for Patients and Their Families:
Education on sepsis management is also essential for patients and their families. Patients and their families should be aware of the signs and symptoms of sepsis, such as fever, chills, and rapid heartbeat. They should also be educated on the importance of seeking medical attention immediately if they suspect sepsis.

Strict Compliance to Sepsis Bundle and Proper Documentation:
To provide the highest level of care to patients, it is important to comply with the sepsis bundle and proper documentation of the MEWS score in the patient's file. Daily rounds also were done to follow up not only on the documentation in patient files but also on the patients at risk of developing sepsis. By following the sepsis bundle, healthcare professionals can identify sepsis early on and initiate appropriate treatment promptly, which can significantly improve patient outcomes. During daily rounds, issues were found and addressed to hasten the management of sepsis. After this, OVRs were raised to address other delays found in the sepsis protocol.

Supervision and Monitoring of sepsis bundle by the Committee:

1. The Sepsis Committee has a responsibility to provide direct supervision of the sepsis care bundle to ensure that patients receive prompt and effective care.
2. Form a dedicated Sepsis Committee responsible for regularly reviewing data, conducting outcome variance reports (OVRs), and ensuring compliance with sepsis care bundles.
3. Establish performance indicators to monitor the advancement in the project.
4. Encourage a continuous improvement mind-set, where the project team regularly assesses and refines strategies based on feedback and evolving best practices.

The implemented comprehensive planning and approach of the project aims to systematically address sepsis care processes, engage stakeholders, and foster a culture of continuous improvement, ultimately working towards the targeted reduction in sepsis-related mortality by the specified deadline.

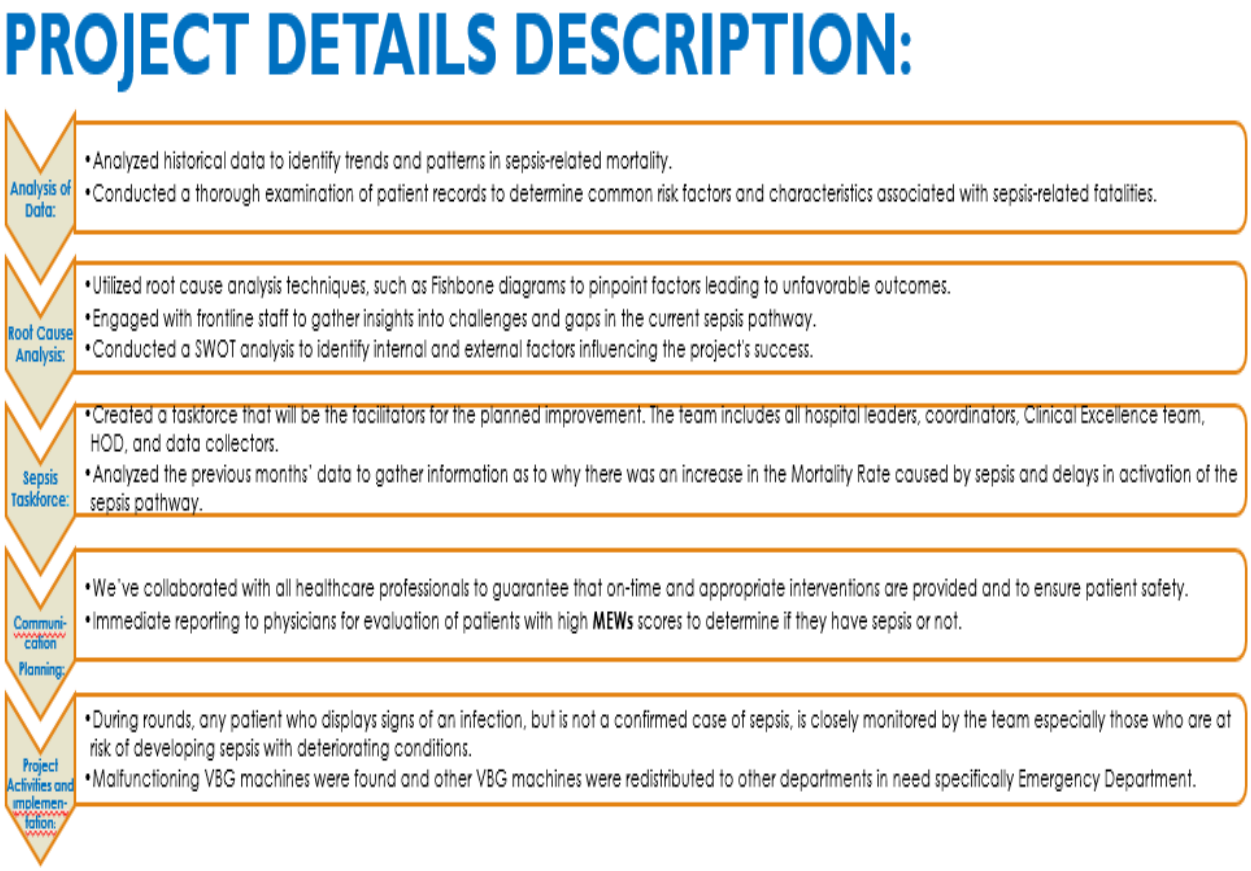

Figure 3:- MEWS –Project Description.

Basis And Ethical Considerations

The basis and ethical considerations applied in this project MEWS were used evidence-based practices that aimed at improving the sepsis pathway to reduce the mortality rate involved a meticulous approach to incorporating proven methods and guidelines into the project framework as shows in Figure 4.

Figure 4 shows the project solutions through the use of MEWS as follows:

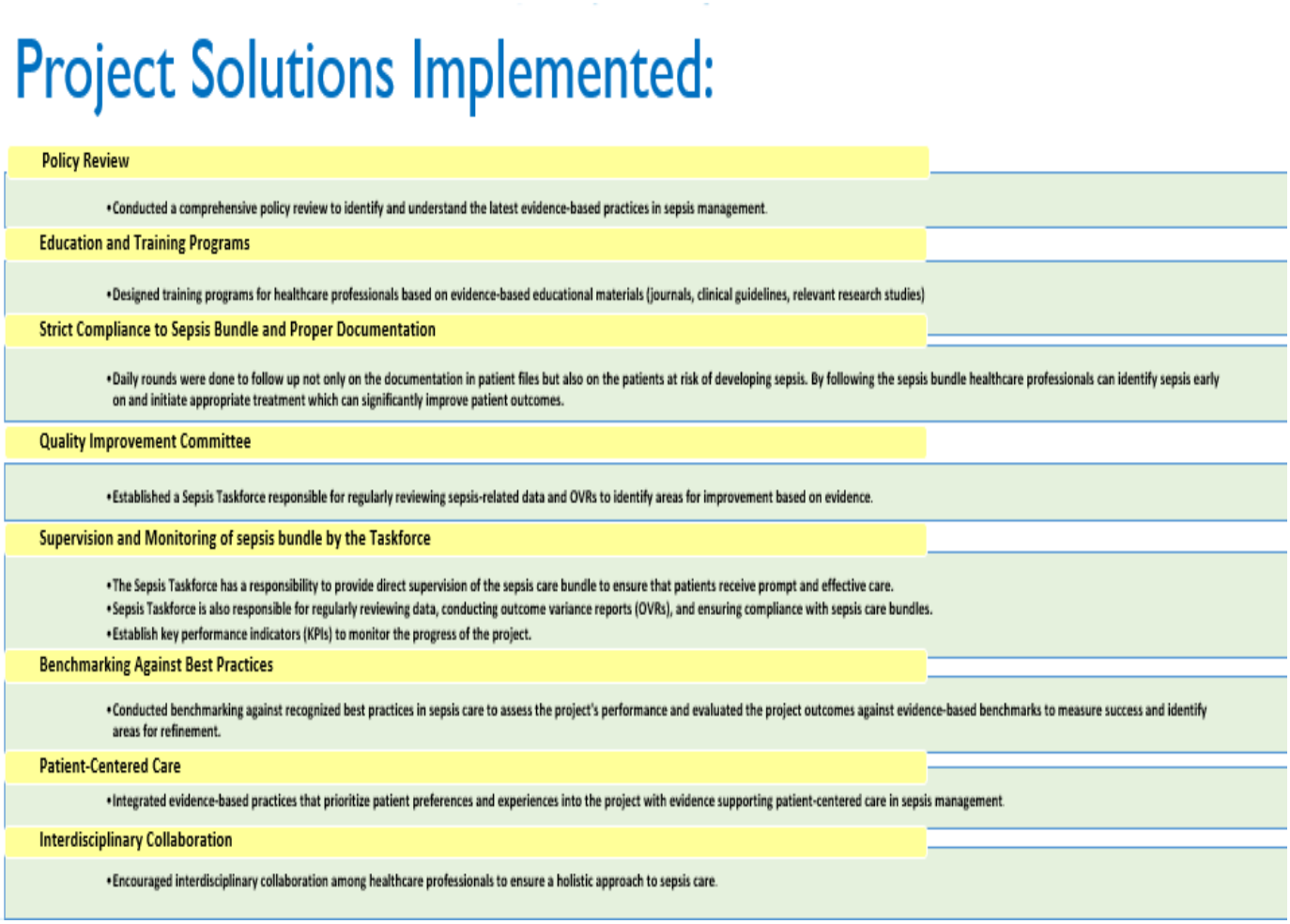

Figure 4:- Project Solution.

Policy Review:

1. Conducted a comprehensive policy review to identify and understand the latest evidence-based practices in sepsis management.
2. Explored reputable sources such as medical journals, clinical guidelines, and relevant research studies.

Guideline Adoption:

1. Ensured alignment with recognized standards for sepsis diagnosis, treatment, and monitoring.
2. Regularly updated protocols to reflect any new evidence or guidelines that emerged during the project.

Education and Training Programs:
1. Designed training programs for healthcare professionals based on evidence-based educational materials.
2. Ensured that educational content reflected the latest research findings and best practices in sepsis management.

Continuous Monitoring and Feedback:
Implemented a system for continuous monitoring of project outcomes and patient data.
Interdisciplinary Collaboration:
Encouraged interdisciplinary collaboration among healthcare professionals to ensure a holistic approach to sepsis care.

Quality Improvement Committee:
Established a Sepsis Committee responsible for regularly reviewing sepsis-related data and OVRs to identify areas for improvement based on evidence.

Benchmarking Against Best Practices:
1. Conducted benchmarking against recognized best practices in sepsis care to assess the project's performance.
2. Evaluated the project outcomes against evidence-based benchmarks to measure success and identify areas for refinement.

Patient-Centered Care:
Integrated evidence-based practices that prioritize patient preferences and experiences into the project with evidence supporting patient-centered care in sepsis management.

The incorporated evidence-based practices into each aspect of the project, from protocols and guidelines to training programs and continuous monitoring, the initiative aimed to maximize the likelihood of success in achieving the targeted reduction in sepsis-related mortality. This evidence-driven approach ensured that the project was grounded in the latest scientific knowledge and best practices in sepsis care.

Results and Discussion:-

On the data and evidences presented and gathered, the findings are the following:

Impact of the MEWS Project
The impact of the project aimed at improving the sepsis pathway to reduce the mortality rate by 20% by the end of October 2023 is wide-range, encompassing various dimensions of healthcare quality:

Patient Safety:
Reduction in Mortality Rates:
Achieving a less than 25% reduction in sepsis-related mortality directly enhances patient safety, indicating improved management and outcomes for individuals affected by sepsis.

Effectiveness:
Timely Interventions:
The systematic sepsis evaluation using the Modified Early Warning Score (MEWS) form ensures early detection, facilitating timely interventions and preventing the deterioration of sepsis, thereby enhancing the effectiveness of care.

Efficiency:
Streamlined Processes:
The optimization of the sepsis pathway and addressing issues during rounds contribute to more efficient workflows, reducing delays in sepsis care bundles and improving the overall efficiency of care delivery.

Equity:
Universal Evaluation:
The project's approach of utilizing the MEWS form for all ED and admitted patients, regardless of initial symptoms, promotes equity by ensuring that every patient receives a comprehensive sepsis evaluation, minimizing disparities in care.

Patient-Centeredness:
Improved Patient Outcomes:
Early warning assessments and immediate sepsis management, guided by vital signs and MEWS scores, lead to improved patient outcomes, aligning with a patient-centered approach to care.

Timeliness:
Reduced Time to Intervention:
Early detection and streamlined processes contribute to reduced time to intervention, addressing sepsis cases promptly and improving the timeliness of care.

Care Coordination:
Multidisciplinary Collaboration:
The establishment of the Sepsis Committee promotes care coordination through regular reviews of sepsis-related data, occurrence variance reports (OVRs), and bundling compliance, fostering collaboration among various healthcare professionals.

Safety:
Addressing Equipment Issues:
Proactive rounds to address issues such as broken VBG machines in the department contribute to a safer care environment, preventing potential risks associated with equipment failures.

Continuity of Care:
Sustained Improvement:
Sustaining a mortality rate below 25% for 6 months post-implementation indicates a positive impact on the continuity of care, emphasizing the project's lasting influence on sepsis outcomes.

Compliance with Guidelines:
Adherence to Protocols:
The project's focus on compliance with sepsis care bundles and ongoing quality improvement aligns with best practices and established guidelines, ensuring a standardized and high-quality approach to sepsis care.

Conclusions:-

In conclusion, the impact of the project extends across dimensions of healthcare quality, showcasing improvements in patient safety, effectiveness, efficiency, equity, patient-centeredness, timeliness, care coordination, safety, continuity of care, and compliance with guidelines. The project's success is evident in its ability to positively influence these critical aspects, ultimately contributing to a comprehensive enhancement of healthcare quality in sepsis management in all R1 hospitals.

Recommendation:-

For the health care practitioners and organizations, continue to discover and develop quick detection and evaluation project device that can help clinicians immediately recognize possible sepsis to prevent and reduce sepsis-related mortality rate. And should implement advance-technology medical facilities that could help patients' treatment resulting to fast curing effect towards better quality of life.

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