

Human factors in Healthcare

Diwakar Verma (0064)
MBA Rural Management
2019-21

Mentor:-

Laxman Swaroop
Sharma

Human Factors in Healthcare

Healthcare professionals are among the most highly trained, motivated and conscientious workers. How, then, does medical malpractice become a major public health problem when patients do not always receive evidence-based care?

People have a limited amount of attention. We work hard when we are tired. We can focus on one thing at a time. We forget things. When systems ask us to exceed these and other limits, failure is possible.

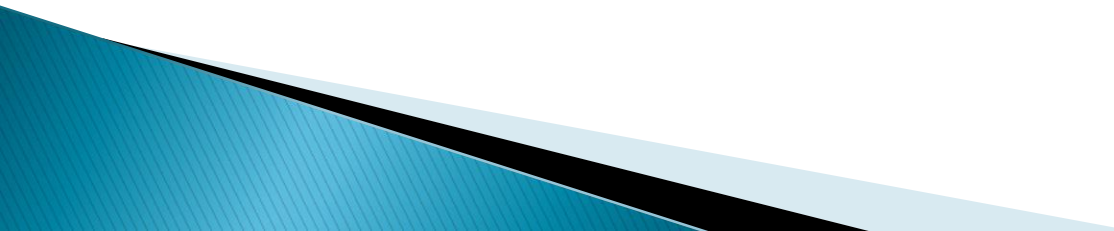
This focuses on human factors, scientific discipline that aims to help people do their best, improve the robustness and performance of the entire system, and reduce errors. Solutions based on personal characteristics make it "easier to do things right and harder to do wrong things." When errors occur, they are less likely to lead to injury.



Human Factors in Action: Examples from the Field

- a) **Safe Medication Storage** – Multidose insulin pens are required to be placed in patient-specific containers in a medication room, per both Johns Hopkins and Joint Commission requirements. However, patient needs, physician requests, phone calls and other interruptions often caused nurses to put the pens in their pockets and make a mental note to return them later. This practice led to medication errors. Working with a human factors engineer, a unit-based safety team devised, installed and evaluated clear plastic lockboxes in each patient's room to hold an insulin pen.
- b) **Preventing Infusion Pump Errors** – There were cases where the tube from the supply pump could interact with the touch screen of the pump, resulting in an accidental change in the input rate. Working with human resources engineer, the team added Plexiglas, a see-through guard that allows doctors to move the tube without accidentally changing the pump settings.

Preventing Human Errors in Healthcare

- ▶ Large number of surveys and recommendations issued regularly. In 2010, a new journal article was published in the National Library of Medicine every 40 seconds, and that number is likely to grow over the past few years. No healthcare provider, other than a volunteer, can find the last moment right now with a huge amount of new science that should influence care decisions.
 - ▶ Clinical care is provided as part of a complex adaptive system consisting of multiple tightly integrated Microsystems. Some security officials have suggested that errors will likely occur when care is brought under such circumstances. This conclusion is based on the assumption that the modification of a single micro system, done in the name of good or bad, will expose the vulnerability of other smaller systems that will jeopardize the delivery of secure care.
 - ▶ People are prone to misunderstandings that negatively affect our ability to solve problems accurately and honestly. We also show significant limitations in our working memory that make us prone to make mistakes due to factors such as anxiety, stress and sleep deprivation
- 

Research Objective

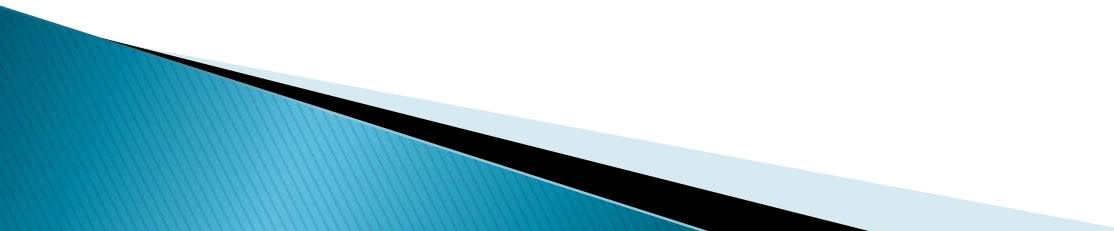
Q1. To measure knowledge among healthcare workers about standard precautions.

A multi-sectoral study was conducted after obtaining ethics from the organization HLPPT. Participants in the study were HCWs (health care workers) at the hospital's emergency and trauma center with an active infection control committee and compliance with waste management guidelines and best practices. Participants included nurses, junior staff (trainees and postgraduate staff), and senior postgraduate citizens from the departments of medicine, surgery, and orthopedics and those who were frequently referred to the hospital and trauma hospital inpatient care. Staff nurses and young and old residents are the immediate providers of cases that require urgent care at the facility.

Estimating standard monitoring practice among HCWs was 52% with an average accuracy of 15% at a confidence level of 95%, the minimum sample size required was 8. The number of HCWs at the hospital's trauma and trauma center is 10. A total of 10 participants were recruited using a population equal to the size of the sample. Participants were admitted periodically to the study, after obtaining written approval. Participants confidentiality was maintained by giving them coded identities.

1. Hand Hygiene About three quarters (74.7%) in the study reported using hand ointment as a precautionary measure and the majority (95.0%) said they used it after touching contaminants. However, less than half (49.4%) means its consistent use between patient interactions. This practice has been reported to be highest among staff nurses (81.1%) and under junior residents (30.9%). The reported rates of hand manipulation were high following procedures such as the insertion of catheters (94.4%) and blood drawings (85.7%). Sixty-three percent of HCWs say they use a hand rub regularly after removing gloves.

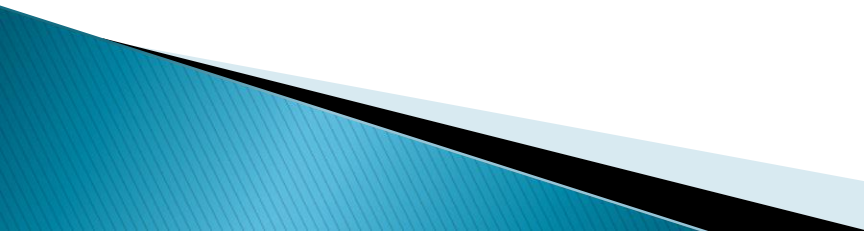
2. Use of Personal Protective Equipment (PPE) – According to the reported data, the use of gloves has been shown to be significant during bleeding (81.0%) and in contact with mucous membranes or raw skin of patients (88.3%).¹¹ About 45.6% of participants agreed to use face masks while massaging, another 53.1% while performing procedures such as inserting the nasogastric tube, and 39.5% during lumbar puncture. When faced with a situation where the risk of fluid exposure is high and the patient's HIV status is unknown, eye protection and protective clothing are said to be used by only 36 (22.2%) and 46 (28.4%) study participants, respectively. However, in cases where a patient's HIV status is known to be HIV-positive, approximately 96 participants (59.2%) reported the use of eye and clothing protection.
3. Needle Safety – The various unsafe practices reported by HCWs about using needles in patient care are shown in Table 2. Successfully 59.3% of respondents were not allowed to retrieve used needles, while another 30.0% reported the practice of removing needles by hand from a syringe. About 18% of respondents agreed not to put used needles in sharpened containers. Not surprisingly, 17.2% of HCWs reported needlestick injury (NSI) at least once in the last 12 months.

4. Perception of Risk More than 60% of health care workers considered themselves at high risk of getting exposed to blood-borne infections (61.7% for hepatitis B and hepatitis C infection). Despite this perception, 12 (7.4%) respondents had not received the complete schedule of the hepatitis B vaccine. Of the 17.2% respondents who claimed to have sustained a NSI in the past, only 5.6% admitted to reporting it to the concerned authorities.
 5. Barriers to Compliance The study participants expressed certain hindrances in complying with PPE when warranted. While lack of time appeared to be the most common reason, protective equipment not being readily available during an emergency situation also figured prominently as a deterring factor. Other less prominent reasons were the likelihood of offending patients and not knowing the correct method of using the equipment. Doctors seemed to be negatively influenced by their peers in not using PPE.
- 

Q2. To investigate their practice towards standard precautions.

Hospital-acquired infection (HAI) or nosocomial infection is an infection that occurs in patients in a hospital or other health care facility where the infection was not present or could not be detected at the time of admission. This includes diseases that have been diagnosed in the hospital but have emerged after discharge, as well as infections from local staff. HAI contributes to serious illness and death, long-term hospitalization and additional medical costs in both 14 developed and developing countries. Prevalence in the developed world is reported to be 15% among patients with levels of up to 37% of patients admitted to the Intensive Care Unit (ICU). The prevalence of developing countries however is high with an increase of 19% in patients and is due to poor practice of controlling infection and overcrowding in hospitals. The abuse and misuse of antibiotics continued to exacerbate the situation with drug-resistant antibodies among organisms, which can thrive and can be transmitted as HAIs.

The present study demonstrates satisfactory level of knowledge and practices towards standard precaution among staff nurses in the study setting and also finds many areas where educational interventions are necessary. Orientation programs for the new staff and on job training for existing employees are the needs of the hour. Hospital management in this regard, has a larger role to play in devising stringent and well-defined work place policies.

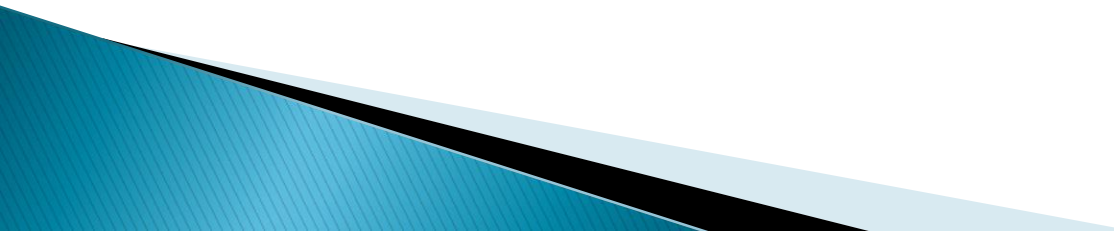


Q3. To identify specific areas that may need further attention in the continuing education of healthcare workers.

Quality improvement methods have been widely used in agricultural and production industries, but some believe that these methods cannot be used in health care because of their expertise. Patient care is generally not considered a viable option. Nurses rely on their expertise in caring for patients, making appropriate decisions about one case at a time. One of the biggest barriers to quality improvement in health care is not the understanding that systems and processes can interact with personal care. With this understanding, quality improvement efforts can focus on practices while physicians are delivering alternative patient care.

- 1: Facilitate Adoption Through Hands-on Improvement Projects.
 - 2: Define Quality and Get Agreement
 - 3: Measure for Improvement, Not Accountability
 - 4: Learn from Variation in Data
 - Intended and unintended variation in data
- 

THE EIGHT COMMON ROOT CAUSES OF MEDICAL ERRORS

- COMMUNICATION PROBLEMS
 - INADEQUATE INFORMATION FLOW
 - HUMAN PROBLEMS
 - PATIENT-RELATED ISSUES
 - ORGANIZATIONAL TRANSFER OF KNOWLEDGE
 - STAFFING PATTERNS AND WORKFLOW
 - TECHNICAL FAILURES
 - INADEQUATE POLICIES
- 

How is technology helping to fill this gap?

Computers provide vast amounts of drugs and data in many applications that support laparoscopic surgeons, including medical imaging, digital X-ray imaging, digital microscopy, electronic health records, clinical decision support systems, hospital management, and video games revolution.

Medical imaging is performed using technology that creates images of the human body for medical purposes, and many modern scanning and imaging technologies rely on computer technology using infrared cameras and advanced use of computers.

X-rays allow doctors to view the patient internal structure from a single two-dimensional angle, use CT scans to collect X-rays to create a multidimensional view, and collect X-rays from the patient body.

Aspiration monitor detects respiratory interruption to prevent oxygen saturation, blood pressure monitor monitors systolic and diastolic counts which monitor blood pressure between heart beats, ECG detects electrical pulses on the screen there are ups and downs.

Disadvantages of Computers in Medicine

- ▶ Adding computers to hospitals can be very expensive because computers are very expensive and large hospitals require a lot of computers to keep the system running smoothly. Creating a network for transferring medical records and managing accounts is an additional preparatory process.
 - ▶ Keeping electronic records requires regular maintenance of computers, computer programs and other electronic items. These electronic items are more expensive than paper documents, so you only need a few additional copies. One of the biggest drawbacks of connecting computers and electronic documents to hospitals is the lack of medical standardization.. Hospitals can exchange information when hospitals transmit medical records or open systems. Inadequate standardization of medical records can make it difficult for professionals to interpret medical records.
- 

Team Performance in Medical Field

- ▶ Teams can be defined as dynamic subordinate groups based on objectives/objectives/tasks of common value and can be separated into two or more people assigned to a specific role or task Limited lifetime membership.
- ▶ Core teams
- ▶ Coordinating teams
- ▶ Contingency teams
- ▶ Ancillary teams/services
- ▶ Support services and administration

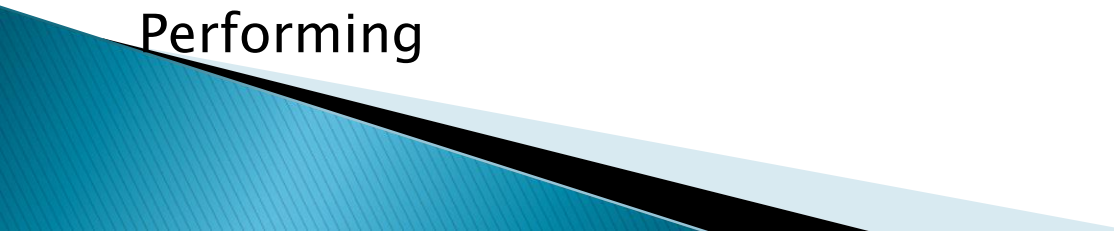
Research shows that we usually take the following steps to build and develop a cohesive, efficient and strong team for future challenges:

Forming

Storming

Norming

Performing



Diagnostic Errors

Diagnostic errors are the inability to adequately and timely describe the patient's health problems or to communicate these descriptions to the patient. An accurate or timely diagnosis loses its chances based on available evidence. This loss of opportunity may be due to cognitive factors, systemic factors, or both. To reduce bias, there must be evidence of omissions (not doing the right thing) or right (wrong) on failure. The relationship between misdiagnosis, missed opportunities, and patient harm. Vendors, medical teams, systems, or patients may miss 26 opportunities. Avoidable errors or delays in diagnostics are beyond the suppliers control and may be caused by factors not related to the supplier's actions.

- 1) Burden of diagnostic errors
- 2) Causes of Diagnostic Errors
- 3) Potential Solutions – Actions to reduce diagnostic errors are focused on improving service provider knowledge and skills and troubleshooting system problems such as communications, logging, and testing. However, there is limited evidence on the effectiveness of methods to reduce diagnostic errors. A combination of interventions will be more effective.
 - a) Improving education and skills
 - b) Empowering Patients
 - c) Health Information Technology

THANK YOU

