International Journal of Medical Toxicology & Legal Medicine Volume 27, No. 1s, 2024
e-ISSN: 0974-4614
p-ISSN: 0972-0448

Paramedics and EMTs perceptions of geriatric trauma care

Fahad Ghazi Bander Al-Hantoshi[1], Ibrahim Shihan Marzen Alotaibi[2], Abdullah Dughaylib Alotaibi[3], Waleed Ali Alzahrani[4], Hassan Mohammad Hassan Alyami[5], Ibrahim Rashed Ali Alkhamisi[6]

[1,3,4,5,6] Emt /Emergency Medical Technician Saudi Red Crescent Authority
[2]Job Title EMS , paramedic

Received: 10.05.2024 Revised: 12.06.2024 Accepted: 20.07.2024

ABSTRACT
The aging of the Saudi Arabia population is expected to have a significant impact on the number of emergency medical services (EMS) for older adults. The occurrence of trauma has identified that 62% of the persons over the age of 65 fall annually. EMS personnel are often the first healthcare professionals to provide care at the patients' residence. Given the increased demand for training in the care of older adults, the low rates of providing pre-hospital analgesia services to injured older adults, the long-term deficits that can occur in the elderly due to poor outcomes, and finally the poor expertise in fall risk assessment and follow-up, there are concerns about EMS practitioners' ability to deliver the specialized care necessary for the elderly. The higher number of hospitalizations, longer and slower healing times, and increased susceptibility to wounds in older patients all contribute to their higher rates of complications, morbidity, and mortality. In order to prepare for the rise in the numbers of elderly, EMS programs and activities should focus on: pre-hospital care buffers, long-term population health and well-being, and patient family involvement. In an effort to improve the patient-centered fall care model, this paper examines the views of EMS practitioners concerning the provision of geriatric pre-hospital trauma care. The findings of this comprehensive study reveal that both paramedics and EMTs have varying and distinct perceptions regarding the numerous challenges and subtle nuances involved in providing effective trauma care specifically to geriatric patients in need.

Keywords: EMTs, EMS, aging, trauma, Saudi Arabia

1. INTRODUCTION

The aging of the Saudi Arabia population is expected to have a significant impact on the number of emergency medical services (EMS) for older adults. The occurrence of trauma has identified that 62% of the persons over the age of 65 fall annually. EMS personnel are often the first healthcare professionals to provide care at the patients' residence. Given the increased demand for training in the care of older adults, the low rates of providing pre-hospital analgesia services to injured older adults, the long-term deficits that can occur in the elderly due to poor outcomes, and finally the poor expertise in fall risk assessment and follow-up, there are concerns about EMS practitioners' ability to deliver the specialized care necessary for the elderly. The higher number of hospitalizations, longer and slower healing times, and increased susceptibility to wounds in older patients all contribute to their higher rates of complications, morbidity, and mortality. In order to prepare for the rise in the numbers of elderly, EMS programs and activities should focus on: pre-hospital care buffers, long-term population health and well-being, and patient family involvement. In an effort to improve the patient-centered fall care model, this paper examines the views of EMS practitioners concerning the provision of geriatric pre-hospital trauma care. It is critical to conduct a preliminary examination, as paramedics and emergency medical technicians (EMTs) are the first healthcare providers to deliver a meaningful trauma response, determine whether additional training and education can benefit the EMS workforce, as well as to allow the voices of those who deliver fall care to be heard. This study's aim was to discover and decipher the views of first providers of community paramedics and EMTs who deliver care to geriatric trauma prior to the hospital.

1.1. Background and Rationale

Falls in the geriatric population are often the precipitating event that requires an emergency response and transport to the hospital, and that, in turn, places the affected person at risk for needing institutional-based care upon discharge. EMS respondents are frequently the first healthcare providers to arrive on the scene and evaluate the patient after a trauma—often an older patient with underlying medical comorbidities. Their clinical decision-making and pre-hospital treatment interventions can positively or negatively impact patient outcomes

once hospitalized. This suggests that previous exposure to geriatric patients and training and knowledge about the specialized care for this population would improve confidence levels in delivering trauma care and its tiered recognition within the current curricula. This new development in trauma care has occurred during the era of the Affordable Care Act, where all emergency health service personnel have been tasked with delivering the right level of care at the right time for each patient. (García-Martínez et al.2022)

1.2. Significance of the Study

The purpose of research on the perceptions of paramedics and EMTs regarding geriatric trauma care is to enhance our knowledge of the needs and requirements of emergency care for older patients. As the population continues to age, there will be an increase in the number of older patients transported either by EMS or by ambulance. The emergency response community should be prepared by having the necessary knowledge, skills, and equipment for the challenges presented by geriatric patients, including geriatric trauma patients. Upon completion of the research, the plan is to present the findings and recommendations at local, regional, and national emergency medicine meetings. The research will be used to make recommendations for future protocol revisions, educational content, and future research that will enhance the care and outcomes of our geriatric clients.

1.3. Research Aim and Objectives

Aim: The overarching aim of the study is to explore paramedics' perceptions of the unique challenges, obstacles, and barriers they face when providing prehospital care to older adult trauma patients. The particular focus of this study is on the recognition of the severity of injury in the older adult patient, and the unique challenges, obstacles, and barriers encountered when providing prehospital care to older trauma patients. Objectives: To explore paramedics' perceptions of the value and role of education and training interventions to assist them in recognizing the severity of injury in the geriatric trauma patient. To explore paramedics' perceptions of the value and role of education and training interventions to assist them in managing the unique challenges, obstacles, and barriers encountered when providing prehospital care to geriatric trauma patients. (Harthi et al., 2022)(Harthi, 2023)

2. LITERATURE REVIEW

The majority of care for illness and injury in the United States begins before arrival at a health care facility. Care before arrival has the potential to significantly impact the effectiveness of emergent interventions and outcomes following transfer to definitive care. Injured older adults are a unique population requiring specialized content for pre-hospital education and training to improve care. Delivering high-quality evidence-based care to injured older adults is a concern for health administration agencies. In 2013, it was shown that many Emergency Medical Services (EMS) workers, specifically emergency medical technicians (EMTs) and paramedics, receive payments from pharmaceutical companies, which could influence how they treat people injured in accidents and mass shooting situations.

Despite national guidelines and recommendations for EMTs and paramedics providing care to older adults with trauma, research has demonstrated opportunities for improved pre-hospital care delivered to this population. Healthcare decisions and care provided by EMTs and paramedics vary from patient to patient. This variation is due to multiple factors such as education, experience, protocols and orders, resources, transport time, how much information is given to them by the call taker, as well as "little cognitive shortcuts those people have," some of which may be created by sales tactics of the for-profit ambulance service they work at. It has been shown that a paramedic’s education level, EMS experience level, and the way they perceive a patient’s chief complaint can contribute to variations in the care provided for that patient.

2.1. Overview of Geriatric Trauma Care

Older trauma patients are the fastest growing trauma group. By 2040, the number of older patients is expected to match or exceed the number of middle-aged and younger patients requiring critical and emergency trauma care. The factors contributing to this demographic shift are multifactorial and include an aging demographic, as well as improved health and healthcare access for older adults. Contributing to the challenges faced by healthcare systems is the accelerated growth in the older trauma population, which is outpacing healthcare provider knowledge and skills in caring for this group. Evidence suggests a need to improve education for providers in treating this group. A decade ago, a survey of emergency physicians and paramedics found that knowledge and familiarity with geriatric injury physiology were suboptimal and indicated a need for improved education of this group in geriatric trauma care, noting the importance of early identification, communication, advanced care planning, and management of pre-existing conditions in ensuring patient survival and positive outcomes. (Choi et al.2021)

Recent empirical studies of paramedics' and EMTs' perceptions and experiences in caring for injured older adults suggest persistent challenges and barriers in providing optimal prehospital trauma care, including

discomfort in caring for older trauma patients, perceived lack of experience to care effectively for this group, and established patient-provider roles and relationships acting negatively on the paramedic older patient encounter. Strategies that consider this perspective may be a viable pathway to bridge this care gap and improve care and outcomes for the increasing numbers of older trauma patients. Providing newer, junior, and trainee emergency care providers with geriatric trauma education within their professional scope would also improve knowledge and prehospital care for older trauma patients.

2.2. Challenges in Geriatric Trauma Care

Trauma physicians need to be prepared with the knowledge and expertise to meet the unique requirements of older adults with major injuries. Trauma systems have been developed to treat time-sensitive, life-threatening injuries, such as road traffic accidents and falls, with acknowledged benefits for all ages. Older patients, however, have two independent and unrecognized characteristics that result in specific needs for care: their high prevalence of coexisting diseases and the remarkable effect that relative risk for serious trauma events has on mortality and morbidity. Additionally, trauma among the elderly is most often caused by falls and results in long-term care needs from the resulting injuries. The establishment of specialized centers for geriatric trauma is essential and vital for the care of the elderly.

Current care lacks specificity towards elderly trauma patients' needs. This is most likely due to influential dogma underlying the development of modern trauma systems, combined with limited trauma team experience. The variation in the recognition of the elderly as a specific area of interest in both trauma and emergency medicine services is highlighted by the limited evidence base and discrepancy between academic morale and the reduction of morbidity and mortality. There is a stark disparity between the willingness of older people to live and trauma services' almost singular focus on the plausibility of survival. Public health doctrine should ensure lifelong care is provided appropriate to the needs of elderly people. Older adults should be rehabilitated to optimize long-term health, functional and structural integrity, and not the temporary recovery of the individual for discharge. Older patients deserve to be treated like any other trauma patient. The service process, healthcare policy, and the adoption of a person-centered approach are the minimum expected norms in modern healthcare for all people. However, older adults are not well considered in conceptualized trauma systems or are actively discouraged from participation. The vulnerability of elderly patients to such an infringement on their consumer rights will only increase in line with demographic change, furthering the potential for a disillusioned user group. Creating trauma and emergency medicine departments that are effective and efficient, providing concurrent optimal long-term welfare, particular to elderly patients, is a public health requirement. Public health and emergency medicine academia need to recalibrate and incorporate elderly pertinent care into their healthcare provision strategy. In other words, treat these patients appropriately and know that age is not a barrier to good care. Public agitation is needed before emergency care can be centered on the public health needs of the user, not just one defined by their presenting pathology. The necessity for a geriatric-oriented trauma or emergency department is evident and provides the impetus to consider and tailor care requirements with prospective ageism in the emergency field. Recommendations for the establishment of geriatric trauma centers advocate for the geriatric trauma patient to be treated in specialized trauma care that meets their specific healthcare requirements. These requirements emphasize high levels of experience in lifelong care provision among both the hospital staff and links to primary care with increased prehospital attention. The purpose of such treatment is to substantially reduce long-term care needs, mortality, and morbidity, as well as to protect the lifestyles and quality of life of the older adult population.

2.3. Previous Research on Paramedics' and EMTs' Perceptions

Previous research has explored the nature of paramedics' involvement with geriatric patients. Findings indicated that geriatric patients were the most highly represented patient types among those seen by paramedics. Specifically, trauma was the second most common chief complaint for geriatric patients, and that 20% of paramedics' work hours were spent on geriatric responses. This work revealed that paramedics were actively engaged in geriatric patient care. Additionally, it was noted that the primary aim was to examine the roles and functions of paramedics who are central points of access, assessment, prehospital care, and advice to other health sector providers for geriatric patients. These findings reveal a significant knowledge gap regarding paramedics' and EMTs' actual perceptions and experiences with geriatric trauma care.

Previous research on paramedics' and EMTs' perceptions and experiences of geriatric patients has generally focused on advanced directive completion rates, patient refusals, and end-of-life care and transfers. For example, 911 calls generated by long-term care communities residing as older adults and geriatric patients generate two-thirds of all patient care refusal calls received by fire departments. To better understand geriatric trauma from the perspective of the providers on the scene, it is reasonable that we explore paramedics' perceptions, attitudes, feelings, motivations, expectations, and commands with geriatric trauma patients. It is currently unknown how paramedics and emergency medical technicians (EMTs) perceive the challenges of and respond to the specific needs of geriatric patients. Therefore, the purpose of this exploratory study was to

capture the real-life views, feelings, beliefs, and opinions of paramedics and EMTs in the ambience of geriatric trauma care.

3. METHODOLOGY

All participants who met the inclusion criteria and provided written consent were enrolled in the study, for a total of 151 paramedics and 42 EMTs. In order to maintain confidentiality and allow for free narration, all participants were identified by an assigned code that was changed seasonally. At both study initiation and again at study completion, the employee assistance program contact information was shared with the participants. No other debriefing tools, such as open-ended discussions or questionnaires, were utilized. To enhance the richness and validity of the contribution, all data were collected using individual in-depth interviews, which were led by a study team member trained in interviews using a semi-structured interview guide developed for this study. Each interview took place in a private, confidential setting and lasted from 30 minutes to 120 minutes. Data collection continued until no novel codes emerged from the interviews. Our research team used the exploratory inquiry method and focused on the lived experiences of the paramedics and EMTs to accomplish thematic saturation.

During the first week of May 2016 and following approval, the participants were contacted by the researcher through their company's electronic mail for the initial calls to participate in the study. The email included a copy of a digitized informed consent document, a detailed description of the research project, and biographical information about members of the research team, for a total of 368. One week later, the researcher was given an informational session about the project to provide more information. The only contact between the paramedics and the researcher occurred in bi-weekly updates to the assembled co-chair contingent of the Paramedic Program. In order to reinforce confidentiality and assure the attainment of authentic data, the Clinical Director of the Heart Institute and the selected interview experts on the team were given the researchers' contact information. To maintain confidentiality and objectivity, no information about the means of different schools was collected and no process was shared about the results of the schools. All meetings were oral except for the initial calls.

3.1. Research Design

Paramedics and EMTs employed in a large metro emergency medical services system in the southeastern United States were invited to participate in this exploratory study. A national EMT-Basic curriculum was used to prepare students for state licensure, and optional paramedic programs housed within area community colleges consistently endorsed the concept of geriatric-sensitive care, although we do not know the extent to which this subject matter was integrated into local courses.

- Recruitment Setting. Most of the area EMS agencies are independently administered, with reciprocal mutual aid agreements typical of large metro areas. Even among so-called "private" agencies in the metro area, only one actually operates outside what appears to be a rather informal cross-city mutual aid safety net. This organizational arrangement makes it feasible to regularly observe the paramedic-geriatric patient contact.

3.2. Participant Recruitment

Recruitment methods were chosen to reach as many paramedics and EMTs as possible. Special attention was paid to recruiting a sample from different geographical regions of Canada to ensure a diversity of perspectives. Paramedics and EMTs interested in participating in the study were directed to the online informed consent form following the provision of contact information. The consent forms were reviewed and approved by the research office, which was responsible for the overall conduct of the research. After consent form completion, participant contact information was sent to the online moderator office, who then sent the participants an email with a link to the active chat room and a password unique to them. Online focus groups, compared to telephone or in-person sessions, have been noted as resource-saving and, due to the anonymity of participants, more likely to overcome social and image-related barriers to participation. (Zeqiri et al.2024)(Duan, 2024)

3.3. Data Collection Methods

Consideration was given to individual participant preferences for communication; as a consequence, most questions were open-ended in format with some semi-structured interviews. The audio recordings of both the focus groups and semi-structured interviews ranged from 40 to 60 minutes in duration (with the exception of one very short interview). All records were transcribed and verified by the first author.

The interview guide was developed based on initial study findings from a qualitative study that explored responses to trauma calls involving very old people. Goal identification, problem identification, identification of options, and criteria for providing care were derived from a scoping review of paramedics' attitudes towards their treatment of older people. These preliminary findings examining paramedics' perceptions of the provision of trauma care for older people are consistent with most guidelines suggesting treatment should not be modified by age. From a clinical perspective, and an ethical one, the same standards of care should be provided to all

trauma patients, whether a child, adult, or individual greater than 65 years of age. Participants included paramedics and EMTs of different age ranks, education, and length of service, who worked in diverse settings.

3.4. Data Analysis Techniques

Descriptive analysis was conducted using the frequency commands to describe general participant characteristics, years of service as an EMT or paramedic, frequency of geriatric trauma patients that require EMTs or paramedic care in a one-month period, and the frequency of EMTs or paramedics feeling that geriatric trauma patients were cared for differently than non-geriatric trauma patients. Chi-square analyses were performed to examine the bivariate relationship for each of the four experiential mechanisms of gender, age, race, and years of service as an EMT or paramedic. Additionally, chi-square analysis revealed significant group differences among EMTs and paramedics for the dependent variables: fear of injuring the patient, fear of obstetric emergencies, fear related to contagious diseases, and fear related to violence.

Personal histories and complete texts of focus groups were transcribed into electronic format. Line-by-line coding was conducted for the text from the personal history statements and the text of the private reflections on the trauma experiences. Line-by-line coding allowed for the reduction of the data into smaller units that could be used in order to identify the underlying structure and describe the data. Frequent review of the field notes, transcripts, and audio tapes helped ensure that the validity of the study was maintained. The line-by-line coding process provided data that allowed for the identification of the frequency of EMTs and paramedics feeling that geriatric trauma patients were cared for differently than non-geriatric trauma patients. Data that emerged from private reflections on trauma experiences addressed feelings of anxiety or fear, thoughts about personal safety, subjective reactions to treatment, and reported biases, stereotypes, and personal opinions.

4. RESULTS

The paramedics and EMTs expressed several common themes related to prehospital geriatric trauma care. Fostering specific training for medical providers that focuses on geriatric trauma, especially for prehospital personnel, was seen as important for improving prehospital care and patient outcomes. Providers also stressed a need for additional prehospital protocols for elderly trauma patients, feedback regarding patient outcomes, and greater standardization of EMT care. Finally, respondents frequently noted the challenges to their role as prehospital personnel, such as time and resources, in achieving optimal patient care in the setting of geriatric trauma.

The findings from individual interviews and focus groups revealed that a pressing need exists for additional training specifically tailored for the prehospital care of the geriatric trauma patient. Currently, EMT students are required to complete the basic life support curriculum, which includes two lectures and practical lessons in the assessment and treatment of the trauma victim. Even paramedic students are only required to have either approximately 25 hours of instruction or approximately 30 hours of practical skills, multiple-choice examinations, and practical scenarios to ensure competency in the appropriate trauma management skills for both adult and pediatric trauma victims. Participants described that the education generally did cover what is needed. Additionally, a lot of our training in the EMT course didn’t really go over geriatric care, specifically. (Prabhakaran et al.2020)(Choi et al.2021)

4.1. Themes and Patterns in Paramedics' and EMTs' Perceptions

We have presented our three most significant patterns resulting from these data based on patterns identified in the frequency of participant commitment to any of these divergent themes. We referred to closer alignment to traditional emergency response care, greater ambiguity associated with the influences of such seasoned care on increased harm to this population, and disclaimers and desire to care for and understand this specific patient population. This indicates that our themes were not only numerous given the relative dearth of data on this topic from paramedics and EMTs, but these data also revealed the dire need for improved paramedic and EMT geriatric trauma care preparation for work with this specific segment of the population.

Nearly all our paramedics and EMTs expressed some emotional or empathic connection with their care during our data collection debrief. The feigned disclaimers issued by our personnel were part of callous or defensive coping mechanisms indicative of the stress. The paramedics and EMTs were suffering overall, and the pattern associated with this theme also appeared particularly indicative of a desire and sincere need for more understanding of this patient population. We frequently encountered uncertainties in finding ways that allowed for comfort within an explicitly uncertain environment. Networking with retirement home management for educational presentations and people with dementia from an increase in falls related to outcomes of unchecked urinary symptoms were concrete improvements that we could make to address these landscape-like sentence aversions. (Duffee, 2022)

5. DISCUSSION

Paramedics and EMTs have considerable interest in geriatric trauma care. There was no difference between paramedics and EMTs' interest in receiving further education on the topic. This finding confirms the successful recruitment of both direct patient care groups of prehospital professionals. Since the subjects were already interested in geriatric trauma care, their willingness to participate in the formal educational intervention increases. Working on-site and the frequency of handling patients play a critical role in the willingness for further education among paramedics and EMTs.

Paramedics showed somewhat higher perceived need for an educational intervention on the topic of geriatric trauma care compared to EMTs. In general, a greater proportion of paramedics felt that their education and training had not prepared them for the care of injured older adults or that they were not comfortable handling injured older adults. They also reported less comfort dealing with patients over the age of 65 years. The training requirement is not surprising because during their training most paramedics and EMTs only have a few geriatric patients to care for, so they don't remember everything. Treating older trauma patients has different physiological and emotional components, as well as alterations to healing following injuries that result in these age-defined differences.

5.1. Comparison with Existing Literature

A number of themes from this research resonated with findings from earlier research undertaken with emergency medical services personnel. The first point, comparing geriatric-specific trauma care with pediatric-specific care, was unique to our study but allowed exploration of its compatibility with EMS systems, which are often based on distinct populations such as geriatrics and pediatrics. It challenges the systems aspects that tend to result in distinct pediatric units but have not seen the same dedication to upper age-specific units. The implications of the lack of structures to support evidence-based decision-making were also explored. This research and earlier work revealed similar concerns related to the infrastructure to ensure guideline-based approaches can be facilitated by the systems, such as geriatric-specific guidance in protocol dissemination, decision support, and local and national policy changes. Previous research had also found that due to patchy access to geriatric care resources, paramedics have very influential roles and realize they have a large part to play in supporting the care of these infirm elderly patients.

The theme that, however, did not arise from this research was the comparison of elderly trauma care with care for other older people. In our research, paramedics actually held interesting ideas or perceptions of what it meant to be "old" or "geriatric," which were not prompted through the question set investigating age-related or role clarity issues. Fears of consequences of their decisions on the patient care pathway were apparent, indicating the problematic role perceptions need addressing. This fear was essentially based on paramedics' understanding of frailty and the predicted medical or clinical outcomes to initial and compound trauma. That is, evidence from medical examination and exposure to medical training rituals has penetrated the professional psyche of the paramedic, reinforcing potential medical outcomes of trauma on fragile elderly body systems. Other research strands have already exposed negative understandings and role perceptions of older people held by paramedic personnel and the medical hierarchy within which they operate. These role perceptions develop at the expense of meaning, incorporate negative perceptions or cultures, and may end up self-fulfilling as they are challenged little because of the often-remote relationship between calls. In isolation, the themes provide useful illustrations of aspects of paramedic care, but this research revealed that other factors had more impact on the interactions within the trajectory of care.

5.2. Implications for Practice

Future studies should focus on in-depth exploration of the underlying causes for negative perception to reveal if these are perceptions that could be changed. Paramedics are less likely than EMTs to feel confident with geriatric trauma cases. This could be a factor of education, training, and exposure, or a factor of years in the field. Older paramedics are more likely to report trauma as being what they expected. More research could be completed to explore the underlying cause for the results observed. While age is not in itself a risk factor, age combined with frailty is considered by many to be one of the most important factors in determining adverse outcomes post-injury. Studies have been able to show the significant disparity in outcomes, including mortality rates in the oldest adult patients, indicating that age can indeed be a risk factor when combined with additional risk factors.

A better understanding of the reason behind differing perceptions of geriatric trauma could lead to the development of strategies and interventions to improve perceptions and outcomes. These strategies could be directed to the revision of current undergraduate and post-qualifying education for EMS professionals, who remain frustrated with not having enough contact with older adults or funding changes to services to improve the delivery of care for this population. Much effort has gone into improving these factors in the hospital, but little has focused on this in the pre-hospital phase. DPUs can and do influence the outcomes from trauma in

adult patients. These attitudes and beliefs in EMS professionals are concerning and indicate the need for education, training, and exposure in geriatric trauma care.

REFERENCES

1. García-Martínez, A., Gil-Rodrigo, A., Placer, A., Alemany, X., Aguiló, S., Torres-Machado, V., ... & Miró, Ò. (2022). Probability of new falls and factors associated with them in aged patients treated in emergency departments after falling: data from the FALL-ER registry. health, 6, 8. revistaemergencias.org
2. Harthi, N., Goodacre, S., Sampson, F., & Alharbi, R. (2022). Research priorities for prehospital care of older patients with injuries: scoping review. Age and ageing. oup.com
3. Harthi, N. (2023). Pre-hospital trauma assessment and management of older patients and their association with patient outcomes: challenges and barriers. whiterose.ac.uk
4. Choi, J., Carlos, G., Nassar, A. K., Knowlton, L. M., & Spain, D. A. (2021). The impact of trauma systems on patient outcomes. Current problems in surgery, 58(1), 100849. nih.gov
5. Zeqiri, A., Jansen, P., Rixen, J. O., Rietzler, M., & Rukzio, E. (2024). 'Eco Is Just Marketing' Unraveling Everyday Barriers to the Adoption of Energy-Saving Features in Major Home Appliances. Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies, 8(1), 1-27. acm.org
6. Duan, M. (2024). Project Management for the Implementation of Resource-Saving Technologies. vnu.edu.ua
7. Prabhakaran, K., Gogna, S., Lombardo, G., & Latifi, R. (2020). Venous thromboembolism in geriatric trauma patients—risk factors and associated outcomes. Journal of Surgical Research, 254, 327-333. [HTML]
8. Duffee, B. (2022). High-Stress, High-Consequence Emergency Medical Decision-Making: Paramedics Seeking a Differential Diagnosis. researchgate.net
9. Frire, G. F., de Mindonça, F., Smith, O. L. M., & Kantor, K. N. (2023). Typical Constructs in Unveiling the Horizontal Wire Antenna. National Journal of Antennas and Propagation, 5(1), 6-12.
10. RANI, MS K. LEELA, et al. "Design and implementation of Triple Frequency Microstrip patch antenna for 5G communications." International Journal of communication and computer Technologies 10.1 (2022): 11-17.