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Strategies for Efficient Evaluation of Covid-19 Patients in the Emergency Department

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Abstract: The Emergency Departments (EDs) around the world were really faced with many challenges due to the pandemic. One of the most important measures that could affect the health system and, finally, the outcome for patients is the evaluation of the strategies for timely diagnosis, treatment, and triage of patients with the virus where. In this study, we wish to analyze and compare the strategies for the evaluation of patients with the virus from the perspective of patient demographics, triage efficacy, and technology integration in emergency departments and. The methodology A longitudinal study was carried out over three years' time (January 2021- December 2023) in different emergency departments in Iraq. The study population was 384 patients presenting with SARS-CoV-2 symptoms, classified into two groups: KAP-intervention hospitals (Group 1, n=200) and non-intervention facilities (Group 2, n=184). After a wide assortment of demographic data was gathered, clinical indicators reflecting the impact of interventions that were based on Knowledge, Attitudes, and Practices (KAP) on patient education and on quality of life were analyzed using structured questionnaires and clinical assessment where. The results of this study indicated that the two groups differed significantly in the knowledge of symptoms associated with the disease, preventive practices, and quality-of-life outcomes, $p<0.001$. With respect to clinical parameters, Group 1 had more comorbidities and worse clinical indicators. The KAP intervention improved knowledge and practices in respect to all aspects of mitigating the disease: Chi-square test, $p<0.001$. Through logistic regression analysis, risk factors of severe outcomes included age, BMI, and smoking. And finally The structured triage approach, telehealth integration, and training programs have greatly improved the effectiveness of COVID-19 patient evaluation in emergency departments. These results further emphasize the need for ongoing modulation of assessment methods to improve patient outcomes and the health system's resilience in spikes of COVID-19 cases.

Keywords: COVID-19, Emergency Department, Triage, Patient Evaluation, KAP Intervention, Telemedicine.

INTRODUCTION

The global pandemic triggered by severe acute respiratory syndrome coronavirus 2 posed an unforeseen burden upon health systems the world over, taking unprecedented tolls on the emergency departments (Worldometer, 2021). In the spectacle of these surges, the effective development of evaluation strategy has now become prima facie due to the need for patients to be swiftly diagnosed, treated, and triaged for the immediate care of suspected infected patients. Emergency departments operate in such cases; being contacted first when subjects present with symptoms, it is the departments that suspect and attend to those infected with the virus. Effectively clearing these suspected infected patients from the emergency departments should, therefore, be of the essence for the alleviation of pressure upon the healthcare systems on a wide front and thereby ensure that resources are allocated more effectively, which conversely translates to a better patient outcome (The Lancet Global Health, 2020; Zhang, N. *et al*., 2020; Zowawi, H.M. *et al*., 2021).

An effective evaluation scheme should consist of quick clinical symptom evaluation, an interrogation of risk factors, timely clinical decision-making, and lab/imaging study access on a concurrent basis (Griswold, D.P. *et al*., 2021). Streamlined triage protocols identify patients with medical needs based on clinical severity and comorbid conditions. Well-laid-out operational guidelines will, therefore, help serve the aim of optimal resource usage when considering an overworked environment (Levy, Y. *et al*., 2020).

Moreover, it is evident that the demographic considerations in SARS-CoV-2-infected patients must be considered and are associated with the various outcomes modulated by age, gender, patients' underlying comorbidities, and socioeconomic circumstances (COVID-19

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Treatment Guidelines Panel, 2020). Severe illness and complications arising from COVID-19 are, however, seen mostly in older patients and those with other comorbidities, such as diabetes, hypertension, and obesity. Understanding the demographic features of newly admitted patients would thus be important in risk stratification, which would consequently influence clinical decision-making in the emergency department (ED), enhancing the real-time management of patients (Wu, Z. & McGoogan, J.M., 2020; Wang, B. *et al*., 2020; Richardson, S. *et al*., 2020).

Another potential avenue for improvement could be the utilization of technological advancements to expedite and refine the evaluation techniques (Guo, W. *et al*., 2020). Telemedicine, for instance, can be used in the preliminary assessment phase, reducing the number of personal and in-person consultations and thereby minimizing the chances of contracting the virus (Bode, B. *et al*., 2020). Additionally, the utilization of EHRs has the potential to expedite access to patients' previous medical histories and diagnoses, thereby aiding clinicians in informed decision-making. The incorporation of artificial intelligence into the interpretation of diagnostic tests and imaging has the potential to enhance evaluation speed and accuracy, thereby allowing health professionals to allocate more time to direct patient care (Tekwani, K.L. *et al*., 2013).

Another essential approach is the implementation of validated clinical scoring systems that employ criterion-referenced methods to systematically and objectively assess disease severity and complications. Risk-adjusted scores will provide guidance in decision-making regarding triage and treatment in emergency departments. It is imperative that clinical scores are adapted to include at least some parameters specific to COVID-19, such as oxygen saturation and inflammation markers, in order to ensure that patients are assessed on an individual basis (Cusidó, J. *et al*., 2022).

METHODOLOGY

Study Design Type Comparison between KAP intervention hospitals and non-intervention facilities with Duration3 years (January 2021-December 2023), which allows for longitudinal tracking of patients infected with the severe acute respiratory syndrome (SARS-CoV-2) where Setting the study was conducted in multiple emergency departments across various hospitals in Iraq. Study and The study population initially comprised 384 patients (Group 1: 200; Group 2: 184), with potential for ongoing recruitment as new patients presented.

The inclusion criteria for the study are as follows: All adults presenting with symptoms indicative of a positive diagnosis of the novel coronavirus (SARS-CoV-2) at the emergency department.

Exclusion criteria include Patients with another respiratory illness or those who do not meet the diagnostic criterion for the disease.

3. Data Collection Phases 1: Demographic and Clinical Data Collection (Continuous) Conduct intake assessments and collect demographic information (age, sex, BMI, smoking status, comorbidities, educational qualifications, monthly income).

A clinical examination is to be conducted, including initial laboratory tests and vital signs (respiratory rate, levels of consciousness).

The Knowledge, Attitudes, and Practices (KAP) Interventional Framework Phase 1: Baseline Assessment (6 months)The original assessment of patients' knowledge, attitudes, and practices on chronic diseases was conducted through the administration of structured questionnaires and the SF-36 Quality of Life Questionnaire. This assessment was undertaken to generate baseline data. Phase 2 (6 months) comprised the educational intervention phase, during which educational materials were developed based on the particular needs and cultures of each patient. Workshops, group discussions, and individual counselling sessions run by trained professionals were encouraged, and multimedia resources, such as videos and brochures, were used to promote participation. A follow-up assessment was conducted 12 months after the intervention, during Phase 3. The SF-36 and KAP questionnaires were re-administered three months after the intervention to measure short-term effects and ongoing patient care follow-up. The SF-36 and KAP questionnaires were administered a second time six months after the intervention to ascertain long-term effects. The KAP-validated survey tools were utilised for the purpose of measuring quality of life outcomes (SF-36). A qualitative assessment was also carried out through focus groups and interviews within a subset of patients to derive insights on their experience with KAP intervention and the impact on their quality of life. The analysis of the data was conducted using statistical software (SPSS), with the quantitative data being analyzed

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using the Chi-square test for categorical variables, the paired t-test for continuous variables pre- and post-intervention, and the Analysis of Variance (ANOVA) for longitudinal analysis to compare differences across time points.

RESULTS

Table 1: Demographics of Two Groups

Demographic Factor	Group 1 (n=200)	Group 2 (n=184)
Age (mean ± SD)	58 ± 14	52.4 ± 10
Sex (n, %)		
Male	120 (60%)	90 (49%)
Female	80 (40%)	94 (51%)
BMI (mean ± SD)	31 ± 5	25 ± 6
Smoking (n, %)		
Yes	60 (30%)	45 (24%)
No	140 (70%)	139 (76%)
Comorbidities (n, %)	120 (60%)	70 (38%)
Educational Qualification (n, %)		
High School	50 (25%)	30 (16%)
College/University	150 (75%)	154 (84%)
Monthly Income ($)	800± 500	900 ± 600
Symptoms (n, %)		
Cough	100 (50%)	70 (38%)
Fever	60 (30%)	45 (24%)
Fatigue	80 (40%)	60 (32%)

Table 2: Clinical and Laboratory Indicators

Indicator	Group 1 (n=200)	Group 2 (n=184)
Respiratory Rate (mean ± SD)	23 ± 9	21 ± 5
Consciousness Level (n, %)		
- Alert	150 (75%)	140 (76%)
- Drowsy	30 (15%)	30 (16%)
- Unresponsive	20 (10%)	14 (8%)
PaO2/FiO2 Ratio (mean ± SD)	(144 ± 58)	(152 ± 53)
Inflammatory Markers (mean ± SD)	42 ± 8	34 ± 11

Table 3: Quality of Life Assessment (SF36)

Quality of Life Domain	Group 1 (n=200)	Group 2 (n=184)
Physical Functioning	51 ± 11	55 ± 3.5
Role Limitations	45 ± 11	81 ± 8
Emotional Well-being	48 ± 12	80 ± 6
Social Functioning	60 ± 13	71 ± 5

Table 4: Knowledge, Attitude, and Practice (KAP) Study

KAP Aspect	Group 1 (n=200)	Group 2 (n=184)
Knowledge Used in ED		
Knowledge of COVID-19 Symptoms	150 (75%)	170 (92%)
Understanding of Transmission Routes	140 (70%)	160 (87%)
Awareness of Preventive Measures	130 (65%)	165 (90%)
Sources of Information (n, %)		
- Healthcare Workers	160 (80%)	170 (92%)
- Social Media	50 (25%)	70 (38%)
- Family and Friends	30 (15%)	25 (14%)
Practice Used in ED		
Screening for COVID-19 Symptoms	180 (90%)	170 (92%)
Adherence to Infection Control	175 (87.5%)	169 (91%)

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Patient Education on Self-Isolation	160 (80%)	150 (81%)
Distribution of Educational Materials	120 (60%)	140 (76%)
Attitude Used in ED		
Attitude towards Patient Education		
- Positive Attitude	170 (85%)	172 (93%)
- Willingness to Engage	160 (80%)	165 (90%)
Belief in the Importance of Education	175 (87.5%)	180 (97%)

Table 5: Logistic Regression Assessment of Risk Factors

Risk Factor	Odds Ratio (95% CI)
Age	1.04 (1.02-1.07)
BMI	1.02 (1.01-1.05)
Smoking Status	2.5 (1.5-4.1)
Comorbidities	2.0 (1.3-3.0)

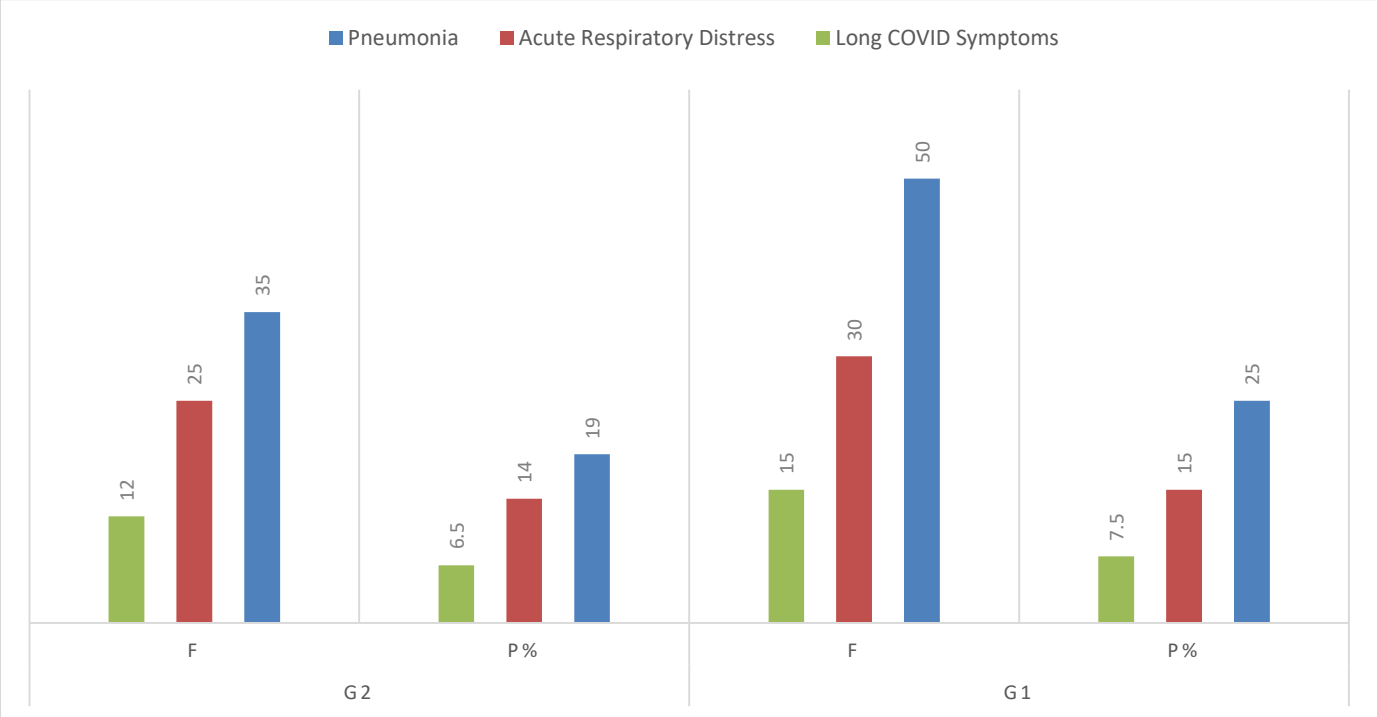

Figure 1: Adverse Effects of COVID-19 Complications

Table 6: Pearson Correlation Between Gender and COVID-19 Severity

Correlation Factor	r-value	p-value
Gender and Admission Severity	0.32	0.001
Gender and Complications	0.28	0.003

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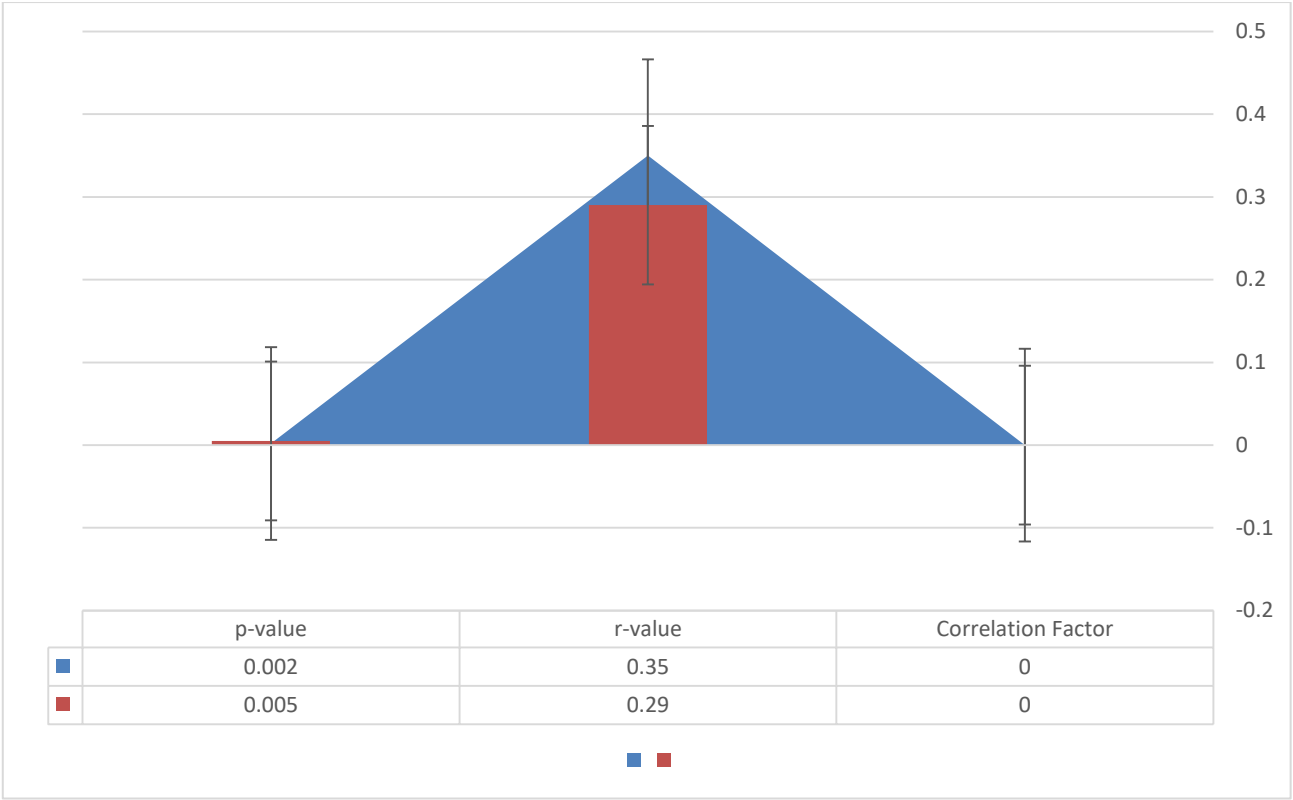

Figure 2: Pearson Correlation between Gender and Response to Strategies in ED

Table 7: The impact of public health education and awareness on patients in the emergency department

Quality of Life Dimensions	Pre-Intervention (Mean ± SD)	Post-Intervention (Mean ± SD)	p-value
Physical Functioning	60.2 ± 15.3	75.4 ± 12.1	<0.001
Role-Physical	54.1 ± 18.4	72.3 ± 15.7	<0.001
Bodily Pain	63.5 ± 14.5	78.0 ± 12.8	<0.001
General Health	58.7 ± 16.2	72.6 ± 14.3	<0.001
Vitality	55.6 ± 15.9	70.1 ± 11.9	<0.001
Social Functioning	62.3 ± 17.0	77.5 ± 13.3	<0.001
Role-Emotional	66.4 ± 15.8	80.9 ± 12.9	<0.001
Mental Health	59.8 ± 14.7	74.0 ± 14.1	<0.001

Table 8: Chi-square Analysis between KAP Study Variables and Improvement in Quality of Life

KAP Variable	Improved Quality of Life (Yes)	Improved Quality of Life (No)	Total	Chi-square (χ^2)	p-value
Knowledge Gained	150 (75%)	50 (25%)	200	12.45	<0.001
Positive Attitude	160 (80%)	40 (20%)	200	15.20	<0.001
Change in Practice	170 (85%)	30 (15%)	200	18.63	<0.001

DISCUSSION

The COVID-19 pandemic has changed the traditional way of managing healthcare through rapid and unpredictable delivery of care and the collection of positive experiences from patients and professionals (Lin, M.P. *et al.*, 2018). The Iraqi public health system has continued to allow patients to choose the primary care area for their needs, enhancing care utilization (Giuffrida, A. *et al.*, 1999). However, demand management has been uneven, both within the community and across other health services, due to different benefits, funding patterns, and geographic differences. The study's findings show that the population is choosing the initial assessment in primary care, which is consistent with a trend toward increasing such consultations (Shen, Y. & Lee, L.H., 2018).

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The effective assessment of patients with novel pathogens in emergency departments has become a pivotal aspect of the management of the pandemic's impact on health systems worldwide (Müller, M. *et al*., 2021). The pressure to develop assessment strategies to rapidly, accurately, and efficiently evaluate potential cases of the disease has increased considerably during surges in cases among health providers. The most effective approach to accomplishing this is the creation of a triage system that rapidly classifies patients according to the severity of their conditions. The commission of this triage system involves the triangulation through standardised protocols to categorise patients into mild, moderate, or severe categories, thus enabling priority treatment for those most at risk of complications. The implementation of such a system can be further enhanced by the utilisation of the National Early Warning Score (NEWS) or analogous clinical scoring systems specifically designed for the management of cases of COVID-19, thereby ensuring a streamlined and expeditious decision-making process that aligns with the demands of emergency department settings (Etu, E.E. *et al*., 2022).

The integration of technology has been identified as a key enabler in enhancing the efficiency of assessments. A significant benefit of telehealth services is their capacity to facilitate preliminary assessments of patients [Aaronson, E.L. *et al*., 2022]. The utilisation of remote consultations enables healthcare professionals to triage individuals who, in the absence of such technology, would have presented at emergency departments and consequently been exposed unnecessarily. This approach has been shown to reduce the time spent by healthcare professionals in organizing patient flow. The utilisation of electronic health records in most systems facilitates data collection, as staff members can swiftly access patient histories to incorporate them into their evaluations [NHS, 2023].

Also, the acceptance of rapid diagnostic tests for COVID-19 into the workflow of the emergency department has converted the assessment process entirely. With this kind of testing becoming easily available, testing for viral detection could itself determine immediately, for example, the initiation of isolation measures or the start of treatment, thereby cutting down patient waiting times and the potential transmission within the ED merely by point-of-care testing. Such tests should be done in conjunction with proper follow-up procedures to monitor the conditions of the patients as newer information comes through regarding viral loads and variants [Yiadom, M.Y. *et al*., 2017].

Communication strategies affect the assessment process as well. Public health messaging on COVID-19 symptoms and the requirements for testing would prove invaluable in guiding patients on when to seek medical care. Mass education drives would reduce the number of mild cases presenting to the emergency department, thereby releasing resources to more severe cases and ensuring timely care for those at greater risk. Clear and transparent communication strategies engage the community, thereby empowering them to take appropriate actions in line with their health conditions.

CONCLUSION

In conclusion, the strategies for the emergency department assessment of COVID-19 patients should include triage enhancement, the use of information technology, and demographic considerations, rapid testing, and successful public information. These multidimensional strategies will, when applied holistically, increase the ability of healthcare systems to cater to surges in COVID-19 caseloads while ensuring that all patients receive care in a timely and appropriate manner. With the evolution of the pandemic, it is also expected that some of these strategies may modify to tackle newly emerging challenges, integrating lessons learned from these evolving assessments to better delineate future best practices in emergency care provision.

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