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STUDY PROTOCOL

Implementation of advanced triage in the Emergency Department of high complexity public hospital: Research protocol

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Abstract

Aim: To evaluate the efficacy of advanced nurse triage based on the quality of care outcomes of patients attending the Emergency Department of a high-complexity hospital. To analyse the concept of advanced triage and the essential elements of the construct.

Design: Mixed longitudinal study, divided into 4 steps; which will include an initial qualitative step, two observational studies and finally, a quasi-experimental study. Clinical Trial Registration Number: NCT05230108.

Methods: Step 1 will consist of a concept analysis. Step 2 will include a mapping of advanced practice protocol terminologies. Step 3 will analyse the opinion of health professionals on advanced triage. In step 4: in the retrospective phase (n = 1095), sociodemographic and clinical variables and quality indicators such as waiting time will be analysed. After that, in the prospective phase (n = 547), advanced triage will be implemented and the two cohorts will be compared. The whole study will be carried out from January 2022 to January 2024.

Discussion: Patients classified as low complexity at triage are more vulnerable to emergency department overcrowding. The implementation of advanced triage would make it possible to respond to patient needs by offering equitable and quality healthcare, facilitating accessibility, safety and humanization of the emergency department.

KEYWORDS
advanced interventions, advanced nursing practice, advanced triage, emergency department, hospital emergency services, nursing

1 | INTRODUCTION

Advanced Practice Nursing (APN), which first appeared in the United States around the 1960s, took almost 20 years to spread to Europe and was first introduced in Great Britain. Subsequently, it was used in other countries such as Australia and Ireland. This practice emerged due to changes in the healthcare system and the need to adapt to new models of healthcare due to a shortage of medical professionals, an increase in the demand for care in the provision of services and an improvement in the professional development of nurses (Woo et al., 2017).

The International Council of Nurses defines the APN as one who has acquired, through further education, the expert knowledge base, and complex decision-making skills and clinical competencies for expanded nursing practice the characteristics of which are modelled on the context in which they are accredited to practice (International Council of Nurses, 2020). The United Kingdom National Health Service (NHS) defines advanced practice as a level of practice characterised by a high degree of autonomy and complexity in decision-making. The degree of advanced practice is obtained with a master's degree or equivalent (Crouch & Brown, 2018).

2 | BACKGROUND

Hospital emergency departments (EDs) are one of the gateways to the healthcare system and play a critical role, as they are often unable to guarantee an efficient and high-quality response to citizens. Of particular concern is the fact that most ED visits are considered non-urgent or inappropriate and classified as low complexity in different countries around the world (Berchet, 2015). One of the main challenges in recent times has been to avoid ED overcrowding. Overcrowding is caused by multiple factors, the most relevant of which are: poor outflow of the hospital ED, insufficient beds, which do not allow patients requiring hospital admission to be conveyed, and a shortage of healthcare staff. The collapse of the ED causes delays in diagnosis and in the initiation of treatment, which is related to an increase in morbidity and mortality because it causes a delay in the initiation of prescriptions and the administration of antibiotics and analgesia. It should be added that ED overcrowding leads to errors and increases hospital stay, and costs. Overcrowding in the ED is the consequence of poor quality of attention in patient care (Austin et al., 2020; Bittencourt et al., 2020; Di Somma et al., 2015).

In the hospital setting, triage was introduced in the 1960s due to an increase in the population attending the ED. A five-level categorisation system was created, as this allowed for very precise patient triage (Zachariasse et al., 2017). Triage provides the patient with a level of prioritisation in clinical care with the aim of identifying the most severe patients, who require the most appropriate and quickest diagnostic or therapeutic interventions and tests to resolve the health problem (Hinson et al., 2018). There are different validated scales that allow patients to be classified on arrival at the ED such as: Australasian Triage Scale (ATS), Canadian Triage & Acuity Scale (CTAS), Emergency Severity Index (ESI), Manchester Triage System (ETS) and Andorran Triage Model / Spanish Triage System (MAT/SET; Hinson et al., 2018; Sarria-Guerrero et al., 2019). Generally, five-level risk stratification scales have been recommended for use because they are more reliable and valid for assessing the clinical status of patients (Silva et al., 2017). Of all the existing five-level prioritisation scales, the Emergency Nurses Association recommends the use of the ESI. The ESI makes the same classification as the MAT/SET and classifies into: level I, immediate resuscitation, where there is no waiting time for the patient to be seen; level II, an emergency where the patient can wait up to 15 min to be seen; level III, an urgency, where the patient can wait up to one hour; level IV, a minor urgency, where the patient can wait up to two hours to be seen; level V, a non-urgent case where the patient can wait up to 4 h or more to be seen (Innes et al., 2017; Zachariasse et al., 2017).

Triage is one of the area's most susceptible to improvement in the ED. One of these improvements is the implementation of advanced triage (AT). AT is a poorly defined concept in the literature, but in principle, AT is understood as the application of protocols or clinical practice guidelines, previously agreed by the entire multidisciplinary team, where the nurse acts autonomously after an initial triage in which patients have been assigned a level of priority. These protocols can be applied in hospital triage, in emergency fast-track (FT) wards and also in Primary Health Care (PHC; Butti et al., 2017; Cabilan & Boyde, 2017; Doetzel et al., 2016; Innes et al., 2017). This means that two actions can be given from these protocols, providing safe and quality care to patients. The first health action is contemplated in the scope of nursing responsibility and without medical action. The nurse performs a comprehensive and focused assessment to orientate the health problem (nursing diagnosis), and performs interventions (pharmacological and non-pharmacological) appropriate to completely solving the health problem. The second action is a comprehensive assessment of the patient that allows requesting diagnostic tests and orienting the health problem (diagnostic suspicion), but its approach requires not only nursing but also medical intervention. Referrals to the physician will only be made when, according to the nurse's criteria, a medical evaluation is needed. This mainly occurs when the patient presents diagnostic or therapeutic complexity. (Barksdale et al., 2016; Bittencourt et al., 2020; Butti et al., 2017; Innes et al., 2017; Van Donk et al., 2017; Vara Ortiz & Fabrellas-Padrés, 2019).

Several studies have shown that AT in the ED decreases drug administration time, increases patient comfort and satisfaction, reduces delay in diagnosis and treatment delivery in patients who are less critical, and reducing patient and family distress related to waiting time (Austin et al., 2020; Bittencourt et al., 2020; Cabilan & Boyde, 2017). Applying AT has also improved efficiency of care by reducing waiting lists and patient length of stay, both in the ED, by ordering complementary tests such as blood tests and X-rays more quickly (Van Donk et al., 2017; Woo et al., 2017). However, this growing need to implement AT has not always been associated with increased training for nurses. It is for that, nurses often have the perception that they lack sufficient knowledge and clinical skills to

assign priority levels correctly in triage. This leads them to make errors in their practice, causing collapses in triage units and ED waiting rooms. (Bijani et al., 2018).

For this reason, it is necessary to answer the following questions:

1. What are the attributes that define AT?
2. What is the conceptual coverage of the standardised AT languages?
3. Are the nurse demand management protocols useful for AT in the hospital setting?
4. What is the profile of patients who are candidates for AT?
5. Does the implementation of AT decrease waiting time and increase the satisfaction of the client consulting the hospital emergency department?

3 | THE STUDY

3.1 | Aims

The main objective of this study is to evaluate the effectiveness of advanced triage in improving the quality of care outcomes of patients attending the emergency department of a high-complexity hospital.

The secondary objectives are:

- Analyse the concept of advanced triage nurse and identify the essential elements of the construct (step 1).
- Evaluate the conceptual coverage offered by Architecture Terminology Interface Knowledge (ATIC), the North American Nursing Diagnosis Association (NANDA) and the classification and the International Classification of Diseases and Health-Related Problems (ICD-10), for the representation of the nursing process in triage based on the contents of the Andorran Triage model and in advanced triage, based on the protocols of the Nurse Demand Management for primary care of the Catalan Institute of Health (step 2).
- Evaluate the protocols of the nurse demand management used in primary healthcare of the Catalan Institute of Health, in terms of usefulness and applicability to advanced triage in the hospital setting (step 3).
- Determine the knowledge of the various healthcare professionals about advanced triage and their opinion (step 3).
- Determine the quality of care based on quality indicators, waiting time, level of satisfaction and pain control in patients attending the Emergency Department care unit of a high-complexity hospital, treated with standard care or with advanced triage (step 4).

3.2 | Research hypothesis

The study aims to demonstrate that implementing advanced triage increases quality of care, decreases waiting time and increases satisfaction of patients attending the Emergency Department care unit in a high complexity public hospital when compared to usual care.

3.3 | Design and methodology

Mixed, longitudinal study, divided into 4 stages.

Firstly, designing a strategy for action without a prior conceptual model would lead to a doubtful and possibly inaccurate interpretation of data in the following stages of this protocol. Secondly, it is necessary to know which terminology is the most appropriate to establish an assessment and diagnosis before carrying out an intervention. Thirdly, it will be necessary to assess the action protocols and get the nurses' opinion. Finally, advanced triage will be implemented (Figure 1).

4 | STEP 1

4.1 | Study design

A concept analysis will be carried out based on a systematic analysis method by which it details and specifies the element to be studied, in this case, the AT. This study is based on the method that was outlined by Wilson (Wilson, 1969) and later evolved by Avant (Walker & Avant, 1989). This technique consists of eleven stages: (1) isolating questions concerning the concept by formulating the questions into three categories: concept, fact and values; (2) finding suitable answers through the scientific literature, and the common uses of the concept in encyclopaedias and dictionaries and in grey literature; (3) developing cases to analyse an exemplary case, to describe the AT; (4) developing cases to analyse an opposite case of the AT; (5) developing cases to analyse a related case, such as describing advanced nursing interventions; (6) developing cases to analyse a borderline case, such as nurse demand management; (7) developing a fictitious case, only if necessary, to clarify a concept; (8) determining the social context that ED has experienced in recent years and describing the most effective interventions to try to decrease the oversaturation of the service; (9) identifying the underlying emotions by other authors, describing how nurses perceive the implementation of AT; (10) establishing the practical results resolving the issues raised in the study; (11) defining the results in language that facilitates the clarification of the controversial concept. The use of this methodology provides the construction of different definitions that reach all variants of the AT concept.

4.2 | Data analysis

Not applied. Concept analysis is a formal and rigorous process using a systematic method, in which an abstract concept is

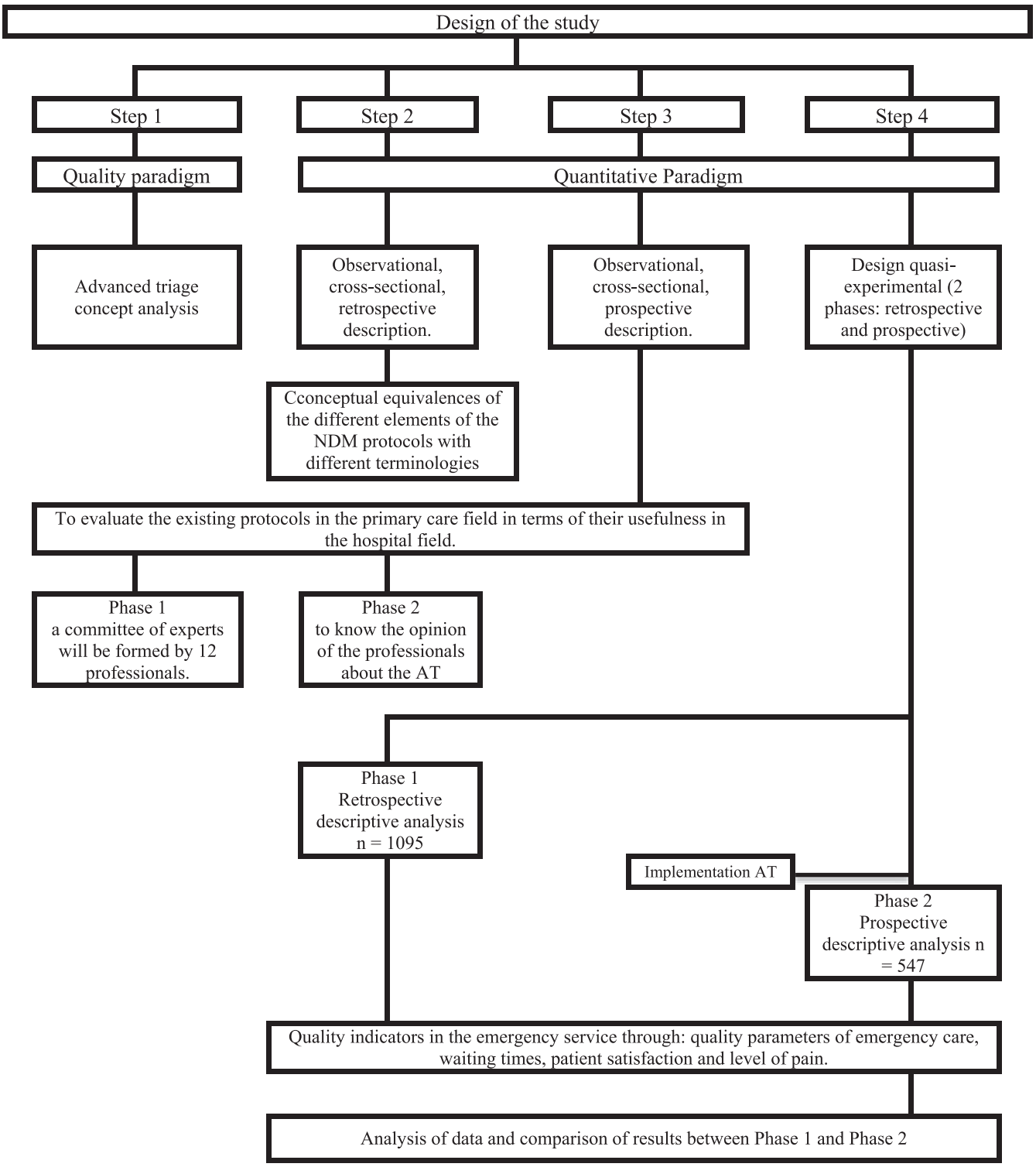

FIGURE 1 Flow diagram: Design and methodology mixed, longitudinal study, divided into 4 steps.

explored, made transparent, defined and differentiated from similar concepts to be used in the formulation of theories. It serves to clarify a concept that is often subject to controversy. Advanced triage can be interpreted in an ambiguous way: only as an advance of tests or as a finalist resolution of the reason for consultation by the nurse.

5 | STEP 2

5.1 | Study design

Observational, descriptive, cross-sectional, retrospective study of interobserver concordance of bidirectional cross-mapping

between Architecture Terminology Interface Knowledge (ATIC), International Nursing Diagnoses: Definitions & Classification (NANDA), Nursing Interventions Classification (NIC) and the International Classification of Diseases and Related Health Problems (ICD-10). Based on the protocols of the Nurse Demand Management (NDM) for primary healthcare of the Catalan Institute of Health. The objects of study are the elements of assessment, diagnosis and intervention, of the protocols of NDM; and their conceptual equivalence to the four previously mentioned languages. The sampling technique will be simple random probability sampling. Assuming an inter-observer discordance of 0.05, an intra-observer discordance ratio of 0.05, a Confidence Level (CL) of 95% ($\alpha = 0.05$), without any loss (as they are concepts), the sample correction formula $Na = n\left[\frac{1}{(1-R)}\right]$ is applied, which results in a total of 416 NDM protocol concepts to be evaluated.

5.2 | Data collection

The data collector will proceed to design an ad hoc form. That will be a structured tool that allows the collection and connection of the three terminologies in each concept (assessment, diagnosis and intervention). The identification of these equivalences will be carried out by the participation of three nurses independently of each of the researchers. Several interobserver consensus sessions will be held according to the results of the concordance. Discrepancies will be resolved, if appropriate, through the agreement processes. To make the equivalences of the concepts included in the NDM protocols with the different languages (ATIC, NANDA, NIC and ICD-10), with trichotomous variables: Yes/No/Partially; and nominal quantitative variables, to facilitate the understanding of the mapping, the codes representing the type of equivalence are included (Table 1).

5.3 | Data analysis

The collected data will be processed and checked for processing errors and analysed with EXCEL. Interobserver reliability will be calculated by considering the ratio according to the results of the three investigators and using the kappa (K) index calculation, in which the agreement is considered to be: (1) low, if (k) ≤0.20; (2) moderate, if (k) 0.21–0.40; (3) acceptable, if (K) 0.61–0.80 and (5) excellent, if (k) ≤0.81.

6 | STEP 3

6.1 | Study design

Observational, descriptive, cross-sectional and prospective study of the different protocols already existing in the PHC of the Catalan Institute of Health and assess whether they are suitable for the hospital setting.

6.2 | Study setting

The study will be carried out in the ED of a high complexity public hospital in the southern metropolitan area of XX. This stage will consist of two phases:

Phase 1 (P1): a committee of experts will be formed, which will evaluate the existing protocols.
Phase 2 (P2): surveys will be passed to several health professionals working in the ED of a high-complexity hospital, in order to know their opinion about the AT.

6.3 | Participants

In Phase 1, it will consist of 12 healthcare professionals (8 nurses and 4 doctors) who will work in the ED of a high-complexity hospital. In Phase 2, the study population will be all healthcare professionals who work in the ED in an assisting or management capacity in a high-complexity hospital.

Selection criteria:

Inclusion criteria: nurses and physicians, assistants and managers of the emergency departments of public hospitals in Catalonia.

Exclusion criteria: Auxiliary nursing care technicians, orderlies, nurses and administrative staff.

Sample size (phase 2):

Starting from a maximum indeterminacy with an expected proportion (p) = 0.05, a 95% confidence interval ($\alpha = 0.05$) and a precision (y) = 0.05. The number of professionals to be included will be 385. Assuming 15% of possible losses, the corrected sample formula will be applied, which gives a total sample of 490 individuals. The sampling technique in this phase will be non-probabilistic consecutive sampling.

TABLE 1 Identification codes representing the type of equivalence

1:1	Concept in NDM which has a conceptual equivalent identical to terminologies
1:0	Concept in NDM which does not have any conceptual equivalent identical to the terminologies
1:A	Concept in NDM having a more abstract conceptual equivalent in the terminologies
1:E	Concept in NDM having a more specific conceptual equivalent to the terminologies
1:N	Concept in NDM that finds multiple, generally more specific equivalent concepts in the terminologies

6.4 | Data collection

The variables for P1 and P2 of stage 3 will be the usefulness and applicability of the NDM, protocols by the hospital AT and two lines will be considered: the first, the evaluation of the perception of usefulness and the second, of applicability by the healthcare professionals, from the two phases.

6.4.1 | Perception of usefulness

(P1 and P2) professionals' impression and assessment of the correctness and advantages of each of the 33 protocols of the NDM by the AT. This variable is measured on a qualitative ordinal scale: 0 to 10, where 0 totally disagrees and 10 totally agrees.

6.4.2 | Perception of applicability

(P1 and P2) practitioners' impression and assessment of the adaptability and feasibility of each of the 33 NDM protocols by AT. This variable is measured with an ordinal qualitative scale: 0 to 10, 0 totally disagrees and 10 totally agrees.

6.4.3 | Secondary variables

(P2) years of experience, professional groups, beliefs about the professional nursing field, knowledge about AT and opinion of AT.

The data collection in phase 1 will be carried out on the basis of grids, where the 33 protocols of the NDM will be analysed. In each protocol, 12 questions will have to be analysed through an ad hoc questionnaire with a qualitative ordinal scale. Each question will be answered using a 10-point Likert-type scale (1 = strongly disagree to 10 = strongly agree). In phase 2, an ad hoc questionnaire consisting of four blocks will be administered: (1) socio-demographic data will be asked; (2) knowledge of the AT will be asked; (3) the opinions held by the different health professionals will be asked; (4) nursing competences will be asked. The questionnaire contained 15 items. Each item will be also answered using a 10-point Likert-type scale (1 = strongly disagree to 10 = strongly agree).

6.5 | Data analysis

Qualitative variables will be described by proportions, calculating 95% confidence intervals. Quantitative variables will be described with mean and median as measures of centrality, and standard deviation and interquartile range as measures of dispersion.

The normality of the distribution of the quantitative variables will be checked with the Kolmogorov–Smirnov test, and the parametric and non-parametric tests indicated in each case in the bivariate analysis will be applied; normally, the most commonly used tests will be the Chi-square, the Mann–Whitney *U*, the Student's *t* and Pearson's correlation-regression tests. Finally, multivariate analysis will include logistic regression techniques. *p*-values of less than 0.05 will be considered statistically significant.

7 | STEP 4

7.1 | Study design

Quasi-experimental study consisting of 2 phases: the first, a retrospective control phase, and the second, a prospective intervention phase in which advanced triage will be implemented. In phase 1, control, quality of care indicators will be assessed, based on quality indicators in the emergency department, waiting time and satisfaction, and the level of pain. In addition, different epidemiological, socio-cultural and clinical variables will be measured. In phase 2, the intervention phase, advanced triage will be implemented based on advanced practices nurse and the indicators of quality of care and pain will be assessed.

- Phase 1 (P1): retrospective control (no intervention). Will include all patients who attended the ED from January 2018 to December 2022.
- Phase (P2): prospective intervention, (experimental) where the ED will be implemented AT based on the advanced nurse practitioner. Will include patients from January 2023 to December 2024.

7.2 | Study setting

The scope of the study will be the ED of a highly complex hospital in a centre in Catalonia (northeastern Spain), which serves as a community reference for 201,192 inhabitants of Hospitalet and Prat de Llobregat and is a reference centre for processes requiring high technology for more than 2 million inhabitants of the South Metropolitan area, Camp de Tarragona and Terres de l'Ebre. Outpatient ED of a tertiary-care centre in Catalonia (Northeast Spain), which serves as a referral centre for community reference of 201,192 people in the Southern Metropolitan Area of Barcelona.

7.3 | Participants

Phase 1, retrospective, will include all patients who attended the ED from January 2018 to December 2022. Phase 2, prospective, will include patients from January 2023 to December 2024. In both phases they will have to meet the following selection criteria.

Selection criteria:

Inclusion criteria: over 18 years of age, admitted to EDs classified with ESI severity levels III, IV and V.

Exclusion criteria: patients over 70 years of age, pregnant women, patients with a Glasgow score of less than 15, patients with more than 3 chronic pathologies and/or 1 complex chronic disease or patients reconsulting the ED for the same reason for consultation.

Sample size: assuming a 95% NC, an alpha risk (α) of 5%, a precision (β) of 20% and a precision (p) of 50%, a sample of 1095 patients in cohort 1 and 547 in the intervention cohort will be required (a total of 1642 patients).

7.4 | Data collection

The main independent variable to be collected will be the AT. As main dependent variables: (a) Quality indicators specific to triage: rate of patients lost without being visited, triage times, triage duration time, waiting time on being visited, admission rate according to urgency, readmission at 72 h and mortality at 30 days; (b) Satisfaction: to assess satisfaction, a survey will be carried out to evaluate the degree of this care; it will be measured at the time the patient is discharged, either as a home discharge or admission. The ad hoc survey will be carried out on an ordinal scale of 0–10; (c) Pain: the visual analogue scale (VAS) will be used to assess the intensity of the patient's pain on arrival and departure from the ED; (d) Epidemiological variables: age and sex, obtained from the computer system and by asking the patient verbally or by means of a survey; (e) Clinical variables, pathological history, reason for triage consultation, diagnoses (nursing or medical) and type of discharge. These data will be obtained from the computer system and through a survey of ED patients. Complexity indicators such as language limitations will also be obtained.

Therefore, data collection in the first phase will be carried out from the computer system and through the different patient medical records retrospectively in 2019, 2020 and 2021. In phase 2, the collection will be through the computer system and the ad hoc survey. This survey will be administered after the patient is discharged from the ED, either at home or admitted to hospital.

7.5 | Data analysis

Qualitative variables will be described by proportions, calculating 95% confidence intervals. Quantitative variables will be described with mean and median as measures of centrality, and standard deviation and interquartile range as measures of dispersion. The normality of the distribution of quantitative variables will be checked with the Kolmogorov–*Smirnov test, and the parametric and non-parametric tests indicated in each case in the bivariate analysis will be applied; normally, the most commonly used tests will be the Chi-square, the Mann–Whitney *U*, the Student's *t* and Pearson's correlation-regression tests. Finally, multivariate analysis will include logistic regression techniques. *p*-values of less than 0.05 will be considered statistically significant. All data will be analysed using SPSS v26.0 software.

7.6 | Ethical considerations

This project has been approved by the Ethics Committee of the University Hospital of Bellvitge (PR085/20). The participants of step 3, phase 2 will be surveyed in order to know the opinion of the professionals with respect to the AT. Therefore, prior to the delivery of the survey, voluntary participation will be requested and, if accepted, the corresponding informed consent form (IC) will be signed. The IC will also be signed for patients in step 4 phase 2 (intervention), on whom the AT will be implemented on the basis of the protocols decided by the committee of experts. Before initiating step 4, approval will have to be obtained from the management of the centre and services involved.

Data collection for step 4, Phase 1 will be pseudo-anonymized by means of an alphanumeric code and only the principal investigator (PI) of the study will be able to relate these data to the clinical history. Therefore, the identification of the participants will not be disclosed to any person. The data will be kept by the corporate network of the University Hospital of Bellvitge and by the PI for a minimum of 10 years. The Research Ethics Committee has been requested to make an exception of the informed consent procedure, due to the fact that the data will be collected retrospectively respecting the legal and current data protection regulations.

The information provided both orally and in writing is linked to the Law 16/2010 of 3 June, on the rights to information concerning the health and autonomy of the patient, and clinical documentation. As far as personal data are concerned, they will be protected by the legislation in force in our country, according to the Organic Law on Personal Data Protection 3/2018 of 5 December. In this Law, the principal investigator undertakes to comply with the duties of professional secrecy and confidentiality, article 5.

The processing, communication and transfer of personal data of all participating subjects will conform to the European Union Regulation 2016/679 of the European Parliament and of the Council of 27 April 2016 on Data Protection, in addition to compliance with the Organic Law 03/2018, of 5 December, on the protection of personal data and guarantee of digital rights. In accordance with the provisions of the aforementioned legislation, you may exercise your rights of access, rectification, cancellation, opposition, limitation of the processing of data that are incorrect or request a copy or that they be transferred to a third party, for which you will have to contact the study nurse. To exercise these rights, or if you wish to know more about confidentiality, you will have to contact the principal investigator of the study. The study will be carried out in accordance with current legislation on research projects in our country, Biomedical Research Act 14/2007.

7.7 | Validity and reliability

Scientific rigour is guaranteed on the basis of reliability, credibility and clinical safety. In Phase 2, Step 4, the AT will be implemented and will always be performed by the same people. Patients will be

cared for by only 3 nurses and these nurses will have a minimum of 10 years Of experience in the ED, the necessary academic training, an official master's degree and adequate training to be able to apply the AT.

8 | DISCUSSION

There is no consensus on the best intervention to reduce crowding in the ED, due to the fact that a large variability of indicators comes into play. However, there are several interventions that influence the length of stay of patients, thus reducing waiting times. Prolonged waiting times for medical care are known to negatively affect the quality of healthcare and increase the risk of undesirable consequences for patients (Bijani et al., 2018; Shen & Lee, 2018). Different studies have implemented a wide range of interventions to improve this collapse of EDs (Austin et al., 2020; De Freitas et al., 2018; Morley et al., 2018). One such intervention that has shown promise is to allow triage nurses to order diagnostic tests even before a physician sees the patient (Bittencourt et al., 2020). This is a valid option especially for patients with traumatic pathologies. In another study, FT areas were implemented to help reduce length of stay in services and costs. This intervention decreased the number of repeat visits, reduced the mortality rate and increased patient satisfaction (Woo et al., 2017). Applying new work processes, such as the use of Lean-based organisational methodology, has also proven useful in reducing length of stay in ED (Allaudeen et al., 2017; Austin et al., 2020).

All these interventions can be effective, but applying APN in both ED and primary healthcare should not be forgotten as one of the central pillars of AT (Brugués et al., 2017; Vara-Ortiz & Fabrellas Padrés, 2022). In order for this to be done, all nurses involved in triage must be properly prepared. In some studies, it is the nurses themselves who feel that they do not have sufficient knowledge and skills to assign triage levels, thus making mistakes in their practice, which, in turn, leads to patient dissatisfaction and overcrowding in hospital ED triage units (Bijani & Khaleghi, 2019). For this reason, to identify nurses' perception of professional capability is essential (Bijani et al., 2018). It should be noted that the triage process is complicated (Bijani et al., 2020). Variability in triage classification has been described as multifactorial. The level of triage assignment has been correlated with the professional profile of the nurse and the number of triages performed by the nurse (Gómez-Angelats et al., 2018). Several studies have shown that the lack of knowledge and professional skills to perform triage influences the level of triage assigned (Bijani & Khaleghi, 2019; Mohammadi et al., 2022). Errors are made in prioritizing patients and placing them in a lower or higher level than their actual condition, resulting in over- or under-triage. However, one study found that the concordance between triage levels assigned to the same patient was higher for more severe patients. Although, there were still some multifactorial discordances at less severe levels (Sarria-Guerrero et al., 2019).

The correct classification of low-urgency patients increases the efficiency of ED flow and reduces waiting times for high-urgency visits (Zachariasse et al., 2019). Patients classified as Priority I and II on triage scales are given higher quality of care, but as the degree of priority decreases, the level of quality also decreases proportionally (Morley et al., 2018; Zachariasse et al., 2019). It is necessary to give a satisfactory response to health needs, especially in patients classified as low complexity, who are more vulnerable to overcrowding, and to apply specific circuits for the care of these patients, such as AT (Hinson et al., 2018; Lauks et al., 2016). AT has been one of the most important strategies implemented in EDs to decrease waiting times in some countries such as Italy, UK, USA (Michigan), Canada, Australia (Melbourne; Barksdale et al., 2016; Butti et al., 2017; Innes et al., 2017; Lauks et al., 2016; Morley et al., 2018; Van Donk et al., 2017). It has been carried out by the APN figure.

8.1 | Limitations

The present project has certain limitations. The first is the non-randomization of patients in either of the two phases of step 4. The second limitation could be in the comparison of the results obtained between the two cohorts (retrospective and prospective) since they are differentiated by a time interval. The third limitation is the results are from a single care centre. Another limitation is this study may have some missing information related to the retrospective phase data collection. The fourth is that the study may present some missing information related to the data collection part of the retrospective phase of step 4. And finally, the study does not present any validated scale to assess AT satisfaction specifically in the ED, and therefore, a Likert-type scale made ad hoc for this project will be used.

9 | CONCLUSION

The execution of this project will try to demonstrate that implementing AT in the ED, mediated by APNs, can increase the quality of care indicators in the ED and increase citizen satisfaction. At the same time, this intervention shall eventually improve the waiting times and reduce ED collapses in the short term. Our results may modestly help to address the APN skills focused on AT and give greater importance to TA, as a model that helps to reduce emergencies by treating minor injuries based on the autonomous role of the nurse. This could respond to the current demand of Health Care System and make it more sustainable.

AUTHOR CONTRIBUTIONS

All authors have agreed on the final version and meet at least one of the following criteria [recommended by the ICMJE (www.icmje.org)]:

- Substantial contributions to the conception or design of the work; or the acquisition, analysis or interpretation of data for the work;
- Drafting the work or revising it critically for important intellectual content;

- Final approval of the version to be published;
- Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

DATA AVAILABILITY STATEMENT

Full top-line results will be available from EGC at evaguix@ub.edu. Now, you can see clinical trial registration.

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