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A qualitative exploration of value and waste in a Trinidadian emergency department patient flow process: perspectives of patients and clinicians

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ABSTRACT

A process that does not include the customer's value may not be effective in providing care. This study aimed to identify value and waste in an emergency department (ED) patient flow process from a patient and clinician perspective.

A qualitative case study was conducted in an ED in Trinidad and Tobago. Observations and informal conversational interviews with clinicians (n=33) and patients (n=50) explored patient flow, value and waste. Thematic analysis was used to create a framework on valuable and wasteful aspects in the ED patient flow process.

Valuable aspects led to direct improvements in the patient's health or an exchange of information in the process. Wasteful aspects were those with no patient activity, no direct ED clinical involvement, or resulted in a perceived inappropriate use of ED resources. However, there was a disparity in responses between clinicians and patients with clinicians identifying more features in the process. The single case study design limits the generalisability of findings to other settings. This study did not specifically explore the influence of age and gender on what mattered to patients in ED services. Future studies would benefit from exploring whether there are any age and gender differences in patient perspectives of value and waste. Further research is needed to validate the usefulness of the framework in a wider range of settings and consider demographic factors such as age and gender

The study has produced a framework which may be used to improve patient flow in a way that maximised value to its users. A collaborative approach, with active patient involvement, is needed to develop a process that is valuable to all. The single case study design limits the generalisability of findings to other settings.

Qualitative methods were used to explicitly explore both value and waste in emergency department patient flow, incorporating the patient perspective. This paper provides an approach that decision makers may use to refine the ED patient flow process into one that flows well, improves quality and maximises value to its users.

INTRODUCTION

Poor patient flow in emergency departments (EDs) affects quality and safety of care, with the risk of adverse events increasing with longer ED waiting times (Hoot and Aronsky, 2008). Improving patient flow requires understanding and identifying where value and waste exist in the patient flow process. These concepts originated from Lean thinking, a management tool aimed at improving flow by maximizing value and eliminating waste in the process (NHS Institute for Innovation and Improvement, 2007).

Lean defines value from the primary customer's perspective where the customer is anyone who 'uses something that is made or provided by a previous process step' (NHS Institute for Innovation and Improvement, 2007). In Lean thinking the patient is considered the primary customer or user and any activity that benefits or improves the patient's health or well-being is valuable (NHS Institute for Innovation and Improvement, 2007). Lean defines waste as anything that does not benefit the patient and has proposed eight types of waste, outlined as follows (Graban, 2012):

- Overproduction (production in excess of demand)- unnecessary lab requests
- Inventory (excess product not being used) – overstocking
- Motion (unnecessary movement by people)- staff searching for equipment
- Transportation (unnecessary movement of products)- poor layout
- Over-processing (performing non-value work)- duplication of information
- Defects (repeating processes because of mistakes)- mislabelling of samples
- Waiting (waiting at or between steps)- waiting for a prescription
- Human potential/skills (under utilising staff)- performance of non-valuable activities

Young and McClean (2008) categorized value into clinical, operational and experiential value. Clinical value aims to achieve the best patient outcome. Operational value represents

the effectiveness of the service and experiential value accounts for patients/care-givers/health workers experiences of care. In addition to patients, it has been suggested that multiple stakeholders exist (clinicians, managers, policymakers), each with their own perception of value (Young and McClean, 2008; Sharp et al., 2014). This creates ambiguity when deciding who to include in identifying valuable and wasteful aspects of a process. If the patient's perspective is not included, one concern is that this may result in professionals potentially identifying what is valuable and wasteful to them rather than relating it to the patient's process.

The principal-agent relationship theory assists in identifying who to include in exploring value and waste in patient flow. Jensen and Meckling (1976) define an agency relationship as "a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf, which involves delegating some decision making authority to the agent." A central principal agent relationship in healthcare is the clinician- patient relationship and although the clinician has the authority to make decisions on behalf of the patient, the patient's preferences and needs are considered with decisions made in the patient's best interest (Smith et al. 1997, Siew et al. 2005).

More recently, there is a focus on co-production, person centered care and patient involvement in health services (Wittel et al.,2011, Russo G et al.,2019). This refers to partnerships and collaborations between patients and professionals to allow joint decisions to be made regarding health services. These theories support the inclusion of patients' perspectives as well as professionals, allowing both to determine valuable and wasteful features of the process.

Exploring value and waste from the perspectives of both patients and professionals may also be beneficial in the development of high quality emergency health systems. The Lancet

Global Health Commission report on high quality health systems states that a high quality health system should be 'for the people', based on peoples' needs and preferences as well as providing supportive environments for those who work in the system (Kruk et al., 2019). This approach aims to improve trust and confidence in the system by its users. Allowing the main users of the process to identify what they value may help policy and decision makers to refine the organizational process to one that flows well, is valuable and 'for the people'.

However, previous studies exploring value and waste often excluded the patient perspective (Poksinka et al., 2017) or, if included, used quantitative approaches to capture responses, which did not allow patients to define value themselves (Holden and Smart,1999; Al Owad et al., 2018]. Studies also focused on identifying waste rather than value or categorised 'value' as patient-staff contact time and 'waste' as non-contact waiting time (Swancutt et al., 2017; Pinkey et al., 2016). This may be considered narrow as it assumes that all contact time is valuable and all non-contact time is wasteful.

Developing a timely patient flow process that does not incorporate the users' value may not be effective in the overall provision of care. Thus, exploring value and waste in the ED patient flow process may be one way of improving patient flow and achieving high quality emergency care systems. The aim of this study was to explore valuable and wasteful aspects of an ED patient flow process from both a patient and clinician perspective.

METHODS

Study design

A qualitative case study was conducted in an ED in Trinidad and Tobago, a developing twin-island country in the Caribbean. Case study research is useful for understanding complex social phenomena, addressing 'how' and 'why' questions [Yin, 2014]. The study was conducted by LD, a PhD student in health services research who had previously worked as a

clinician in the ED but not during the study period. The other authors included an emergency physician, a qualitative researcher, a health economist and a local researcher. This collaborative approach served to limit the influence of any one researcher's background on the study.

Study setting

The health system in Trinidad and Tobago is a mix of public and private facilities. The public health system is funded by the government and the taxpayers and is a non-paying service to citizens (Ministry of Health, Trinidad and Tobago). Emergency medicine in Trinidad and Tobago is a relatively new specialty. The emergency medical system follows the Anglo-American model of emergency care, with distinct emergency physicians working in emergency departments. The ED study site attended to adult patients only, over the age of 16 years. The hospital to which the ED is attached had approximately 450 beds. The ED attended to approximately 200 patients daily and utilised the Canadian Triage and Acuity Scale (Canadian Association of Emergency Physicians, 2016). The triage system categorises patients from Level 1 to 5 based on acuity: Level 1 (Resuscitation), Level 2 (Emergent), Level 3 (Urgent), Level 4 (semi-urgent) and Level 5 (non-urgent). The ED attends to a variety of medical, surgical and gynaecological cases.

The overall departmental staffing structure during the study period is outlined in table 1. Consultants generally worked 8-4pm during the week, while there was always an on-site registrar. The house officers worked in five teams of approximately eight doctors per shift. An average of one registrar and eight house officers were assigned to each shift. Assignment of nurses to each shift depended on staffing availability. Sample of staff and patients were interviewed.

Table 1. Overall staffing structure in ED during study period

Physician staff	**Nursing staff (permanent)**	**Auxiliary staff**
Consultants (n=5) Registrars (n=8) House officers (n=40)	Nurses(n=32) Enrolled nursing assistants (n=12) Patient care assistants (n=7)	Escorts (n=35) Laboratory technicians (n=7)

Data collection and analysis

Informal conversational interviews with a sample of patients and ED clinicians were used to explore value and waste in the ED patient flow process and were conducted from August to October 2017 with a follow up in February 2018. Observations of the patient flow process were conducted prior to the interviews and were used to inform the informal interviews.

Informal conversational interviews are useful for exploring areas that are not well understood or well defined, such as value and waste (Roulston, 2008; Gillham, 2005). In this type of interview, questions are spontaneously formed based on observations and topics are discussed in an informal, casual tone. The method was also chosen for pragmatic reasons as data were collected in real time as ED clinicians were providing care and patients were seeking/receiving care and was considered more suitable for the ED environment. Recording verbatim speech was difficult but 'speech in action' was often included (Fry, 2011). This meant describing the actions and speech used by participants as they occurred. In order to avoid affecting the spontaneity and informal nature of the method, the informal interviews were not audio-recorded. (Robson and McCartan, 2016). Additionally, audio-recording would have been difficult given the high levels of background noise.

Participants were patients and clinicians. While all ED staff have a role to play in maintaining flow, in this ED setting, doctors appeared to be mainly responsible for decisions that

determined patient flow. The term clinician, in this setting, therefore refers to doctors. This may contrast with other settings where nurses are more influential. A sample of staff and patient participants were interviewed. Purposeful sampling occurred across the hierarchy of doctors (consultants, registrars, house officers) and patients from different triage categories, to achieve triangulation of data sources (Creswell, 2000).

Verbal and written information about the study were provided to participants with posters displayed throughout the ED informing the ED population of the on-going research. Given the informal nature of the interviews, verbal consent was obtained from participants. Prior to interviews, each participant (patients and clinicians) was asked if s/he was willing to participate and reminded that s/he did not have to participate if s/he did not wish to do so.

Consistent with the iterative nature of qualitative research, the informal conversational interview technique was refined after initial conversations with participants and preliminary data analyses, using inductive thematic analysis, occurred during the fieldwork. Participants were asked 'what steps or parts of the patient's journey do you think were valuable /wasteful/worthwhile in the process?' This allowed participants to identify as many aspects of the process as possible. Staff participants were asked about specific patient journeys (patients they had just managed) in order to develop as broad an understanding of value and waste in the patient flow process as possible. Alternative terms used to represent valuable were 'useful' and 'worthwhile'; alternative terms used to represent wasteful were 'not necessary' or' not useful'. Conversations with participants occurred at the end of the ED patient journey. Supplementary file 1 has the topic guide.

Data were collected with the aim of achieving saturation, that is, no new ideas or themes were generated (Patton, 2002). The University of the West Indies Campus Ethics Committee and the hospital site granted ethical approval (CEC014/09/16). Handwritten field and reflexive

notes were transcribed into Microsoft Word 2016 within 24 hours of data collection. Inductive thematic analysis was conducted with codes and themes developed from the data (Braun and Clarke, 2006). Since qualitative research maps the range and diversity of data, the development of a theme was not based on the number of instances a theme occurred (Spencer et al., 2014). NVIVO 10 software was used to facilitate data analysis. The co-authors reviewed a selection of transcripts and provided critical feedback of the analyses.

RESULTS

Informal conversational interviews were conducted with 33 ED clinicians and 50 patients (table 2). Of the clinicians, 24 were males and 9 females. Of the patients, there were 27 males and 23 females. Supplementary file 2 presents details of the patient and clinician characteristics.

Table 2. Summary of clinician and patient participants

Clinician category	**Number of clinicians**	**Triage category**	**Number of patients**	**Patient Ages (years)**
Consultants	5	Level 1	12	18-34 (n=5)
Registrars	8	Level 2/3	24	35-54 (n=25)
House officers	20	Level 4	22	55-74 (n=14)
		Minor operating theatre	22	75 (n= 5)

The ED patient flow process

Observations revealed that ED patient flow broadly involved the following steps. On arrival to the ED, a triage nurse screened patients to determine if the ED was the appropriate place. Patients then registered and were formally triaged. Basic investigations were conducted and

patients assigned a triage level. Patients were assessed by clinicians and either discharged or referred to inpatient teams. Inpatient clinicians reviewed patients in the ED before making an admission decision.

Value and waste in ED patient flow

Two overarching themes on value and three on waste were generated from the data. Valuable steps (i) directly improved the patient's health or experience or (ii) led to an exchange of information. Wasteful steps were those with (i) no patient activity, (ii) no direct ED clinical involvement or (iii) a perceived inappropriate use of ED resources.

A comparison of clinicians' and patients' perspectives is presented in table 3, representing a framework to identify value and waste in patient flow. In the framework presented, each value subtheme was categorised as having clinical or experiential value and each waste subtheme was matched with the appropriate and relevant Lean waste categories described earlier.

Value: direct improvement in patient's health or experience

Patients identified areas that improved their general ED experience whereas clinicians identified specific process steps that directly improved the patient's health. Four key areas were identified:

Medical treatment addressed patient symptoms

Clinicians identified the direct medical treatment of the patient as a valuable step in the patient's process. This step appeared to be valuable if it addressed the patients' complaints/alleviated discomfort and/or was the definitive treatment for the patient and/or led to a disposition decision. Any of these factors may contribute to an improvement in the patient's health or experience.

> …"giving the patient antibiotics was very valuable because it's the mainstay of his treatment. Once the patient receives the antibiotics it doesn't really matter what time surgery [referring to the surgical house officer] comes- the patient has already received his definitive management" [SHO#1, T1P5]

> …she [senior house officer] felt that the treatment step was the most useful because the patient's symptoms were alleviated and she was able to discharge him. [SHO# 7, T4P1]

Gurneys provided physical comfort and indirect treatment of patients

It was observed that patients were not automatically placed on gurneys when being seen by clinicians. Clinicians considered gurneys valuable as an indirect form of treatment in the management plan. For example, a clinician assessed a patient with an infection in his leg and thought the gurney was useful to provide elevation of the limb as part of the management of the patient.

Clinicians also identified gurneys as valuable for providing physical comfort for the patient, regardless of clinical need. Gurneys were primarily utilised for those patients who were referred to inpatient teams, presumably because these patients would have longer lengths of stay in the emergency department and therefore their comfort was important.

> "Yes I think it is useful [referring to gurney use] because the patient should be comfortable. Normally I will try to arrange a gurney for patients but this time the house officer had planned to discharge the patient. Only when he reviewed with me did I decide to refer so I had not yet arranged anything." [Registrar#4, T6P1]

For patients, the value of a gurney was directly related to physical comfort in the ED, similar to the clinicians' perspectives:

> "At this point now I know they admitting me, being on a bed [gurney] is important because I know it will take long to go to the ward and I just want to be comfortable". [Patient #5 T1]

It also appeared that patients did not have an expectation or desire to be placed on a gurney if it was not necessary:

> "When I came I was feeling dizzy so I preferred to be on a bed. But now I feel better so I prefer to sit or go outside to breeze out [get fresh air]". [Patient #4, T6]

Accessibility and availability of resources enhanced the effectiveness of steps

Accessing the resuscitation room was valuable for clinicians as it afforded access to support staff and material resources allowing staff to quickly accomplish tasks. Any resource abundant ED area may be perceived as valuable for this reason:

> She [junior house officer] told me that taking the patient to the resuscitation room was useful because she was able to manage the patient quickly and get all the investigations done quickly … if the patient was on the corridor she would still be waiting to get those things done. [Junior HO#1, T6P6]

ED referrals to inpatient teams allowed for continued care

ED clinicians identified their referrals to inpatient teams as valuable because these teams provided definitive management or continuity of care, described as being able to "fine tune and adjust care for the patient." [SHO#1, T2P8]. The value was in providing care that may be considered beyond the scope of emergency care.

Value: provision of information

Patients identified aspects of the process as valuable if they gained information from the visit. Clinicians valued steps that provided information enabling patient progression. Five key areas were identified:

Activities at the triage stage provides information

Obtaining patient vital signs at triage was considered valuable to clinicians because it provided information at the point of entry, contributing to patient prioritisation. Similarly, information obtained from basic investigations (ECG, urine tests and X-rays) performed at triage, was valuable for eliminating steps in the main process. This strategy at the triage stage saved clinicians and patients time, providing necessary information in an efficient manner:

> "The patient had had a urine test done at triage which is useful because it was one less thing for him to do and one less delay when I see him…"[SHO#10, T6P5]

Clinicians' assessment directs future steps

Clinicians identified their patient assessment (history and physical examination) as valuable because it provided information that informed the next steps, including treatment and disposition.

> "…. the history and examination is also useful because this will tell you what exactly is going on with the patient and can direct your management plan." [SHO #10, T6P4]

For junior clinicians, patient review by senior clinicians was considered valuable. This involved senior clinicians assessing the patient themselves, performing procedures or verbally discussing the patient. It appeared that junior clinicians expected seniors to either confirm the original clinical decision or provide expertise leading to a clinical decision. If this expectation was not met, the senior clinician contribution was seen as less valuable. As senior review often occurred towards the end of the ED journey, value was found when the information contributed to a disposition decision:

> "..., the registrar had picked up other points I had not considered and had changed the management plan from a potential discharge to an immediate referral." [SHO#6, T6P4]

'*Being seen by the doctor' provided information to the patient on 'knowing what is wrong'*

Patients cited 'being seen by the doctor' and determining the reason for their complaints ('knowing what was wrong') as valuable aspects of their journey. 'Being seen by the doctor' encompassed steps such as clinical assessment, diagnosis and treatment.

> "The most important part was seeing the doctor because the doctor would determine the next steps for me." [Patient #9, T1]

Patients identified both emergency and non-emergency clinicians as providing information to determine what was wrong. The value in 'being seen by the doctor' from the non-emergency doctor appeared to concern the continued care or definitive management:

> "Yes because the emergency doctors can only manage to a point and then the surgical doctors need to take over to complete management" [Patient #6, T3].

Less commonly, patients could not find value in their visits until they knew what was wrong. For these patients, the diagnosis or 'knowing what was wrong' was the most valuable part of the process and without this information it was difficult to find value in the overall visit. Patients also found value in knowing what was not wrong with them or being reassured about their condition:

> "I went to the health centre last week and they sent me to the outpatient clinic but I didn't like how my foot was looking yesterday so I came today to make sure it was ok." [Patient #4, T10]

Useful waiting- making the most of waiting periods

ED clinicians identified waiting times to be seen as valuable for certain patients. The long waiting times to be seen were incorporated into the clinical management of these patients and used as observation periods. These waiting periods may be viewed as opportunities to gather information about patients that would determine further interventions, contributing to a disposition decision. This form of waiting may be referred to as 'useful waiting' because it

appeared that there was activity related to the patient even though it may not be readily obvious to the patient. For example, the waiting time for a patient with a traumatic minor head injury was incorporated into clinical management as an observation period:

> … "That [the waiting time to be seen] was very long and although that may be a waste normally for these minor head injury patients we would observe for a 12 hour period. We didn't do that for the patient because the waiting time to be seen by me together with the period after he was seen could be considered an observation period. So the waiting time was beneficial to the patient" [SHO#9, T8P1]

While the waiting period may be used as observation, it may also provide an opportunity to avoid unnecessary investigations:

> "….Before she [the patient] came here, she had taken pain medication for her headaches. She waited 4 hours to be seen and that could be a waste, but by the time I saw her she already had pain relief so the waiting was actually beneficial for her…." [SHO#6, T3P3]

This 'useful waiting' was not an intended waiting period identified as valuable at the outset. Rather, it was a retrospective value judgement identified only for a subset of patients, apparently non-urgent patients not requiring an active intervention.

Communication and information transfer supported decision-making

Patients valued information sharing with clinicians. It appeared that a lack of communication between patients and ED staff affected patients' ability to tolerate long waiting times, which potentially affected their ability to find value in the visit. This communication and information exchange amongst clinicians and with patients may also be valuable because it provides patients with another valuable aspect, 'knowing what is wrong':

> She [the patient] said … the wait was worthwhile because the doctor had explained everything to them about what was happening with the patient and why they were waiting [Patient #1, T8]

Clinicians cited various modes of communication as valuable. This included verbal communication amongst ED staff members and with staff from district EDs, written communication in the form of referral letters from other health services as well as patient discharge papers. These forms of communication resulted in a transfer of information to clinicians that informed their clinical decision-making. Written communication was also valuable if it contained information that accelerated the ED process and expedited inpatient referrals:

> "…This referral letter was very useful because it came from the cardiology specialist and confirmed the patient's history….The referral letter from the cardiologist also made the referral easier because he is also a consultant in the hospital." [SHO#8, T4P4]

Waste: no patient activity delays progression

Both patients and clinicians identified waiting periods as wasteful. In this 'wasteful waiting' it appeared that nothing was happening to the patient, delaying progression to steps with patient activity. Patients identified long waiting times to be seen as a wasted part of their process:

> He [the patient] told me that his only issue was the waiting time… He told me that he did not wait long at triage or for the ECG but he waited about 2 hours to see the doctor. [Patient #4, T6]

ED clinicians, however, did not readily recognise waiting to be seen as a step in the patient's process, considering it an expected part of the process:

> "…you must expect some waiting in a service oriented system" [Consultant#1,T18].

In one conversation, a clinician did not recognise waiting periods as a process step, stating:

> "I don't do anything that is unnecessary for the patient." [SHO#12, T12P3].

This suggests the patient journey was viewed based on steps the clinician performed and not steps actually taken by the patient, which would include waiting periods. It also suggests clinicians considered all aspects of their contribution automatically produced value. This perception may affect the clinician's ability to identify value in the process as well as identify waste, such as waiting.

However, clinicians identified other waiting periods such as waiting for the administration of medication or waiting to have an investigation performed as waste in the patient flow process:

> "I requested X-rays for the patient but I have to wait for the escort to carry the patient so that's a waste." [SHO#5, T2P6].

One explanation for the easier recognition of these waiting periods was that these periods were more obvious because the clinician was now directly responsible for the patient:

> "…It's [referring to waiting for an investigation] more obvious because he [the patient] remains under my care for that period of time so I am responsible for him" [SHO #10, T6P5]

Waste: no direct ED clinical involvement in patient process

Clinicians questioned the necessity of the ED process for some patients. These patients were referred from hospital outpatient clinics with pre-determined plans to be performed by the respective inpatient team as well as patients who were transferred from other health services. The only step clinicians identified as valuable was informing the inpatient teams of the patient arrival. Limited information gained from the ED process resulted in clinicians unable

to provide patients with what they valued- 'being seen by the doctor' and 'knowing what was wrong'. In one case, the ED doctor explained how unnecessarily experiencing the ED process resulted in multiple delays for the patient. The following extract is from an interview with senior house officer regarding a dialysis patient who was sent to the ED after being seen on the ward:

> "Everything was useless because this patient should not have been in the emergency department... Sending her here, [the ED] only results in a delay for her at triage, a delay for her to be seen in MOT, although I saw her immediately, and a delay for her to be seen by the on-call doctor. All I did was make a phone call and all she is doing is sitting on a chair waiting to be seen by the on-call medical team." [SHO#2, T1P4]

Another clinician expressed a similar perspective regarding a patient transferred from a district ED.

> "The only valuable step in the process was the phone call to the ophthalmology house officer for the patient to have slit lamp examination done because we don't have that here… All the other steps are useless because nothing more was done for the patient than what was done in the [district ED]…[SHO #1, T1P7]

The patients described in this theme were all low acuity, non-urgent cases. The ED process was considered a waste for this subset of patients because, although the patients experienced many of the same steps as a self-referred patient, it appeared that doctors did not add any clinical value to the patient's ED process. Additionally, the time taken to interact with these patients could have been directed to other patients or other value-adding aspects of the patient process.

Waste: ED resources perceived to be used inappropriately

Clinician performance of tasks perceived as a waste if their skills are not required

On occasion, clinicians questioned whether the most appropriate person was performing specific tasks, ranging from phone calls to refer patients to performing basic routine procedures. This was viewed as a waste if it was thought that someone else could potentially perform the task, allowing clinicians to attend to other patients. The perceived inappropriate use of ED resources could delay the flow for other patients being cared for by clinicians or those waiting to be seen:

> "… Utilising a house officer to make this call was a waste of time again, time that could have been spent doing something useful for another patient."[SHO#1, T1P7]

Performance of basic procedures by other staff members was considered useful because clinicians were able to continue attending to waiting patients:

> "… It is useful to have someone else perform straightforward procedures that don't require any further skill on my part. I can then use my time to see other patients where my clinical judgment is needed". [SHO#16, T20P1].

The use of clinicians' time or skills to perform tasks for a specific patient may be considered valuable and promote flow for that specific patient. However, it may be inferred that if there is another appropriate individual to perform the task, then the clinicians' time or skills could be used for other valuable steps in that patient's process or directed towards other patients in the ED. Thus, the perceived inappropriate use of clinicians' time or skills could potentially delay the flow of the individual patient or the flow for other patients. However, although there is a potential waste with the use of clinicians' time, employing less-qualified people to undertake occasional simple tasks that could be undertaken by the clinician may in itself be wasteful.

Waste in the ED attendance but value in the individual patient steps

Clinicians felt that not all patient attendances were necessary noting that although there was value in individual steps, that value could be achieved in a different setting:

> "The steps were necessary but could have been performed in a more appropriate setting like the health centre". [SHO#9, T13P1]

This theme is in contrast to the previous theme where the clinicians felt that almost none of the steps were useful. Again, these findings suggest that the time taken to attend to these patients may have delayed the patient flow process for other patients. Patients, however, reported the visit as valuable because they obtained what they valued in the visit, 'being seen by the doctor'.

Searching for material resources was considered an unnecessary part of the process

Clinicians considered time spent searching for resources, such as materials or gurneys, an unnecessary step in the process. It may be inferred that the time clinicians spent searching for resources was time that could have been dedicated to other valuable steps in the patient process.

> … He [senior house officer] thought this searching for a room was also a waste of time. He…required the patient to be placed on a gurney… he had to search the department for a gurney… He told me "All of these steps- searching for things and moving the patient back and forth were wasted steps in the process...there was a lot of wasted time in the process". [SHO#13, T17P1]

It is important to note that in these sub-themes, the clinician perspective of waste in this context may be influenced by their perceptions of their status in the department.

Table 3. Framework for identifying value and waste in ED patient flow

Step or aspect of patient process		**Identified by clinician**	**Identified by patient**	**Value/Waste category**
VALUE				
Direct improvement in patient's health or experience				
Medical treatment of patient	Symptom relief or definitive treatment; should allow patient progression	√		Clinical value
Access and availability of resources	Available support staff and resources will enable quick accomplishment of tasks	√		Clinical value
Use of gurneys	Provide comfort if feeling unwell/long ED stay; contribute to patient management	√	√	Clinical value Experiential value
Referral to inpatient teams	Provides continuity or definitive care	√		Clinical value
Provision of information				
Information gained from triage stage	Vital signs: provide information on patient stability; contribute to patient prioritisation Front loading of investigations: provide information early; eliminate steps in main ED process	√		Clinical value
Clinician's assessment	Direct future steps; produce what patients value Aid clinical decision making, provide expertise and credibility	√		Clinical value
Being seen by the doctor and knowing what was wrong	Provide reassurance; provide information on what is wrong or not wrong; provide definitive care or follow up		√	Clinical value Experiential value
Useful waiting	Use waiting periods to create value to the patient- as observation periods to avoid unnecessary investigations	√		Clinical value
Communication and information transfer	Support clinical decision making; enhance patient journey	√	√	Clinical value Experiential value

WASTE				
No patient activity				
Wasteful waiting	Expected part of process; no activity to patient	√	√	Waiting
No direct ED clinical involvement with patient				
Unnecessary ED process	Duplication of steps; ED clinicians add no value to process; use of ED may delay other patients	√		Defect
Inappropriate use of ED resources				
Inappropriate use of clinician's skills	Clinician's skill could be used for other value adding steps	√		Human potential
Inappropriate use of ED	Individual patient steps useful but may be provided in another setting; clinicians' time could be directed to other patients	√		Defect
Searching for resources	Clinicians' time could be used for other value adding steps	√		Motion

DISCUSSION

This study used qualitative methods to explore the concepts of value and waste, from the perspectives of both patients and clinicians. The five overarching themes identified were 1) value- direct improvement in the patient's health or experience, 2) Value- provision of information, 3) Waste- no patient activity delays progression 4) Waste-no direct ED clinical involvement with the patient and 5) Waste- inappropriate use of resources. These themes may represent a practical framework for understanding value and waste in ED patient flow. The recent report on high quality health systems has encouraged a change in the type of indicators used to measure quality of care, suggesting that measures should reflect what matters most to the users (Kruk et al., 2019). This study may serve as an example of an approach that may contribute to the development of these types of ED quality indicators.

While there is little empirical literature explicitly exploring both value and waste in patient flow, patient experience studies may provide relevant insight. However, there are differences

between the two areas. Value and waste refer to what does/not benefit the patient and specifically relates to the patient process. Patient experience refers to how patients feel about the process of care (NHS Institute for Innovation and Improvement, 2013) and studies are often broad, including factors like cleanliness, friendliness and availability of amenities (Gordon et al., 2010; McConnell et al., 2016). Additionally, exploring value and waste may lead to the identification of health impacts that may not be readily recognised by the patient, requiring the expertise of a clinician (or other professional). The findings in this study are discussed within the context of the framework.

The framework provides a practical approach to improving ED patient flow by enabling departments to eliminate waste and optimise valuable aspects of the process. An example of this was seen with the two forms of waiting identified. Consistent with existing literature, waiting was generally perceived as waste or a negative aspect of the patient experience by both clinicians and patients [Sanchez et al., 2018; Sonis et al., 2018; Aaronson et al., 2017]. This included patients waiting to be seen, staff waiting on staff or patients waiting for investigations. However, clinicians in the current study also identified waiting periods that they considered valuable to the patients' process, termed 'useful waiting'. This may be considered controversial given the negative aspects usually associated with waiting. However, these 'useful waiting' periods appeared to add value to the patient's process if the clinician felt that something beneficial was still happening to the patient, for example, by incorporating waiting to be seen as an observation period to guide further intervention and management.

Mai (2014) suggests that long waiting times may be advantageous as symptoms may resolve in this period, describing it as 'masterly inactivity' where 'waiting and seemingly doing nothing' benefits the patient. This supports the 'useful waiting' finding in this study. While this value in waiting may only be applicable to certain patient groups, it is important to

communicate this concept to these patients to allow them to understand the potential value in waiting as well as to clinicians to remind them that a 'wait and see' approach may be beneficial. This may increase their trust and confidence in the process, potentially contributing to the development of a high quality system. Waiting periods may also be valuable or beneficial to patients if they are used to provide patients with what they value, for example, provision of information on why they are waiting (O'Cathain et al.,2008; Stuart et al., 2003).

The clinician-patient approach in this study provides an integrated perspective into value and waste. For example, steps considered valuable to clinicians, such as patient assessment and medical treatment, enabled them to produce value for patients, that is 'being seen by the doctor' and 'knowing what was wrong'. The inter-professional communication valued by clinicians led to inter-personal communication valued by patients. Patient experience studies have similar findings with patients highlighting medical-technical steps such as triaging patients and communication with staff as important aspects of patient experience (Gordon et al., 2010; McConnell et al., 2016). Identifying valuable aspects of the process from the perspectives of both patients and clinicians may assist with developing quality indicators that balance the needs of the main users.

The framework of value and waste may also be used to address concerns in individual patient journeys or specific patient groups. Clinicians identified patients who they felt could have been assessed in another setting. This group may represent inappropriate ED attendances and while it requires further investigation to confirm if these attendances were truly inappropriate, understanding what patients and staff value in the process may enable policy makers to provide that value in more suitable environments.

Lastly, the framework may contribute to future research in ED patient flow. When

determining what interventions may be used to improve flow, future studies may benefit from incorporating this identification of value and waste into the intervention choice, inclusive of the patient voice.

Co-creating value in ED patient flow process

While there were aspects of the process that both clinicians and patients identified as valuable and wasteful, overall there was a disparity in responses between clinicians and patients. Clinicians identified more aspects of the process and, with respect to value, their responses were mostly categorised as clinical while patient responses were related to experiential value. This finding is consistent with a quantitative study conducted in the United States that also compared staff and patient responses on what they considered important in an ED visit (Holden and Smart, 1999). In that study, patients prioritised waiting times while staff focused on clinical aspects. This difference in both instances may be related to the principal- agent relationship where unequal knowledge between the two parties resulted in the clinician perspective dominating (Smith et al.,1997).

These disparities between the two groups raise concerns that the clinicians were not acting as agents for the patient. This has implications for the role of the clinician in patient flow with three potential pathways identified. First, the role may be clearly defined, focusing on activities that directly benefit the patient's health (example, undertaking clinical and non-clinical tasks). Second, the role requires balancing the needs of individual patients with the wider ED population (example, identifying general benefits such as the appropriate use of ED resources). Third, clinicians may fail to act as agents for patients (example, by not appreciating that waiting is a potential waste).

The findings also have implications for the role of the patient in patient flow and in reducing the disparity between patients and clinicians. Patients should be engaged and empowered to

actively contribute to improving patient flow. A collaborative approach, known as value co-creation, may assist in managing the differences between the two groups and identifying value-adding activities in the patient flow process (Elg et al., 2012; Prahalad and Ramaswamy, 2004). This approach is based on each person's perspective of the services, integrating the patient's perspective with the varying roles of the clinician, ultimately producing a process that is valuable to all. It aims to promote an equal partnership between patients and clinicians (or more broadly, between patients and key healthcare stakeholders) and goes beyond passive patient participation, actively involving patients in organisational decision-making (Elg et al., 2012).

This co-creation of value in the patient flow process may be a step towards improving flow and developing ED quality indicators that incorporate quantitative measures with aspects of the process considered valuable or useful to its users. The active involvement of the main users may increase their own confidence in the system while also reducing waste and utilising resources in the most effective way possible. This may ultimately contribute to the achievement of high quality emergency care systems.

Strengths and limitations

Participants were engaged in real-time, reducing recall bias. Although participants may have been pre-occupied or managing difficult circumstances that could affect their perspectives, they appeared thoughtful in their responses. Using specific patient journeys enabled participants to discuss the process in its natural context, evoking a range of responses that may not have occurred with generic scenarios. The nature of informal conversations on value and waste may also have caused distress to participants. However, asking these questions may also have been beneficial to patients as it provided them with an opportunity to express their feelings and thoughts about the process.

The trustworthiness of the data was ensured by conducting interviews until data saturation was achieved and triangulating data sources by interviewing patients and clinicians across all triage categories and staff levels. Excerpts of transcripts were shared with the co-authors who provided feedback. Reflexive notes were maintained throughout the research process, which contained rationale for decisions made and personal challenges encountered throughout the process.

Staff participants initially struggled with the concepts of value and waste which may have affected early responses. Consultant clinicians represented a small proportion of participants. This may affect the range of responses as senior clinicians may have different perspectives to junior clinicians. Additionally, clinicians in this study were limited to doctors. Obtaining the views of other health care professionals may have provided a broader perspective; however, the broad clinician role may be relevant to other settings. The findings in this study are based on a single case study design in a developing country, which limits the generalisability of findings. Further research would benefit from conducting larger studies in a wider range of settings to validate the findings and usefulness of the framework. However, the approach described may be applicable to other settings.

It is also possible that a patient's age or gender may affect what s/he considers valuable and wasteful in the process. Previous studies have explored what older adults value in primary care or what they want from their healthcare providers (Marcinowicz et al.,2014, Williams-Roberts H et al., 2018). In these studies, older patients were found to value communication, support, provision of information. This study did not specifically explore the influence of age and gender on what mattered to patients in ED services. Future studies would benefit from exploring whether there are any age and gender differences in patient perspectives of value and waste.

Conclusion

Exploring value and waste has the potential to improve ED patient flow and achieve a system that delivers high quality emergency care. Emergency departments utilise many strategies in an attempt to improve patient flow but knowledge on what users of the process, inclusive of patients, value in the process may provide ED managers with an opportunity to refine patient flow in a way that maximises value to patients.

Differences in responses between clinicians and patients suggests that greater work is required to reduce the gap and empower patients to be actively involved in health care improvement. The perspectives of all users, not just those delivering the care, should be aligned with principles of co-production, person centred care and patient involvement.

Further qualitative research is needed to validate the framework as well as to explore the collaborative approach to defining value, considering demographic factors such as age and gender.

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