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Triaging and referring in adjacent general and emergency departments (the TRIAGE-trial) : a process evaluation of medical staff experiences in a nurse-led triage system

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1 **Triaging and Referring In Adjacent General and Emergency departments (the** 2 **TRIAGE trial): A process evaluation of medical staff experiences in a nurse-led** 3 **triage system**

4 **ABSTRACT**

5 **Aims:** This process evaluation aims at identifying the facilitators and inhibitors that influenced the
6 successful uptake of a nurse-led triage system streaming low-risk patients from an emergency
7 department (ED) to the general practitioner (GP).

8 **Design & Methods:** Semi-structured interviews with ED nurses (n=12), ED doctors (n=6) from the ED
9 of a Belgian general hospital and GPs (n=5) affiliated with the adjacent GP cooperative (GPC). The
10 process evaluation ran in parallel with the TRIAGE trial that started in March 2019 and ended
11 31st of December 2019. The first set of interviews was conducted in June 2019 and the second set
12 in January 2020. Data were analysed based on a framework approach and grounded theory
13 techniques.

14 **Results:** Through a deductive framework, facilitators and inhibitors could be identified on three
15 levels: the organisational, group and individual level. Main inhibitors are the degree of risk
16 aversion of individual nurses, possible language barriers during delivery of the triage advice and
17 the non-adapted ED infrastructure. Training on both the use of the triage protocol and effective
18 delivery of the triage advice, in combination with periodical feedback from the GPC were the
19 most important facilitators.

20 **Conclusion:** Based on the process evaluation we can conclude that a consensus exists among
21 stakeholders that the ED Nurses are considered ideally positioned to perform the triage of walk-
22 in patients, although a certain degree of experience is necessary. Although the extended triage
23 protocol and GPC referral increases the complexity and duration of triage and entails a higher
24 workload for the triage nurses, ED nurses found it did lead to a lower (perceived) workload for
25 the ED in general.

26 **Key words:** process evaluation, nurse-led triage, out-of-hours care, emergency department,
27 general practitioner, facilitators, inhibitors, triage, grounded theory, qualitative study, general
28 practitioners cooperative

29 **INTRODUCTION**

30 When patients have a medical problem after the GP's normal office hours they have to fall back on the
31 system of out-of-hours (OOH) care (Berchet and Nader 2016). In an increasing number of European
32 countries, such as the Netherlands, Belgium, France and Denmark, OOH primary care is being organized
33 through large-scale General Practitioners Cooperatives (GPCs), where GP's from a region group together
34 to replace small rotation groups in order to provide after-hours primary care at a centralized location for
35 face-to-face consultations and house calls, with the support of additional personnel (Grol, Giesen et al.

2006, Smits, Keizer et al. 2014, Berchet and Nader 2016). Hospital Emergency departments (EDs), where patients can receive urgent medical treatment without previous medical referral, work in parallel to these GPCs (Philips, Remmen et al. 2010). Despite the increasing number of GPCs, these EDs do not necessarily experience a reduction in patients. On the contrary, recent research has shown that EDs as well as GPs see an increasing number of patients (Henninger, Spencer et al. 2019).

In Flanders, patients are free to consult any GP or a specialist for their health problems without specific referral. This freedom of choice is an important characteristic of the Belgian healthcare system (OECD and European Observatory on Health Systems Policies 2019) and, in combination with the fact that EDs are designed to be convenient for those in need of medical attention (Unwin, Kinsman et al. 2016), makes that the threshold for patients to self-present at the ED after the GP's normal office hours, even with non-urgent complaints, is very low. This increased level of convenience is recognized as one of the contributing factors to the rising number of ED visits worldwide (Lowthian, Curtis et al. 2011, Peterson, Harbertson et al. 2019, Parkinson, Meacock et al. 2021).

Background

Previous studies (Philips, Mahr et al. 2010, Philips, Remmen et al. 2010) have shown that, when it comes to OOH care, patients are often not aware of the different characteristics of the respective OOH services. They find it difficult to assess the urgency of their medical problem or illness and subsequently present themselves at the ED (Philips, Mahr et al. 2010, Philips, Remmen et al. 2010). Although a clear definition of what can be considered 'appropriate' or 'inappropriate' use of an ED is lacking (Lowthian, Curtis et al. 2011, Unwin, Kinsman et al. 2016), several international studies have reported that many of the presented medical problems at the ED could be managed in primary care (Derlet and Ledesma 1999, Carret, Fassa et al. 2007, Durand, Gentile et al. 2011, Kraaijvanger, Rijpsma et al. 2016). Observational studies have shown that 10 to 40% of self-presenting patients at the ED could be managed in primary care (Dale, Green et al. 1995, Ward, Huddy et al. 1996, Coleman, Irons et al. 2001, Thompson, Lasserson et al. 2013, Cooper, Carson-Stevens et al. 2020). The aim of the TRIAGE trial was to deliver the most appropriate care for self-presenters at the ED. In this trial, triage nurses assessed self-presenting ED patients aided by a triage protocol based on the Manchester Triage System but extended specifically for this research project. This assessment resulted in an advice concerning the most appropriate point of care for their medical problem: the GPC or ED. At the end of the TRIAGE trial, 13% of the included patients were assigned to the GPC (Morreel, Philips et al. 2021).

The evaluation of such a complex triage and streaming process is necessary in order to identify inhibitors and facilitators to its successful adoption (Boon, Macpherson et al. 2007). An effective method is process evaluation, which provides insights into why an intervention is successful or not (Oakley, Strange et al. 2006, Craig, Dieppe et al. 2008). It explores how the intervention is received by stakeholders, how it is implemented and in what context the trial is set (Oakley, Strange et al. 2006). Depending on the specific scope of the process evaluation, different research methods, both quantitative and qualitative, can be applied (Grant, Treweek et al. 2013). Given the specific focus of this research being the identification of factors that influence the successful implementation of the intervention from the the medical staff's perspective, a qualitative approach based on interviews was chosen.

In this article, we report the findings of the process evaluation based on the interviews with the ED nurses, ED doctors, and GPs on call at the GPC during the TRIAGE Trial. The TRIAGE trial was conducted in the ED of a general hospital and an adjacent GPC in an suburban area in Flanders, Belgium. The trial, in the form of a cluster randomised controlled trial, started March 1st, 2019 and ended December 31st, 2019. The ratio of intervention and control clusters was three to one. Overall, 8158 patients were included, 6374 during intervention clusters and 1784 during control clusters. During intervention clusters 838 patients (13.3%, 95% CI 12.5 to 14.2) received the advice to be seen in the GPC of which 196 (23.4 %, 95%CI 20.6 to 26.4) refused this advice (Homburg, Morreel et al. 2022). Young patients arriving without an ambulance with a typical primary care presentation were more often triaged to the GPC (Morreel, Philips et al. 2021).

The implementation of the triage intervention involved the development of Computer Decision Support Software (CDSS) to help the ED nurses in performing the triage. The training of the triage nurses both in the use of the CDSS and in persuasive patient communication with respect to managing the patient's expectations took 12 hours.

The triage was conducted in a separate examination room at the ED with the aim of seeing patients within 15 minutes after their arrival. Only nurses with at least one year of experience in the ED were allowed to triage. The ED nurse performed the triage aided by the CDSS resulting in allocation of the patient to either ED or GPC. During control clusters, the patient was not informed about this advice. During intervention clusters, the patient was allowed to accept or refuse this advice. When accepting the advice to attend the GPC, the patient received a short referral note and instructions to go to the GPC. In case the patient preferred to stay at the ED, the patient was led to a waiting room. When the triage protocol outcome indicated that a patient could be referred to the GPC, the ED nurse was allowed to overrule the outcome of the triage protocol if deemed inappropriate.

Aims

The aim of the process evaluation presented in this article is to identify factors that influenced the medical staff during the triage trial, as well as obtaining insight into the facilitators and inhibitors that have surfaced during the trial. Change management research has shown that the adoption of innovation and resistance to change depends on different factors that can be aggregated into three major levels: organisational, group and individual level (Cameron 2009, Zennouche, Zhang et al. 2014). On the organizational level, the focus lies mainly on factors such as structure, strategy, and resources and how they facilitate or hinder the planned intervention (Cameron 2009, Zennouche, Zhang et al. 2014). The group level encompasses the social interaction between co-workers and other staff members and stakeholders who participate in the intervention (Zennouche, Zhang et al. 2014). This envelopes both interactions within a group and between groups (Cameron 2009). On the individual level, literature identifies three sublevels of factors influencing the willingness to adopt innovation and change: the individual's personality, their motivation and their cognitive capabilities (Zennouche, Zhang et al. 2014). This theoretical framework will serve as guidance for the data collection and analysis of this process evaluation.

METHODS

Design

Due to the specific scope of this process analysis, a qualitative framework approach (Pope, Ziebland et al. 2000) based on interviews was deemed appropriate. This study design was chosen because it draws on grounded theory techniques: Data collection and analysis were done simultaneously so that questionnaires could be expanded or deepened based on prior gathered information. Thematic analysis and constant comparison are used to analyse the raw data, leading to the emergence of categories and themes, and purposive sampling is used in order to aim toward theory construction instead of population representativeness (Glaser and Strauss 1967, Charmaz 2006, Birks and Mills 2015). However, from the start, the research design has a pre-set aim and clear objectives, allowing for the data analysis to start from a deductive coding framework (Pope, Ziebland et al. 2000).

Sample/Participants

In total, 25 ED Nurses, 10 ED Doctors and 110 GPs were involved in the TRIAGE trial during its term. For each of the staff groups, a purposive sample was constructed. Ten nurses were purposively selected through maximum variation sampling based on age, gender and experience (Etikan, Musa et al. 2016). Two nurses outside the selection volunteered for the interviews. Five were interviewed in June 2019 and seven in January 2020. Six ED doctors were selected based on availability (Etikan, Musa et al. 2016), all of them were interviewed in January 2020. In the case of the GPs, we specifically selected GPs that had seen at least 10 or more referred patients to ensure they had relevant experience with the system. As GPs generally are on call approximately once a month, this resulted in a limited short list of 11 individuals. From this shortlist, five GPs were selected purposively (maximum variation sample) (Etikan, Musa et al. 2016), to cover as much variables as possible, including gender, age, type of practice, geographical location of the practice, socio-economic status of patients, etc. ... For all groups, information saturation was reached.

Data collection and analysis

The semi-structured interviews were conducted face-to-face at the ED or at the GP's respective private practices during normal office hours (Keats 2000). All interviews were conducted in Dutch and recorded audio visually with the interviewees' permission. Quotes in this article are translated reflecting the sentiment of the original as closely as possible. The recordings of the interviews were transcribed verbatim and subsequently analysed using QSR NVivo 12 (Birks and Mills 2015). A deductive coding framework was developed based on the earlier presented principles of change management and in accordance with the research questions of the process evaluation. This framework was tested in an initial round of coding of the first wave of interviews and deemed appropriate.

Subsequently, all interviews were coded inductively within the deductive framework, making it possible to extrapolate patterns and identify recurring themes and categories from the interviews (Birks and Mills 2015). The inductive coding focused specifically on areas of agreement or disagreement on the necessity and usefulness of different aspects of the triage protocol, followed by the concurrence or difference of opinions between and within staff groups.

For all staff groups, theoretical saturation was reached. Theoretical saturation is described by Glaser and Strauss (1967) as the point when no new or relevant data emerges in the category framework, categories have well developed properties and dimensions and inter-category relationships are well established and validated.

Ethical considerations

Ethical approval was obtained from the relevant University and Hospital Ethics Committees (advice 18/37/410). All interviewees signed a written informed consent.

FINDINGS

The results are structured following the principles of change management, in accordance with the coding framework used in the analysis of the interviews. In the following paragraphs, results will be presented for the organisational, group and individual level. For each level, specific facilitators and inhibitors will be summarised.

Results on the organisational level

Overall, both ED nurses and doctors (ED staff) felt that the implementation of triage for all walk-in patients was a welcome addition to the existing procedures. Until two years before the start of the trial, no formal triage was performed, and priority of care was determined based on waiting time and the patient's appearance and demeanour. Sometime before the start of the intervention, the hospital had set up a taskforce with the goal of developing a triage system in the ED. This led to the implementation of a first generation limited triage protocol based on the Manchester Triage System (MTS). Although the staff considered this as progress, the protocol was not considered optimal.

"Because we also knew that we really needed a triage system urgently. Because the way it was, it just didn't work anymore. We all felt that, though. Real mistakes were going to happen at those moments."

Triage Nurse, Female, 8 years of experience

Among the interviewed ED staff, there was unanimity that the extended version of the MTS protocol as developed for the intervention was suitable for its purpose. All Triage nurses indicated that they could easily find their way through the flowchart system after using the new CDSS during a few triage shifts, and that most of the program was self-explanatory. The additional information that is integrated in the CDSS to help the triage nurse in case of doubt, was also considered very helpful in the beginning and for less experienced nurses.

"On itself, it is indeed an easy system. Also certainly because, if you are in doubt, you can also request additional information. In... even if it is only with a word or two words, sometimes that is a good explanation of what [discriminator] still fits in or not."

Triage Nurse, Male, 6 years of experience

Another point of consensus was the necessity of infrastructural adaptations in order to facilitate this new triage procedure. The extent and the exact interpretation of these adaptations, however, differ between

interviewees. While some focus on the redesign of the waiting infrastructure, others go as far as a complete integration of the adjacent GPC into the hospital.

“What can be a stressor is: you're triaging and the people waiting in the waiting room start complaining to you: am I going to be here for a long time? It adds to all the other things. So... the infrastructure has to change too, right? Larger waiting rooms, so that chaos can go away...”

Triage Nurse, Female, 32 years of experience

“The ‘Common Entrance’ is becoming more and more of a topic. [...] Yes, that's positive isn't it. That does raise some questions, doesn't it... You have to find financing. For example, now just a very stupid question: your receptionist... Whose paying that for? Those are the questions that are going to be discussed a lot.”

Triage Nurse, Male, 17 years of experience

“I think that integration [of the GPC] in the [hospital] building itself would be very useful. Triageing everyone? Yes everyone who comes in for one thing or another (slightly in doubt). I think that should also be explored, how interesting that is.”

ED Doctor, Female, 7 years of experience

Facilitators

Before the start of the intervention, the ED nurses received trial-specific training by a specialised training company: a five-hour training on the use of MTS, a five-hour communication training focusing on assertive patient communication and a two-hour session on the trial itself. Additionally, all ED nurses received two months (January and February 2019) of on-the-job training which was followed up by a research nurse to get used to the new triage procedure and to the CDSS. During these months, the ED nurses would triage patients during the OOH care window according to the eMTS, without effectively referring the patient to the GP if this was the triage outcome. This allowed the staff to acquaint themselves with the procedures, the software and the outcomes of the triage protocol resulting in greater self-confidence during the future implementation of the intervention.

“In my opinion, they gave a training on ... the interaction and communication and stuff... They did give some good tips. Yes, I thought so. Because that sentence of: ‘I'm going to see which doctor is the best to help’, they have taught you how to refer someone without giving them the feeling they are forced, but actually you do. So... you give them one choice, but not really. How you could do that. And I thought that was an added value, it helped a bit to be able to do that more confidently.”

Triage Nurse, Female, 12 years of experience

What also facilitated the implementation of the intervention, was the fact that only 4% of the referred patients was sent back to the ED by the GP on duty at the GPC. This enhanced the confidence of the triage nurses on duty, and the trust in the triage protocols.

Inhibitors

Although the GPC is adjacent to the hospital, it has a separate entrance as depicted in figure 1. Triage nurses have indicated that the fact that patients physically need to leave the ED to go to the adjacent building often causes delays. Patients are often not aware of the existence of the GPC and are confused when they are redirected to it. This often coincides with a language barrier.

223 “And what I always did, and I noticed that this helped people to take that step, is that I said: I'm going to
224 go with you. Then I'll go down the corridor through the door: and then you must go next doors.”

225 **Triage Nurse, Female, 12 years of experience**

226 “I think most [patients] don't know yet. Because if you tell them, then they dare to go to the GPC. But we
227 are here in a hospital with a lot of multicultural... so a lot... either they don't understand that they have
228 to go there or yes... they still think they have to pay, even if you explain it. Because they don't understand
229 the language well...”

230 **Triage Nurse, Female, 1,5 years of experience**



231
232 *Figure 1 Current situation of the Hospital ED (building on the left) and GPC (Building on the right) with separate entrances. (AZ*
233 *Monica, 2016)*

234 Multiple Triage nurses have indicated that they frequently accompany the patients outside the ED
235 entrance to physically point out the GPC. This takes up valuable time, especially during busy moments. A
236 possible solution could be to adapt the existing infrastructure so that patients have a direct passage to
237 the GPC from the ED.

238 A second inhibitor is the existence of insufficiently defined discriminators. In the eMTS, a numeric pain
239 scale is used. Pain is inherently subjective and previous research has already shown that ED nurses tend
240 to rate a patient's pain level lower than reported by the patient (Guru and Dubinsky 2000). During the
241 interviews, experienced triage nurses indicated that they frequently adjusted the pain discriminator
242 downward based on the patient's appearance or demeanour. This results in very different outcomes for
243 patients with similar pain experiences, depending on the patient's tolerance level for pain and the
244 adjustment made by the triage nurse. And although nurses are allowed to adjust this discriminator based

on the MTS pain behaviour scale, this variance results in a distorted triage result. A possible solution suggested by an experienced ED Nurse is to determine pain based on predefined, discrete categories that indicate how the pain impacts the everyday life of the patient.

“But personally, I find a pain scale very difficult. [...] We learned that pain is [the number] the patient says it is. But you can’t use that number to... prioritise patients. A colleague once made her thesis on... It’s a scale that is used to assess pain for people with mental disabilities. They assess facial expressions and body posture... And I think... you actually put the decision-making right, if I may say it like that, with the nurse who also studied for those things. [...] When a patient can still do daily activities, then you can downscale. I think the pain scale is not working properly... ”

Triage Nurse, Male, 35 years of experience

“The only thing I really keep bumping into is that pain. I think that’s... a patient who... if you’re really very short on staff and you have people who are inexperienced, who can’t handle it well. Who obediently follow the triage protocol, then you will have very few people who get referred to the GPC. And that’s a shame, sometimes... [...] If someone is on their mobile all the time and you ask: is the pain bearable and that ‘no, no, no... certainly not’ and you ask: ‘how much do you score the pain?’ ‘certainly eight’. Then he scores Orange...”

Triage Nurse, Male, 17 years of experience

A second discriminator that raised an issue during the interviews, was fever, specifically in the case of small children. All nurses indicated that the cut-off point of 38.5 degrees Celsius for the discriminator fever for small children (37.5 degrees Celsius for children younger than 6 months) was very strict. As small children produce high fever easily, and still can be very lively while doing so, the relatively low cut-off point seemed undue. The eMTS protocol also didn’t discriminate between children who made a fever and did or did not receive an antipyretic earlier. This would result in relatively lively children with minor symptoms being triaged in the second most urgent category, due to a high, previously untreated, fever.

“Well... Sometimes [the doctors] ask: why are you keeping those children here? But yes, that is... in principle... I think you should perhaps be able to put in the criteria: have they already given something, yes, or no. Or if it is a persistent fever despite the fact that [the parents] have given medication. Or a persistent fever simply because they haven’t given medication all day long. That’s also a bit depending on the nature of the... patients... well, the mothers of the patients.”

Triage Nurse, Female, 8 years of experience

The effect of these problematic discriminators resonates in the experience of the ED doctors with the system. As can be read in the excerpt above, triage nurses mentioned that ED doctors would ask why certain patients with relatively mild problems were retained, instead of being referred to the GP. In the interviews with the ED doctors, all of them indicated that they found the existing discriminators for referral correct or too lax, with a majority specifying that, according to their professional opinion, even more patients would be eligible for referral to the GP.

In the current intervention, eligible patients were also referred to the GPC at night. The GPC has one GP on duty during the night and it is common practice that this GP sleeps during his shift and is only awakened in case of emergency. This is because GPs do their on-call services in addition to their work in practice, in contrast to ED doctors who work in 8 to 12 hour shifts. During the intervention, however, the GP on duty had significantly more consultations during the nightly hours. This led to some resentment with the GPs because this was often during periods when it was quiet in the emergency room. One GP stated:

"It is either a medical emergency for which you go to the ED, or it can wait [until the next morning]. Because what is urgent GP pathology? I have questions about that. I have serious questions about that. What is urgent as a general practitioner?"

GP, Female, 30 years of experience

It is, however, remarkable that the younger GPs were more understanding of the nightly consults than the older ones. It was frequently stated that, when one imposes an intervention, one should be consistent about it, even if that resulted in more night-time work.

Results on the group level

Findings regarding relations and interaction within groups

An important finding from the interview data, is that the workload of the triage nurse has increased significantly due to the intervention: because of the referral procedure, triage nurses have indicated that the administration and therefore the duration of triage has increased, resulting in a higher perceived intensity of the job. A shift as triage nurse takes between 7 and 10 hours, depending on the type of shift. The combination of high intensity and long shifts make this a very demanding task.

As the interviewed triage nurses reported that the job of triage nurse has become more intense, they also indicated that the intervention has an observable effect on the ED operations. All interviewed nurses indicate that, due to triage, the workload for the other ED nurses has reduced, and that they notice that, according to their subjective observations, the quality of care for the remaining patients generally has improved. Many nurses therefore indicate that they consider the increased intensity of triage as an example of 'taking one for the team'.

Within the group of ED doctors, especially the older generation, some concern existed about a loss of income due to the patients referred to the GPC. Most of those patients do not take up a lot of effort or time and could thus be considered as easy income. If the intervention would be continued and expanded, this could presumably amount to a considerable loss of income. The younger generation of ED doctors, however, all agreed that the patient demand would keep increasing due to demographic evolutions, and that chances were small that they would lose income on the long run. A popular view amongst the ED doctors was to use the referral protocol mostly during busy periods, creating an overflow to the GPC, whilst keeping patients at the ED during the off-peak hours would allow for the productivity of the doctors to keep up to standard.

The group of GPs associated with the GPC is rather large, with 110 members in 2019. Because of this, the number of shifts a GP has to be on duty at the GPC for OOH care is limited. Although the GPC administration organises frequent meetings and briefings and sends out regular newsletters, it proved to

319 be difficult to involve everyone in the day-to-day business of the GPC. One GP admitted he does not pay
320 much attention to the communication of the GPC administration in general, because the shifts at the GPC
321 are his least favourite pastime.

322 *"To speak for myself again: It is not what I am looking forward to, and then I am not the one who will*
323 *anticipate in advance... what do I need to know in detail here?"*

324 **GP, Male, 13 years of experience**

325 The fact that not all GPs are as diligent when it comes to the communication of the GPC administration,
326 resulted in frustration with less informed GPs, as they were not correctly informed about the existing
327 intervention, its procedures, and its aims.

328 *Findings regarding relations and interaction between groups*

329 Both the ED doctors and GPs were asked if they considered the triage nurse to be the right person to
330 conduct the triage at the ED. As the aim of triage is to determine the urgency of the patient's medical
331 issue, most of the doctors agreed that the triage nurse, given he or she has enough experience, is the right
332 fit for the job. Multiple interviewees agreed that letting a doctor perform the triage would be cost-
333 ineffective and would lead to opposite results. One GP formulated this as follows:

334 *"We immediately think diagnostically, and that is precisely what you're not allowed to do during triage.*
335 *During triage you have to see: what is the problem? Is it for now or is it for later? That is something we*
336 *cannot do because it is not in our nature."*

337 **GP, Male, 4,5 years of experience**

338 Triage Nurses indicate that communication with patients is key for successful referrals. Quick triage after
339 arrival at the ED serves as an opportunity to communicate with the patient about the urgency of the
340 patient's problem and the projected waiting times. Triage nurses have indicated that, when they inform
341 the patient about the most appropriate point of care for their medical problem, they also inform them
342 about the probable waiting time for their problem at the ED. This often convinces the eligible patients to
343 choose for the GP and informs patients who stay at the ED that their stay could be a lengthy one.
344 Generally, the triage nurses agreed that this information made ED patient less impatient during busy
345 periods. Not all patients, however, understood the consequences:

346 *"If I send them there ... if they... if I can send them on [to the GPC] and they choose to stay anyway, I will*
347 *tell them that serious cases may come in and that they may have to wait a little longer. I'll pass that on,*
348 *but that's just how it is. If it is a busy moment, it is, and they do not belong here. So then I tell that honestly:*
349 *Look, it may be that it will take longer. But that's it ..."*

350 **Triage Nurse, Female, 3 years of experience**

351 *"Look, when it is busy, they ask ... why they have to wait a long time, but then you explain it. They don't*
352 *always understand that someone else's problem is more urgent than theirs. But you will always have that."*

353 **Triage Nurse, Female, 1 year of experience**

354 There were even ED nurses who stated that, to their subjective perception, the number of aggression
355 cases diminished due to the intervention.

356 *"Yes, those are so often the people of "yes: I am sitting here ... with my sick child who has been sick for two
357 weeks and has to be checked again. And I have been here for two hours, and I have been here for three
358 hours ... and then other people may go first! I don't know!" ... it doesn't matter. And yes, those annoyances
359 pile up, and eventually they become aggressive and they stand at your nurses' station all the time and yes
360 ... So I think that is ... also happening less. It is never gone, but... So that is also a positive experience."*

361 **Triage Nurse, Female, 8 years of experience**

362 *"I thought it had a positive impact. Because the waiting times became shorter on some days. As a result,
363 people also... Yes, we come across a lot of aggression, so yes... Some people can suddenly become
364 aggressive when they have to wait a long time, so... that was a little less during that period. But you always
365 have people who continue, so... but all in all I thought it was positive."*

366 **Triage Nurse, Female, 1 year of experience**

367 During the intervention, the cooperation with the GPs on duty at the GPC was not always optimal,
368 according to the triage nurses. When patients were sent back to the ED by the GP on duty, very limited
369 feedback to the ED was given as to why. Triage nurses indicated that this feedback would help them in
370 the future, to prevent them from making the same mistake again. If possible, the triage nurses would ask
371 the ED doctor for a second opinion on the back referral afterwards.

372 *Facilitators*

373 The fact that the ED doctors are very approachable for the ED nurses to ask second opinions concerning
374 triage, is very much appreciated. Also, within the ED nurses group there is a lot of willingness to support
375 colleagues who are in need of advice.

376 *"I am open to that. Ultimately, [...] you see more together than you see alone. And if, anyway, the nurse
377 here, who does the triage, ... Well, that's still individual, but ... When they say: "I don't have a good feeling
378 about this triage result". Even though the parameters are good, and I should be allowed to refer them, I
379 trust their assessment. And then indeed, when we see the patient... well, yes, the gut feeling prevails at
380 that moment."*

381 **ED Doctor, Female, 10 years of experience**

382 With regard to patient communication, the communication training the nurses received was perceived as
383 a successful facilitator. During this training, the nurses learned several communication strategies and
384 standard phrases to use as a starting point for their conversation with the patient. This was considered
385 useful, as the practice of referral is not currently embedded in the Belgian habits, causing a reticence with
386 almost all triage nurses. Generally, the older (and thus more experienced) ED nurses also indicated that
387 patients tended to accept the referral advice more easily from them as opposed to from younger
388 colleagues. Younger colleagues, however, stated that, during the trial, their confidence grew, resulting in
389 a higher acceptance rate of the referral advice by patients.

Inhibitors

Because of the necessary efforts that are related to the triage protocol (e.g. Extra time to inform, persuade and direct the patient to the GPC), a certain risk exists that triage nurses might be less willing to invest time in referring patients during peak hours. During the interviews one triage nurse admitted being less diligent during peak hours, as she could not justify to herself the extra time spent on informing the patient about the referral:

"If it is really busy, and it is going over your head, then you have to. Then you'd better just carry on, instead of facing the hassle for those 10 minutes that they will sit inside."

Triage Nurse, Female, 20 years of experience

However, most triage nurses answered they understood that the benefit of the intervention was the overall reduction of workload at the ED, not that of the triage nurse. Specifically, during peak hours, referral could make a serious difference in (perceived) workload.

When a triage nurse asks an ED doctor for a second opinion, this often results in the patient staying at the ED. This could be attributed to the fact that the gut feeling of the nurse was correct and that the patient was not eligible for referral. However, one ED doctor admitted that, as the patient was already seen by her, she preferred the patient to stay:

"I don't think it's a problem. If the nurse feels insecure about something, or would like advice, she is allowed to. But of course, you've already seen the patient. So it is easier to say yes now that I have already seen him: to keep him here. Because yes.... Otherwise, you will have already done a little bit of your patient history and a little bit of your clinical examination. To refer him to the GPC is also a bit... Yes, so, it was often automatic.... That the patient then stayed here, even if it is something for the GP ..."

ED Doctor, Female, 7 years of experience

The fact that the number of GPs associated with the GPC is high, complicates the communication process. However, it has to be noted that the GPC administration uses different channels to reach its GPs, and that a certain level of due diligence should be expected from the GPs when it comes to communication and information. It was however striking that many of the triage nurses indicated that some GPs on duty sent almost every referred patient back to the ED with very little feedback.

"That was just the doctor who called for something else and I thought: now is the time. [...] And then I asked kindly "hey, doctor, I now have had four of the six [patients] sent back by you, and really all by you. Did I do something wrong?" "Yes well, I have examined them better... ""

Triage Nurse, Male, 6 years of experience

Results on the individual level

Cognitive Aspects

Both the operational and communication training provided at the start of the initial period before the official start of the intervention was considered to be very helpful. It was also reported that, the longer the intervention was in place, the easier it became to follow the triage protocols and to communicate the

referral advice successfully. However, nurses reported that sometimes the triage outcome would not correspond with the patient's demeanour or appearance, and that their gut feeling would steer them towards another triage decision.

"Because sometimes it is difficult to tick a box on the clinical presentation of a person. Anyway, if someone is sitting in front of you, sweaty, clammy, but otherwise parameter-wise everything is ok: the system indicates everything is ok."

ED nurse, Female, 12 years of experience

These observations often result in the triage nurse manipulating the triage protocol to make the result fit with his or her gut feeling and experience. Often this was done through adjusting the pain score or choosing for the discriminator "GP Risk", which automatically leads to an ED advice. Consequently, many ED nurses have advocated for the addition of a discriminator "abnormal clinical presentation" as an option to overrule the triage protocol's outcome.

Motivational aspects

A topic that was very apparent in the interview results was that the intervention added to the improvement of professional pride and honour of being an ED nurse. The fact that the task of triaging delegated a part of the responsibility of care to the ED nurse, was considered an added value and a source of satisfaction for all interviewed nurses. Older nurses felt that they were able to contribute more to the task of triaging because of their extensive experience and saw the job as triage nurse as a good solution for when the more demanding manual labour of nursing becomes too difficult later on in their careers.

The fact that the ED nurses also perceived an improvement in the quality of care for the remaining ED patients due to the intervention, helped towards a more successful implementation, as the results of the intervention became apparent and improved motivation. The positive effects of the intervention also positively affect the acceptance of the heightened workload for the triage nurse due to the increased triage complexity.

Personality

One personality trait that has an important effect on the outcome of the intervention, is the degree of uncertainty avoidance of the ED Nurse. From the interviews, it has become clear that this trait is proportional to the trust the triage nurse has in the triage protocol of the intervention. Triage nurses with a high level of uncertainty avoidance, reported that they found it very difficult in the beginning to refer patients to the GPC. It was only after the reassurance that low risk patients they referred were not send back, that they would gain trust in the system. This uncertainty avoidance also resulted in a discrepancy between the relative share of referred patients in the initial training period compared to the relative share of referred patients during the intervention period. One triage nurse summarises it as follows:

"It is true, in the beginning we had that trial period. [...] That's the same as playing poker for chips. And when the real period arrives, it's poker for money. And then you start to think differently. Because no matter how you turn it: a nurse also has a sense of honour, I think... and she actually wants you to not see every patient who you send to the doctor come back."

ED nurse, Male, 35 years of experience

When it comes with dealing with negative patient reactions, and the effect it has on referral behaviour, another important factor is 'Locus of Control'. The construct of locus of control was defined by Rotter (Rotter 1966) in 1966 as a person's predisposition of the perception of internal or external causes of reinforcement (Kormanik and Rocco 2009). Kormanik et al. (2009) specifically studied the link between planned organisational change and the locus of control of employees within that organisation. In their article they found that employees with an internal locus of control respond better to change, when feedback programs are provided (McCarthy and Garavan 2006, Kormanik and Rocco 2009). During the interviews, it became clear that triage nurses with a stronger internal locus of control (i.e. those who saw the reason for a patient's negative reaction to their referral advice as their personal failure), were also the ones that would prefer more feedback, both on a personal and general level.

Facilitators

A few months after the start of the intervention, a research nurse involved in the development of the triage protocol spent several days at the ED as a triage mentor. This mentoring came on top of that of the already present research nurse who acted as a change champion (Greenhalgh, Robert et al. 2005) to facilitate the intervention. Both the continuous presence of the champion as the extra mentoring were perceived as positive and helpful as many of the triage nurses were reinforced in their triage practices. This decreased the level of uncertainty and doubt that still existed. From the quantitative data, it became clear that this effect persisted afterwards.

Inhibitors

During the intervention period, the feedback from the research team to the triage nurses was limited. A limited number of results was communicated after an interim analysis but no individual feedback was given to triage nurses. This was a deliberate choice, in order not to increase the pressure on the triage nurses by avoiding benchmarking themselves with their colleagues and to ensure complete privacy. However, through the (subjective) observation of a decreasing workload and the limited back referrals of patients by the GPC, the triage nurses did receive implicit feedback on their work. As mentioned earlier, a planned feedback strategy during the intervention, both in general and individually, could have contributed to faster adoption by ED nurses with a more internally focused locus of control.

A second inhibitor in this category, is the missing possibility of overruling the triage outcome based on a patient's deviating clinical presentation. This forces the triage nurses to adjust parameters in the triage protocol to influence the triage outcome. This has influenced the overall outcome of the intervention. However, all interviewed nurses indicated that this happened very rarely.

DISCUSSION

The successful adoption of change depends heavily on the personal antecedents of the person undergoing the change (Greenhalgh, Robert et al. 2005). Next to some general characteristics identified for all employees, two specific hurdles for starting triage nurses could be identified: the degree to which the triage nurse trusts the outcome of the triage protocol and the efficient delivery of the referral advice to the patient. The height of these hurdles is very individual to each triage nurse. However, specific training,

planned feedback and mentoring can be considered as best practices to overcome said hurdles. Previous studies came to similar conclusions (Cone and Murray 2002, Wolf, Delao et al. 2018).

Several triage nurses indicated that triage with referral is a very time-consuming and complex process, and could take up to 15 minutes. This extra time is mostly taken up by informing and instructing the patient about the referral. However, literature shows that patients base their choice for OOH care mainly on the alternatives they are familiar with and the previous experiences they had with these alternatives concerning quality of care and waiting times (Philips, Mahr et al. 2010). A patient survey included in the triage intervention showed that only 40% of the triaged patients knew the GPC existed prior to visiting the ED. Therefore, this intervention also educates eligible patients about the GPC, hoping that in the future, when they have a medical problem with a similar degree of urgency, they will prefer the GPC over the ED. This is a position that is supported by Philips et al. (2019) and Carret et al. (2007) and has been shown to be successful in Doran, Colucci et al. (2013). However, for the extra time necessary for the intervention to be justifiable it may not exceed the projected care time of the patient. This trade-off became especially apparent during crowding at the ED, and triage nurses opted to ignore the outcome of the triage protocol in favour of triage speed.

In this intervention, the degree of the crowding of the ED was not taken into consideration. This resulted in situations where ED triage nurses had to send patients to the GPC next door, when there was excess capacity at the ED. This rose concerns about the long-term financial impact on the ED's funding and the increased (nightly) workload at the GPC. However, due to the current remuneration scheme in Belgian healthcare, a night consultation of a GP is more costly than an ED Doctor consultation due to extra fees, thus increasing the cost for the Belgian health insurance. Therefore, the discontinuation of night referral is, on the short term, not only advisable from an economic point of view, but will also facilitate an easier implementation of the intervention with the different stakeholders. On the long term, it is advisable to review the remunerations schemes of nightly OOH care on a national level, in order to level the financial playing field, that is currently putting ED doctors at a financial disadvantage.

From the ED Nurses' feedback during the process evaluation, it became clear that the clinical presentation of a patient sometimes doesn't correspond to the triage result of the extended protocol. Previous research shows that the experience of the ED nurse is a valuable tool during triage, as triage protocols cannot foresee all possible symptoms for a certain medical condition (Forsman, Forsgren et al. 2012). In this trial, however, it resulted in a limited number of cases where triage nurses were slightly manipulating discriminators in order to change the outcome of the protocol to a higher (or on occasion even a lower) urgency category. However, the research protocol foresaw such discrepancies, and as a rule, triage nurses were allowed to overrule the advice of referral to the GPC when deemed necessary. Nonetheless, they were not allowed to manipulate the discriminators in order to change the urgency category as this would lead to system validity issues. By manipulating the system protocol to over- or undertriage certain patients based on the ED nurse's gut feeling, the system protocol is no longer a validated instrument, potentially resulting in unexpected and unwanted effects. A consideration supported by Patel, Gutnik et al. (2008), who reported that, as the experience of the triage nurses increases, triage decisions become more and more often intuition-based instead of analytical. This leads to triage guidelines being used differently by ED nurses during the triage process, partly because explicit guideline information is internalised as nurses

gain experience (Patel, Gutnik et al. 2008). Although this manipulating of urgency category outcomes should have never taken place, the potential risks and effects of such adjustments would be interesting for further research.

Nurses also indicated that fever as an urgency discriminator for small children often lead to very lively children being scored in very high urgency categories. It is known that the MTS leads to much more over-triage than under-triage in children (Veen, Steyerberg et al. 2008). However, in some of these cases it is possible the child is actually very ill (e.g. Sepsis). By lowering the threshold for this discriminator, the risk of missing these cases will become too high (van Ierland, Seiger et al. 2013). A possible solution could be that in these cases an assessment by the ED doctors subsequent to the triage should be integrated in the protocol leading to a reclassification in a lower urgency category. A study by van Ierland, Seiger et al. (2013) shows that, with minor adaptations, discriminators in the MTS could serve as signal functions for the identification of febrile children at risk of severe illness.

Triaging and referring to a GPC closely relates to the topic of postponement of health care. As indicated by some of the interviewed GPs, some patients that were referred to the GPC could have waited until after the weekend or bank holiday to seek treatment for their ailments. Although this might be the case for some pathologies, the Belgian law stipulates that patients asking for medical care at the ED cannot be sent away before they have seen a doctor. An extension of the triage protocol with the referral of patients to their own GP after the weekend is therefore legally impossible. However, the study shows that 22% of the patients that were actually seen at the GPC of the trial would be eligible for such a referral. Therefore, this could also be considered as an avenue for further research.

Limitations

An important limitation of this study is the fact that it was only performed in one ED. It is highly recommended that this intervention with triage and referral is repeated in several other EDs located in different settings in order to identify general and location specific hurdles, inhibitors and facilitators. For the same reason, it is important to note that this process evaluation still only covers a limited number of stakeholders in one location. Although saturation was reached for all groups in this specific setting, there is a limited risk that the findings are not generalisable and of anecdotal nature.

Another limitation of the study pertains to the CDSS that was used to assist the ED nurses during Triage which allowed for the extended triage protocol to be included within the existing user interface. However, the possibilities, both in functionality and registration, were a limiting factor throughout the trial.

Finally, the patient as stakeholder is not included in this part of the process evaluation. The experience of the patient during such a triage process can be very valuable information to improve the streaming process. Therefore, further research on this topic is to be advised.

IMPLICATIONS FOR EMERGENCY CLINICAL CARE

The study comprises a process evaluation of the implementation of a nurse-led triage system streaming low-risk patients from an emergency department (ED) to the general practitioner cooperative (GPC). The

study focusses on the factors that facilitate or inhibit the successful implementation of such a triage system based on the experiences of the involved medical staff and particularly the ED Nurses.

Stakeholders agree that ED Nurses are uniquely qualified and ideally positioned to perform the triage of walk-in patients in the ED. Personal characteristics of the triage nurse and existing ED infrastructure have an important influence on the successful implementation of the protocol. The former can benefit from both protocol and communication training, the latter should be taken into consideration on the long term. Although the extended triage protocol and GPC referral increases the complexity and duration of triage and entails a higher workload for the triage nurses, ED nurses found it did lead to a lower (perceived) workload for the ED in general.

The results of this process evaluation are valuable for other Emergency Departments who are planning to implement a nurse-led triage system with or without the streaming of low-risk patients to other care givers, as it identifies important inhibitors and facilitators to the successful implementation of such a system on both an organisational, group and individual level.

CONCLUSION

The aim of this process evaluation was to map different facilitators and inhibitors that impact the successful implementation of a nurse-led triage system at an ED with patient streaming to an adjacent GPC. Overall, all medical staff stakeholder groups experienced the intervention of triage with referral to the most appropriate point of care as positive. The triage protocol, together with the CDSS was considered helpful and correct. Many interviewees, however, stressed the importance of overcoming some infrastructural issues that currently burden the process. A consensus exists that the ED nurse is best positioned to perform the triage: they are considered to have the correct level of education and the delegated responsibility adds to the professional pride of the job. It is also economically justifiable, as doctor's fees would make triage by a doctor much more expensive as no specific fees for triage by ED doctors are stipulated by the government. The experience of the ED nurse, together with their propensity for uncertainty avoidance and locus of control, has a large impact on the trust they have in the outcome of the system. The implementation of feedback programs and mentoring could lower these thresholds. Communication training is also important as it gives ED nurses the self-confidence to refer patients to the GPC. With the lack of formal feedback, motivation comes mainly from indirect results, such as a perceived lower workload and the low number of patients that are referred back from the GPC.

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