

Six Sigma and patient satisfaction in Orthopaedic Clinic

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Abstract

Purpose: *Productivity and efficiency are key factors for an improved well-functioning organisation. Six Sigma Methodology uses tools that can help quantify the improvement achieved. Healthcare organisations are known to apply these tools to check quality of their services and patient satisfaction.*

Design/Methodology/Approach: *The study performed at a District General Hospital attempted clarification of reasons influencing the delays observed in Orthopaedic Outpatient Clinic. To achieve it, two audits were performed following managerial and open departmental meetings. The first audit was planned to investigate the potential reasons for the delays. Following organisational alterations according to the findings the second audit would close the loop and analyse the learned lessons using Six Sigma Methodology..*

Findings: *In the initial audit, run for two month, 2110 patients replied, after consenting verbally, to questionnaires asking their opinion of possible reasons influencing their late arrival. Analysis found that their main complaints were parking and the sitting area of the clinic. Six Sigma analysis was performed. After alterations a second audit closed the loop running for similar time period collecting 2530 questionnaires. Significant improvement to patient satisfaction was found on the targeted problems. Further issues resurfaced. The conclusion of the study reinforced the use of Six Sigma as a tool of analysing and controlling the quality in Healthcare.*

Originality: *Applying Six Sigma Methodology as a tool in Health care proven to be important as quality improvement is visible, measurable and everyone is able to understand and follow it.*

Keywords: Six Sigma, quality, healthcare, patient satisfaction

Introduction

The daily productivity and efficiency improvement in all industries is something that is given a lot of emphasis over the years. Initially this applied to the manufacturing but slowly it has been extended to the service or educational sectors. Different models were introduced and used as health workers were trying to improve patient satisfaction during their stay in the hospitals (Mikel, Schroeder 2006, Mohebbifar et al 2014). Six Sigma Methodology is an additional tool which is used for quality improvement and the business management. Motorola developed the Methodology in 1986 based on standard deviation statistical analysis and steps were taken to improve this (Tennant 2017). At later stage Lean Six Sigma Methodology was introduced, which has better application in analysing and managing service sectors (Ohno 1988). Six Sigma or Lean Six Sigma concepts have been widely used at the Health Systems around the world. Main reason for this method to be used is efficiency improvement for the different levels of the clinical practices and very often is concentrating at the outpatient clinics or operating theatres function and the patient flow through them. The main principles that Six Sigma is based are Design, Measure, Analyse, Improve, Control (DMAIC) (Cima et al 2011, Dinesh et al 2013, Habidin et al 2015).

The National Health Service (NHS) is under pressure to constantly improve. This includes the improvement of patient experience during their stay or visit and the effort to facilitate patient and relatives satisfaction during their time spent within the clinical areas. A constant demand for improvement is the waiting time and the quality of the service given to them. It is reported that long waits have a negative impact on the patient experience either before or after their operation or clinical appointments (Bleustein et al 2014, Lizaur-Urtilla et al 2016).

This study is based on a District General Hospital and it analyses the experience patients had when they attended the Orthopaedic Outpatient Clinic. Six Sigma (DMAIC) simple tools were used.

Material and Methods

Design

It was observed that the orthopaedic outpatient clinics were constantly overrun beyond the scheduled sessions' end. Patients reported their disappointment and the health workers their increased stress levels. After receiving a number of patient complaints for this unacceptable condition a departmental meeting was organised to assess the situation. During the management's discussions with senior clinicians from all disciplines involved in the outpatient department it was decided to collect data and analyse it with the view to find any organisational problems. The possibility that personnel numbers were lacking or there were delays due to staff inexperience or internal delays due to wrong referrals were excluded as there was a robust system of patient selection according to clinician's special interest. The staff was adequate and well trained to assess all patients at all times, as gaps of personnel were not permitted. To prove the above, all health workers, doctors and nurses, consented verbally in a separate meeting for data collection of their presence retrospectively by using the off-duty registry and clinic data. The collection and analysis was performed by the staff in charge of the outpatient clinic. The results were presented to all members of the managerial team including all doctors and nurses. Further data of patient arrival time at the outpatient department was collected by the receptionist's registry. It was noticed that patients were arriving on time up to the time of 10.30 am, but from that time onwards all patients were

arriving late. This abnormality resulted for the last patient to be seen beyond the end of the clinical session and this last appointment had a maximum delay of 45-60 minutes before discharge.

Following these observations and findings it was decided to run an audit and find the potential reasons of the delayed arrival and experiences from the patient prospective. A letter was created (Appendix 1) which was given to patients on admission to the clinic informing them about the project, giving them the choice to participate or exclude themselves from it. They were informed about the ability they had to ask for further information about the results of the project and their participation was taken as an informed consent. The audit run for two months. It was a qualitative survey and the collected data was grouped to facilitate a quantitative measurable outcome.

Measure

The Orthopaedic Outpatient Department was situated separately from the rest of the Outpatient Departments for the other specialties, as it was close to Accident and Emergency and Radiology Departments. Morning session clinics were observed to have the most delays, so it was decided to concentrate on these. Two consultant led independent clinics were present in every morning session. There were five double clinics in a week. Every clinic was manned by one consultant and two registrars, meaning that in every morning session six doctors were present. Each consultant was seeing ten new patients and each registrar 25 follow-up patients. Follow-up patients with difficult management were initially seen by the registrar and discussed/reviewed by the consultant. The result is that a maximum of 20 new patients and 100 follow-up patients were seen daily, making the weekly maximum activity of 100 new and 500 follow-up patients. The audit was run for two months making the maximum reviewed number at 800 new and 4000 follow-up patients. Following the first audit and the changes made according to these results a second audit using the same questionnaire and for a period of two months and for the same clinical sessions was run trying to close the loop and analyse if any changes were made.

Results

Analyse

Out of the potential combined number of 4800 patients in the first two months 2110 questionnaires (44%) were collected. The answers were grouped and analysed and the Six Sigma was calculated. As the questionnaire had open text questions it was observed, after grouping, that more than one issue was mentioned in each of them. The main complains were about commuting and inability to access the health service in a closer to home facility, traffic around the hospital due to road works, queuing in reception, parking issues, crowded sitting area (Table 1).

Table 1

Problems	Answered questionnaires [2110] - (% of frequency the answer was presented)	Sigma
Parking (Difficulty to park No space	1560 (74%)	0.9

Parked far away Issued fines)		
Traffic/Road works	360 (17%)	2.5
Commuting-Hospital closer to home	200 (9.5%)	2.9
Queuing in reception	300 (14.2%)	2.6
Sitting area	850 (40.3%)	1.8
X-rays/Plaster	50 (7.1%)	3.5

Having these results an Ishikawa (Fish bone) analysis was performed at managerial level after a brainstorming meeting analysing the basis and also the received complaints. The diagrams show the abstract of the thoughts put on the table. The first diagram (Diagram 1) is mainly centred on all the reasons given by the patients either in the community area or the hospital and the clinic. The second (Diagram 2) is concentrating to the reasons that it was thought that can be affecting the patients and it was possible for the Hospital’s Board to intervene and improve.

Diagram 1. Reasons given by patients

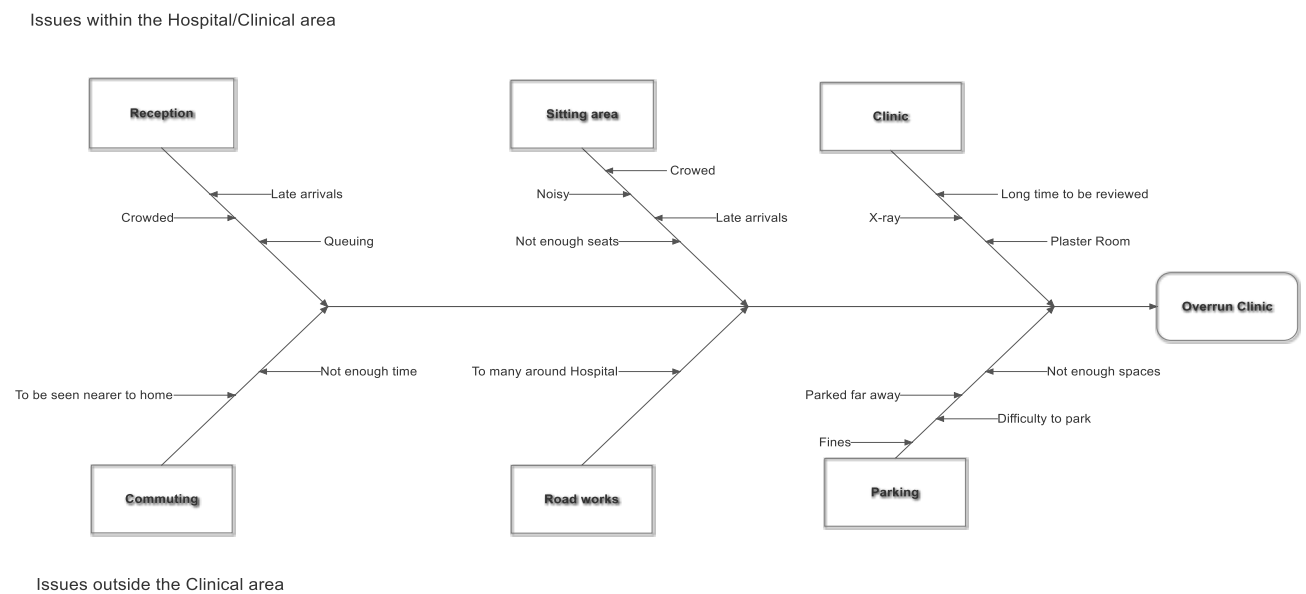
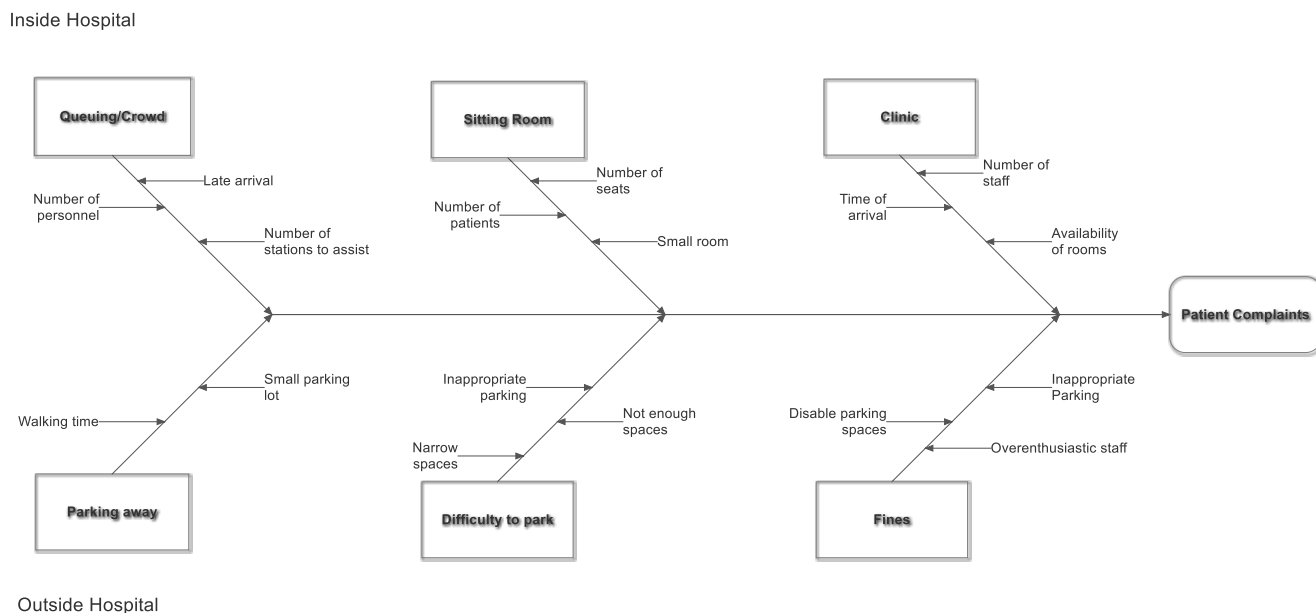


Diagram 2. Areas influenced by managers



It is considered that road works and commuting was not something that could be influenced as the former was responsibility of the council and for the latter there were no periphery clinics manned for the purpose of Orthopaedic service and thought also that it was impossible to cover every single patient due to geographical difficulties and the expense of organising peripheral clinics was taken into account. Because of these reasons, these sections were not analysed.

Patients’ higher number of complaints was about their ability to park their vehicle with ease and the crowding in the clinic’s waiting/sitting. Those were the areas targeted for potential improvement. Queuing in reception was the result of the high number of people arriving in the same time due to possibly the patient late arrivals. The same reason could affect the overcrowded sitting area. Delay in arriving to clinic could result delay to the patient’s review as well as delays in X-ray Department and the plaster room, making the clinic to overrun.

Improve

The decision was made to create

1. Second sitting area closer to the consulting rooms
2. Changes to the parking area.

Starting from the latter the parking area in front of the hospital and adjacent to the clinics was preserved only for patients and their relatives who were attending the clinic. They had to show their appointment letter to security personnel and they were easily parking close to the outpatient department. Health workers and other staff were not permitted to park close to hospital and the parking lot available to them was moved to the peripheral area to the hospital. This way the patients had easy access to the Orthopaedic Clinic.

In clinic nurses were checking the lists and patients closer to time to be reviewed were called and moved to a smaller sitting area near to the consulting rooms. This way the main sitting area had free seats at all times. At a later stage the nurses were freed from this duty and a system of electronic tickets was used.

Control

The second audit which was performed six months after the alterations, planning to close the loop shown more positive patient experience at the targeted sections. This again was run for two months concentrating in the same working sessions. Out of the maximum 4800 patients we received 2530 questionnaires (53%) (Table 2).

Table 2

Problems	Answered questionnaires [2530] – (% of frequency the answer was presented)	Sigma
Parking	280 (11%)	2.8
Traffic	995 (39.3%)	1.8
Commuting-Hospital closer to home	980 (38.7%)	1.8
Queuing in reception	30 (1.2%)	3.8
Sitting area	80 (3.2%)	3.4
X-rays/Plaster	60 (2.4%)	3.5

It is obvious the improvement of the patients’ satisfaction. The Six Sigma increased by almost two standard deviations for the parking alterations and “policing”, and about one standard deviation for the sitting area and reception. This is a vast improvement for the analysed sections of the clinic and continuing monitoring could lead to a potential result of higher satisfaction levels, but it is obvious that people would be more satisfied if the service provided was closer to their home. In this section (vicinity of service to home) Six Sigma indicated the drop of satisfaction by one standard deviation based on the results of the second audit. There was an increase of the dissatisfaction for the traffic section as well.

Discussion

The unobstructed pathway through the outpatient clinics was studied in many institutions. In the outpatient department of Internal Medicine data was collected between two groups of patients trying to study the efficiency of the clinic. The first group experienced the changes to the function of the clinic that were applied while the second was the control group. The findings supported that the changes had facilitated a more efficient flow of patients through the clinic (Fischman 2010).

In the present study a similar pattern was followed although the group participating in the first audit was the control group and their data was compared with the data collected at the second audit.

It is indicated that process mapping is facilitating the understanding of the problem. As soon as this becomes clear management and supporting staff can be engaged and acting as a team solve any problem (Cima et al 2011). In our case a true cooperation between all parties

involved, concentrating on the voiced concerns by the NHS main stakeholders, patients and their relatives, was extended to senior management and the hospital board, resulting to parking lot alterations as well as the clinical waiting area.

Furthermore a clear way of data tracking and its analysis using the correct method can improve the quality and efficiency of patient flow through a clinic by changing key factors that have been identified by the analysis (Pons 2012, Lin et al 2013). This was demonstrated in the present study and by improving the patients' stay within the waiting area and by keeping on top of their flow through the clinic, helped the unobstructed constant patient movement increasing their satisfaction.

A factor influencing patient satisfaction is the received communication by the hospital members (Kallen et al 2012, Ho 2014). In the present study positive communication was established in both parking area with signs and the presence of security guards, who were indicating the correct areas people had to park, as well as initially guidance received by the auxiliary nursing staff and electronic ticketing later. This helped with the timely announcements the constant patient flow to the clinic.

Cooperation from Health workers of different levels and their readiness to change practice is paramount for the patients' experience in a very stressed for them environment and this is mentioned time and time again throughout the literature (Cima et al 2011, Kallen et al 2012, Street et al 2017) and Six Sigma Methodology is known to be used in health care analysing different aspect of the provided service and concentrating in the improvement of the quality given to patients (Cima et al 2011, Lin et al 2013, Zafiroopoulos 2015, 2015). In our study all staff from all grades and levels worked tirelessly to improve the quality of the service provided in the Orthopaedic Clinic and made this a pilot scheme for the implementation of further changes in other outpatient clinics within the organisation.

The interesting finding was that as soon as one of the problems was improved another problem shown to be more prominent and it raised the question if it may be the root of the initial problem. Traffic and road works were from the beginning one of the issues but they were dismissed as not controllable by the Managerial Board. It is true that road works cannot be control by the Hospital and it was thought that traffic was in the same category. The results of the second audit potentially indicate that traffic could be directly linked with the congestion created due to lack of service in the periphery clinical facilities. Having this in mind the further study has to be done and the necessity of re-organisation of the clinical service may be considered.

As limitation of the present study could be considered the low volume of answered questionnaires in comparison with the number of patients attended the Orthopaedic Outpatient Department. Based on the second audit's results further alterations may happen and further auditing would be beneficial.

Conclusion

Six Sigma is a tool that once more was implemented successfully and calculated the improvement of the quality the patients experienced within the clinical environment, facilitating the flow through and minimising their stress while in Hospital stay in the particular environment of the Orthopaedic Outpatient Department. It also proves that for every success listening to patients' concerns and working as a team delivers a positive outcome and improves quality. Despite this it is also indicating that using Six Sigma further problems that can arise as soon as the original targeted issues have been improved and move

out of the Hospital's limited boundaries. This is indicating the multitude of the different aspects that can influence the system, leading to a constant study of its function and the focus and effort needed to improve the quality of the service provided.

Conflict of interest

The author has no conflict of interest

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Appendix

Dear Patient

This is an anonymous survey. We are conducting an audit trying to find ways to improve the service to our patients and facilitate a quick and pleasant stay in our outpatient department.

We would be grateful if you could write any comments, in the box below, about your experience and if there are any reasons affected your,

1. Punctuality (potential delay) to your appointment
2. Satisfaction during the time you spent within the Department

You are free not to participate to this audit. If you wish to be notified about the results of this survey, please leave your details to the nurse in charge. Do not write your name on this form.

We thank you for the help you providing us in our course to improve the quality of your experience and allow an uneventful pathway through our outpatient department.

Orthopaedic Outpatient Department