

**Evaluation of the effect of an innovative automated text messaging service on
patient experience in day-case hand trauma surgery**

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Abstract

Introduction

Hand trauma provides high volume of cases in Plastic Surgery Departments. However high patient turnover can cause delays and miscommunications which can lead to patient dissatisfaction. We aimed to evaluate the effect of an automated text-messaging platform (Lister) on patient satisfaction in hand trauma.

Methods

Day case hand trauma patients were allocated to two patient groups (n=20v20). Lister group received texts via the Lister software providing them pre-operative information and updates on wait time on the day of surgery. The control group received standard written information. Each patient answered a PROMs questionnaire postoperatively.

Results

More Lister patients understood instructions regarding hospital attendance (85% v 65%) and felt well informed on the day of surgery (85% v 65%) compared to the control group. Three Control patients felt "Not at all" informed during the day of their surgery. Overall patient experience was better in the Lister group, with 16 (80%) reporting experience as "Very good" compared to 8 (40%) in the Control group ($p < 0.05$). Two Control patients reported their experience as "Bad". The majority of Lister patients reported the pre-hospital text message had been very helpful, whilst 14 (70%) Control patients reported a text message service would improve their overall experience.

Conclusion

We have demonstrated that the Lister automated software can significantly improve the understanding of patients regarding their hospital attendance, time of operation and overall

~~hospital experience within a busy hand trauma unit. Further studies are needed to confirm the potential for cost reduction and financial analysis.~~

Introduction

Hand trauma makes up a significant proportion of the acute caseload of plastic surgery departments in the UK. At least 1.36 million hand injuries are assessed in Accident and Emergency (A&E) departments each year and approximately 2425 patients per 500,000 population require specialist care [1,2]. Our unit runs a full hand trauma list every day treating several thousand patients per year. In our unit at the Royal Free Hospital we run at least one full-day trauma operating list every day, with between 5-15 day-case hand trauma patients per day. This equates to several thousand patients per year, a picture mirrored in the majority of UK plastic surgery units [3]. Despite high demand for services, there is limited operating capacity in most units, increasing pressure on the operating teams. This can lead to delays in time to surgery, patient miscommunication and in some cases significant errors.

~~The high volume of hand trauma patients and the lack of theatre capacity can lead to delays in time to surgery, patient miscommunication and in some cases significant errors leading to litigation.~~ Litigation claims against NHS England for hand injury mistakes amounted to £6,066,214.55 between 2004 and 2014 with an average payout per patient of £30,000 [4]. ~~—A significant cause of error is inadequate communication with patients which can not only lead to patient harm but can also reduce patient satisfaction with their hospital experience. In particular, it is often difficult to keep patients fully informed during the day of their surgery due to the high demands of a busy trauma theatre list placed on the operating team. Good Surgical Practice, as published by the Royal College of Surgeons, recommends that all patients are fully informed regarding all the details of their surgery including times, potential delays and precise locations [5]. Anecdotally, there are often patient complaints regarding delays to day of surgery, lack of information regarding waiting times on the day of surgery and patients arriving at hospital at the~~

~~incorrect time. A common cause of error is inadequate communication with patients which can cause harm and reduce patient satisfaction with their hospital experience.~~

~~The use of automatic SMS text messaging systems to improve patient attendance and satisfaction is not new [5] but has not been routinely used by UK hand trauma services. We evaluated the effect of a text messaging service developed by Lister Care Limited (Aylesbury, UK) on patient experience of hand trauma day case surgery. Lister Care Limited (Aylesbury, UK) has developed an automated text messaging service Lister, which is designed to improve patient communication and overall patient experience for patients undergoing surgery. The aim of the service is to provide supplementary information to the details currently given to patients at the time they are booked for surgery and to ensure patients are better informed about their treatment during their surgical journey, thus improving overall patient experience.~~

Aim

~~The aim of the study was to evaluate the effect of automated text messaging service (Lister) on patient reported outcomes measures (PROMs) of their experience of hand trauma day surgery.~~

Methods

Hand trauma patients admitted to the Royal Free Hospital ~~Day Surgery Unit under the care of Plastic Surgery~~ over a two week period between August-September 2016 were allocated randomly allocated one of two groups. Random allocation was performed using a random number generator via SPSS Version 22 (IBM, Armonk, NY, USA). Twenty patients were allocated to standard practice (control group), and twenty patients were allocated to receive text messages ~~via Lister~~ (test group). Patient ~~phone numbers were recorded at the time of booking for surgery and~~ consent was taken for participation in the study.

Standard practice involved ~~the plastic surgery doctor booking the patient for surgery (either when seen in A&E or trauma clinic) and at the same time~~ providing verbal and written information regarding the date, time, location, type of surgery, type of anaesthesia and potential waiting time of

~~the patient's surgery at the time of booking. Patients were also provided with written information on the above. Each patient was then also reviewed by the operating team on the day of their operations surgery and advised on the approximate waiting time until the operation.~~

The test group received the same information as the control ~~group~~ patients at the time of booking. They also received a text message ~~update~~ the day before surgery including the date, time, location, type of surgery, type of anaesthesia and when they could eat and drink. They also received a link to the hospital website providing ~~more~~ written information on their planned procedure (~~e.g. flexor tendon repair~~) and a number to call if they had any ~~further~~ questions. On the day of surgery, test patients received a text message to update them on their place on the operating list, and the approximate waiting time ~~until their procedure. Text messages sent to the patients were fully automated and no user interference was required. Text messages were automated via the Lister software.~~

~~After surgery each patient was asked to complete a PROMs questionnaire and responses were analysed using unpaired t-tests. A value of $p < 0.05$ was considered significant. Prior to discharge on the day of surgery, each patient was asked to complete a PROMs questionnaire [Appendix 1]. Patients in the test and control groups were asked to answer three questions and their responses were analysed using unpaired t-tests on SPSS Version 22. A value of $p < 0.05$ was considered significant. Each patient was then asked further questions specific to the treatment pathway they received [Appendix 1].~~

Results

~~A higher number of test patients (85%) reported that they understood 'very well' the instructions regarding their hospital attendance compared to control patients (65%) (Table 1). A higher number of test patients (85%) reported they were 'very well' informed regarding the time of surgery on the day of their admission compared to control patients (65%). Three control patients (15%) felt 'not at all informed' compared to no test patients. Results are summarized in Table 1. A higher number of patients in the test group (n=17, 85%) reported that they understood, 'very well', the instructions~~

~~regarding their hospital attendance compared to patients in the control group (n=13, 65%) (p=0.15). A higher number of test patients (n=17, 85%) reported they were 'very well' informed regarding the time of surgery on the day of their admission compared to control patients (n=13, 65%) (p=0.1) (Figure 1). Three patients (15%) in the control group felt 'not at all informed' compared to none in the test group.~~

Overall hospital experience was significantly better in the test group with 16 patients (80%) reporting their experience as 'very good' compared to 8 control patients (40%) (p<0.01). None of the test patients reported their experience as 'bad', compared to 2 controls (10%).

~~Overall hospital experience was significantly better in the test group with 16 patients (80%) reporting their experience as 'very good' compared to 8 patients (40%) in the control group (p=0.009). None of the patients reported their experience as 'bad' in the test group, compared to 2 (10%) in the control group.~~

The majority of test patients (n=16, 80%) reported pre-hospital and day of surgery text messages were 'very helpful'. Whilst 15 patients (75%) reported that the test service improved their overall hospital experience 'very much'. In the control group, the majority of control patients (n=14, 70%) reported that a text message service providing information before and during the day of surgery would improve their overall experience. (Figure 3).

Discussion

The results of this study show that providing supplementary information to patients regarding their operation improves their understanding and significantly improves their overall hospital experience. The vast majority of patients feel that a text message service is helpful and those that did not receive messages felt that it would be beneficial. The introduction of a service like Lister would bring the UK in line with other countries where this is routine practice and would reduce the

workload of busy hand trauma staff. Limitations of this study include the small sample size in both groups which may limit the conclusions that can be drawn from the data. A larger randomised controlled trial would provide higher level evidence of the benefit of the service. In particular evaluation of potential cost efficiencies, such as from reduced cancellations and reduced litigation would be very useful.

~~The Lister automated text messaging service has the potential to ease some of the strain placed on busy hand trauma staff. Approximately 20% of all A&E referrals are hand trauma related and this figure is set to rise [1]. There are significant pressures on hand trauma units with many frequently exceeding their operating capacity due to lack of beds or operating space [6]. An automated patient information service would ensure adequate information is provided to patients whilst at the same time reducing pressure on operating staff.~~

~~The use of mobile phone technology to augment patient care is rapidly becoming a crucial part of surgical management. By 2020 4.6 billion people will have a mobile phone subscription [7] illustrating the need to engage with technology in order to enhance patient contact [8]. Text messaging is an ideal patient communication tool given its accessibility, ease of use, widespread availability and low cost [9]. Several studies have demonstrated high patient satisfaction and improved care outcomes when mobile phone communication has been used, such as in acne treatment and smoking cessation [10,11]. Text messaging services can also reduce the number of missed appointments which may in turn save hospital departments money and improve operative efficiency [12].~~

~~The Lister text messaging service allows the operating surgeon to generate bespoke messages which can be automatically sent to a selected population of patients. On the day of surgery the order of the operating list can be generated by the surgeon and the text messaging service enabled for patients to receive regular updates on their place in the list and their approximate wait time. We found the system extremely easy to use with very little training required. Our data shows~~

that patients receiving this additional information felt better informed and overall more satisfied with their hospital experience.

Limitations of this study include the small sample size in both groups which may limit the conclusions that can be drawn from the data. A larger randomised controlled trial would provide higher level evidence of the benefit of the service. In particular evaluation of potential cost efficiencies, such as from reduced cancellations and reduced litigation would be very useful.

Conclusions

Our findings show that a text messaging service providing supplementary information both pre-operatively and on the day of surgery can significantly improve patient understanding and overall satisfaction of day-case hand trauma surgery. The Lister service is simple to use, accessible to patients and easy to implement in busy hand trauma units. It can be used effectively as an additional tool for providing patient information.

Conflict of Interest

N Rastogi, A Abdaal, and R Kerstein are directors of Lister Care Limited and were not involved in the collection or analysis of the study data. N Hachach-Haram is affiliated with Lister Care Limited.

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References

1. British Society for Surgery of the Hand. Hand Surgery in the UK. London: BSSH; 2007.
2. Burke FD, Dias JJ, Heras Palou C et al. Providing care for hand disorders a re-appraisal of need. J Hand Surg Br 2004; 29: 575–79.

3. Davies RM, Anderson K, Iqbal A. The organisation and management of hand trauma presenting to plastic surgical services in the British Isles. *Ann R Coll Surg Engl (Supp)*. 2013;95(7):1-4

4. Trevatt AEJ, Smith OJ, Needleman J et al. An analysis of the most common types of hand injury mistakes and their cost in the acute setting. *Medico-legal Journal*. 2016;84(4):206-11

~~Good Surgical Practice, The Royal College of Surgeons of England, September 2014~~

~~Hussain A, Sen S, Walker R et al. Acute Hand Trauma Services: Have Things Changed in Seven Years? *Ann R Coll Surg Engl (Supp)*. 2012;94(8):1-3~~

~~GSMA Intelligence The Mobile Economy 2015. 2015.~~

~~Varma DS, Hart M, McIntyre DS et al. A Research Protocol to Test the Effectiveness of Text Messaging and Reminder Calls to Increase Service Use Referrals in a Community Engagement Program. *JMIR Res Protoc*. 2016;5(2):e133~~

~~Car J, Guroi-Urganci I, de Jongh T et al. Mobile phone messaging reminders for attendance at healthcare appointments. *Cochrane Database Syst Rev*. 2012;7:CD007458~~

~~Okhovat JP, Tenconi F, Kim J et al. The Utility of Text Message Reminders for Acne Patients: A Pilot Study. *Am J Clin Dermatol*. 2017;18(1):133-7~~

~~Müssener U, Bendtsen M, McCambridge et al. User satisfaction with the structure and content of the NEXit intervention, a text messaging-based smoking cessation programme. *BMC Public Health*. 2016;16(1):1179~~

5.4. Liew S, Tong SF, Lee VKM et al. Text messaging reminders to reduce non-attendance in chronic disease follow-up: a clinical trial. *Br J Gen Pract*. 2009;59:916–920

Tables

Question	Group	Questionnaire Response					P value
		Very well	Reasonably	Neutral	Not much	Not at all	
1. Hospital attendance	Lister	17	3	0	0	0	0.15
	Non-Lister	13	7	0	0	0	
2. Time of	Lister	17	3	0	0	0	0.1

surgery during day	Non-Lister	13	3	0	0	3	
		Very good	Good	Neutral	Bad	Very bad	<i>P value</i>
3. Overall experience	Lister	16	4	0	0	0	0.009*
	Non-Lister	8	10	0	2	0	

Table 1: Summary of PROMS questionnaire responses

Figure Legends

Figure 1: Patient understanding of information regarding hospital attendance

Figure 2: How well informed patients felt during the day of their admission

Figure 3: Overall hospital experience

Appendix 1

For Test patients:

0. How well did you understand the instructions regarding your hospital attendance?

0.

0.

0.

2. How well informed were you regarding the time of your surgery during the day of your admission?

3. How would you rate your overall hospital experience?

4. How helpful did you find the pre-hospital instructions text message?

~~5. How helpful did you find the text updates during the day of your surgery?~~

~~6. How much did the Lister service improve your overall hospital experience?~~

For Control patients:

~~0. How well did you understand the instructions regarding your hospital attendance?~~

~~0. —~~

~~0. —~~

~~0. —~~

~~2. How well informed were you regarding the time of your surgery during the day of your admission?~~

~~3. How would you rate your overall hospital experience?~~

~~4. Would a text message service giving you information on your admission the day before improve your overall experience?~~

~~Yes/No~~

~~5. Would a text message service giving you information regarding the time of your surgery during the day of your admission improve your overall experience?~~

~~Yes/No~~