Impact of providing patient information leaflets prior to hospital discharge to patients with acute kidney injury: a quality improvement project

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ABSTRACT

Acute kidney injury (AKI) is a common health issue. It is a sudden episode of kidney failure that is almost entirely associated with episodes of acute illness. AKI is common with as many as 20% of patients arriving at hospital having an AKI, with up to 15% of patients developing AKI in a postoperative period. Patients who have an episode of AKI are more likely to have a further episode of AKI and require readmission to hospital. This project aimed to provide patients with AKI education for self-care and management, with the hope of reducing AKI readmissions. Using quality improvement methodology, the AKI patient discharge and readmission pathway was reviewed, and information about AKI was given to patients. This was in the form of verbal information and a patient information leaflet. This information was provided on discharge from acute care.

Baseline data were collected that showed more than 80% of patients reported that they were not given information about AKI prior to their discharge from hospital. Due to higher readmission rates, the focus of this improvement project was on acute medical wards. Following implementation, there was a sustained reduction in AKI patient readmission rates. This reduction led to a significant reduction of inpatient bed days and a shorter length of stay for those patients who were readmitted. Quality improvement methods have facilitated a successful reduction in acute AKI readmission to hospital.

PROBLEM

Acute kidney injury (AKI) is a sudden episode of kidney failure or kidney damage that occurs within the previous 48 hours or within 7 days.[1] Patients who have premorbid conditions, such as diabetes,[2] as well as older people, are at increased risk of developing AKI.[3] Low socioeconomic status is also associated with a higher risk of developing AKI.[4] Those with AKI also have an increased risk of unplanned readmission within 90 days of discharge.[5]

The University Hospital Southampton NHS Foundation Trust (UHS) serves a large local population that is split between two local Clinical Commissioning Groups (CCG) that have vastly different demographic populations. Southampton City CCG has a population of around 300 000 with a younger than average population from a higher than average area level of deprivation and with 46% of the population with comorbidities. West Hampshire CCG has a population of 550 000 with around 30% of those patients who are over the age of 85 years. This means that there is a wide range of patients who have varied risk factors for AKI.

Following a local audit, it was found that there was a higher than average readmission rate for patients with AKI, some of which was attributed to being highly compliant with AKI reporting (more than 90% of AKI reported to primary care, compared with a national average of 65%); however, on review there were areas that could be improved. The project aim was to provide patients with AKI education for self-care and management and a measure of the effectiveness of this was to review AKI readmissions within 90 days with an AKI readmission being defined as any admission during which the patient had an AKI following which they were readmitted within 90 days and had an AKI on that subsequent admission.

BACKGROUND

AKI has become a well-recognised medical condition since the National Confidential Enquiry into Patient Outcome and Death,[6] and the introduction of the National Institute for Health and Care Excellence guidance in 2013 (subsequently updated in 2019[1]) which highlight the impact of AKI on patients and their long-term health. AKI is an acute change (within 7 days) in the patients' baseline renal function; specifically, creatinine and/or urine output. AKI covers a wide range of clinical conditions, ranging from mild injury (stage 1) to severe injury (stage 3), which can result in permanent and complete loss of renal

Table 1 Kidney Disease| Improving Global Outcomes (KDIGO) staging

Stage	Creatinine	Urine output
1	1.5–1.9× baseline OR Increase by 26 µmol/L within 48 hours	<0.5 mL/kg/hour for 6–12 hours
2	2–2.9× baseline	<0.5 mL/kg/hour for more than 12 hours
3	3× baseline OR Increase of 354 µmol/L ORRequiring renal replacement therapy	<0.3 mL/kg/hour for 24 hours OR Anuria for 12 or more hours

function.[7] These three stages of AKI are classified using internationally agreed staging[8] (table 1).

AKI is a common complication of many other acute illnesses, such as sepsis or dehydration.[9] It is present in 22% of hospital patients,[10] and is associated with an increase in morbidity and mortality,[11] with patients being at increased risk of death during their hospital stay, alongside increased risk of developing chronic kidney disease (CKD),[12] despite the severity of their AKI.[13] While it was previously thought that AKI was completely reversible with no long-term health implications for patients, there is growing evidence that even a single episode of AKI can lead to permanent organ damage.[14] The impact of a single episode of AKI can lead to future AKIs,[15] the development of CKD,[14] and increase the risk of other complications such as cardiovascular disease[16 17] and stroke.[18] Despite its high prevalence and associated morbidity, many AKIs are preventable,[19] or treatable with rapid recognition and treatment.[20] To date, much of the literature has focused on the role of professionals in managing and reducing such risks. Less work has been done to consider the role patients have in altering disease progression through modifying or changing their behaviour.

It has been suggested that improved self-management support can reduce disease progression in a number of conditions such as diabetes,[21] chronic obstructive pulmonary disease[22] and CKD.[23] In the context of CKD, improving health literacy may improve long-term health outcomes.[24–26] However, to date, work in this area has typically focused on providing health promotion, assisting patients in modifying risk factors and promoting active engagement in self-management.[27] For patients to take an increased role in the management of their condition, people require appropriate knowledge about their underlying medical condition.[28] Therefore, knowledge and awareness are essential educational components for enhancing self-management.[29] It is suggested[30] that the giving of information is most important when there are long-term health implications involved. However, less is known about the impact of providing information or education to those presenting with acute issues (such as

AKI) to prevent complications and the genesis of chronic illness. There is some evidence that providing patient information leaflets can promote adherence to treatment in acute conditions, especially where people have limited existing knowledge of the condition.[31] Alongside this, much of the literature around patient information leaflets discusses the content of the leaflets and the context that it is given in, to be important factors to the success of the leaflets, such as giving patient information leaflets during General Practitioner (GP) consultations.[32]

There are currently no guidelines or guidance on AKI patient discharge provided locally, nationally or internationally. Although there is emerging research into what AKI follow-up is required for patients with significant/severe AKI (stage 2/3), this does not currently include all AKI stages or severity or provide guidance about the discharge process.

Within the UHS, AKI patient information leaflets were available on the staff intranet and were printable, to aid the staff to give them to patients prior to discharge. Despite this, patients with AKI indicated that they rarely received this information. Only 20% received information about their condition at discharge. A quality improvement (QI) project was designed that centred around the provision of information both verbally and through paper a patient information leaflet prior to their discharge from hospital. There was an assumption made by the AKI nursing team that patients were unable to amend their behaviours and prevent future AKIs, as they had little or no knowledge on how to do so and that this led to readmissions with future AKI episodes. The focus was therefore to change patient behaviours through providing of information. Due to the high number of patients and the size of the AKI team, it was not possible to provide one-to-one teaching sessions for every patient with AKI; however, an explanation of what an AKI was and where further information could be found were provided.

MEASUREMENT

To assess the impact of the information given to patients about AKI around their discharge, it was decided that AKI readmissions would be used. AKI data were collected from patient discharge summaries using International Classification of Diseases-Tenth Revision-Clinical Modification codes. An AKI readmission was defined as any hospital admission during which an AKI occurred that was within 90 days of a second admission, and during that readmission the patient had a subsequent AKI. AKI did not have to be the initial presenting complaint on either admission and all levels of AKI were included within the data collection. Patients who were readmitted without an AKI were not included within the data set as the aim of the project was to prevent future AKI as a cause for hospital admission.

Initial data were collected for all adult inpatient areas and reviewed to assess which areas had the highest readmission rates. These data were collated into Pareto charts

that were used to assess the areas that would show the most impact by implementing a change. It was identified by these Pareto charts that patients in acute medicine were most likely to be readmitted within 90 days, therefore this area was designated as the specific target area.

Baseline data showed that on average seven patients were readmitted from the acute medical ward areas per week. This accounted for around 15% of all readmissions to this ward area. In order to meet our project aim, we planned to target these ward areas initially, until we had established a successful method of implementing the process of giving patient information leaflets to patients. If this change was successful, the plan was that it would be spread gradually across to all other adult inpatient areas.

DESIGN

The planned intervention was to provide a patient information leaflet to those being discharged home from the acute medical ward areas following AKI. A copy of this leaflet can be found in online supplemental appendix 1. It was intended that this was provided alongside routine discharge information by the ward team. The assumption was that by providing patients with information that included the basic function of kidneys, signs and symptoms of AKI and ways of avoiding AKI, the patients would be able to reduce their risk of AKI. A secondary aim of providing this information was to assist patients in early referral back to a healthcare provider, preferably to primary care, to lessen the impact of AKI if it was to reoccur.

No educational targets for patients were set as there was no clear behaviour that specifically needed changing, but rather an increased awareness of what an AKI was, what the early signs and symptoms were and which medications they should suspend should they become acutely unwell again. The patient information leaflets were given alongside verbal information about the importance of early recognition of AKI. Patients were not given specific teaching but any questions that the patients had were answered.

A group of multidisciplinary AKI specialists were engaged and ward leaders and managers from the ward areas were asked to be involved in the project. Alongside this, there was a QI support from my peers from the QI fellowship and the local QI team and leads for the UHS, who provided project feedback and insight. No problems were predicted at this stage, as it was recognised that there was a missed opportunity to give patients with AKI a patient information leaflet and it was assumed that this would be an easy intervention to implement with education for self-care and management. This was because patients with AKI were easily identifiable due to AKI being coded on all discharge information summaries, and the AKI information was readily available on every computer.

The local QI team met once a month, either face to face or virtually, and provided feedback and guidance to the QI processes that were required to improve the authors'

understanding and ability to implement the change in practice. The QI fellowship group met once a month during the project and offered feedback and support. The AKI team involved in the change met frequently. However, engaging the ward teams for frequent meetings proved challenging due to the high level of acuity in these areas and their competing clinical commitments.

Patient and public involvement

Patients were not involved in the design of the project as the focus was on hospital staff providing information to patients at the point of discharge. However, the patient information leaflet was taken to a local patient and public involvement group to assess whether it was fit for purpose, prior to it being used as part of the project. This group decided that while there were improvements that could be made to increase the impact of the patient information leaflet that included reformatting and amending the wording, for the purpose of the project, it was decided that it was appropriate to use. A longer term part of the project would be to design a new AKI patient information leaflet using a codesign method involving patients who had experienced AKI.

Strategy

The Specific, Measureable, Achievable, Realistic and Timely (SMART) aim for this project was to reduce the number of AKI readmissions for patients who were discharged from the acute medical ward areas through increasing the number of patients who were given AKI patient information leaflet prior to discharge from hospital. The timeframe to measure that improvement was within 12 months. Multiple Plan, Do, Study, Act (PDSA) cycles were carried out throughout the project but there were four significant cycles that are detailed below.

PDSA cycle 1

The initial intervention was to inform the ward teams that were discharging patients to print out an AKI patient information leaflet. This was done by meeting with the senior team from the ward areas to discuss the roll-out. However, engagement with the ward-level staff was very difficult to do due to the level of acuity on the ward. The feedback from the ward staff was that this was not achievable/sustainable as while the patient information leaflet was available to print, it was difficult to find online and this took too much time to make it deliverable. The team also highlighted that while patients with AKI were easy to find, they were concerned that they did not have enough knowledge to answer any questions that the patients might have had about AKI; this led to implementation of a training package on the ward.

PDSA cycle 2

To assist in reducing barriers to finding the AKI patient information leaflet and to printing it, a large number of patient information leaflets were printed and supplied to the ward. Following the implementation of the

training package, the pharmacy and medical teams were contacted to assess whether it would be possible for them to deliver the discharge information. However, due to the discharge process, it was noted that patients were typically discharged from areas where there was a non-resident pharmacist, and the patients' medical teams would not be present at the point of the patient being discharged.

PDSA cycle 3

Following PDSA cycle 2, the timing of information given was assessed as there was not a sustained change in reduction in readmissions. Patients with AKI were often seen by the AKI nursing team on the ward areas, and were subsequently given verbal information by the AKI team. However, they did not always provide written information, as this was often at the time of acute illness (as opposed to discharge). During this cycle, it was decided that the AKI nursing team would give both written and verbal information when they reviewed the patients on the ward. This removed the element of doubt with regard to when or who should give the patient information leaflet. However, spread to the wider hospital environment was not possible due to the large number of patients discharged following an AKI. This cycle showed a sustained improvement with a reduction in readmissions and it was decided that to spread this, further alternative methods of the giving of information needed to be developed. At this time, the organisation was also exploring ways to improve patient discharge summaries to GP to make the transferring of data more impactful, and to link these discharge summaries and patient information leaflets to patients' electronic medical records. This is now an ongoing project, relating to transferring information to patients via their electronic records.

PDSA cycle 4

The final test cycle was undertaken following an increase in readmissions, and the process for discharge was reviewed. It was realised that the change was not sustained during a norovirus outbreak and over the Christmas period as there was an increase in readmissions following these periods. This was deemed to be due to the AKI team not being able to visit the patients prior to discharge (due to ward closures and staff leave). This showed that the intervention was not robust enough to be delivered through periods where there was internal or external pressure for patients to be discharged home and an alternative would need to be in place long term.

RESULTS

The outcome that was measured was AKI readmission from the acute medical ward within 90 days of their first discharge following AKI. The average readmission rate prior to the project was 8.9 patient readmissions per week. This improved to 8.2 in the first 19 weeks of the project, with a reduction following the third PDSA to an average of 5.5 readmissions per week. This accounted for 51 less patients being readmitted during the period of data measurement. Those with an AKI, on average, were admitted for 4 days. This accounted for a reduction of 200 bed days in a 15-week period.

However, the change implemented in this last PDSA cycle was not robust enough to be sustained during a norovirus outbreak at the hospital. There was an increase in readmissions during this period that rapidly improved once the norovirus outbreak was over; there was also a spike in readmissions in the period over Christmas.

The increase in readmissions during the Christmas period and during the norovirus outbreak are both times where there is an increased pressure on discharging patients who are medically fit for discharge. For almost all of the patients with AKI, their renal function had improved back to their baseline prior to discharge and therefore there was no medical reason for them to remain in hospital. However, due to the speed of their discharge, there was a reduction in the amount of information given to the patients about self-management leading to an increase in readmissions as the AKI team did not get a chance to provide this information.

While there are many factors that could have impacted the readmission rates, no other changes or projects were being carried out during the time of this project for patients with AKI. It is therefore reasonable to assume that this project was a primary driver for change.

Measurement for readmissions was stopped in July 2019 following the commencement of AKI nurse-led follow-up clinics. A statistical process control (SPC) chart can be found in online supplemental appendix 2. SPC charts are a versatile tool that assists in discriminating changes that yield improvement and those that do not.[33] There is a 'rule of 7' that is generally applied to demonstrate changes that are unlikely to have occurred by chance.[34 35] The SPC for this project demonstrated that following the norovirus outbreak there are more than 7 points under the mean, 11 points, and therefore it is reasonable to assume that this is unlikely to occur by chance.

Lessons and limitations

The aim of the project was to provide all adult inpatients with AKI with a patient information leaflet at the point of discharge. The primary focus was on ensuring a sustainable change in practice. For this to be achieved, the change had to be deliverable across inpatient settings, as patients with AKI are admitted to all specialties within the hospital. In the initial phase of the project, attempts were made to engage the range of clinical specialties involved in caring for AKI; however, the use of a Pareto chart demonstrated that the inpatient areas where the change needed to start were acute medicine.

Following the initial PDSA cycles, it was highlighted by the staff that for them to be able to confidently provide AKI patient information leaflet to patients, they would need further education for self-care and management. However, it was not possible to deliver this within the project timescale. Therefore, a single ward area with the highest readmissions was focused on for the project. The

initial idea of having a patient information leaflet that was available to print off had not considered the time it would take for nurses to find the document, print it out and then give it to the patient. Following another PDSA cycle, we implemented the system of the AKI team giving information to patients with AKI prior to discharge.

The ward-based nursing team do not have the AKI-specific knowledge or time capacity to provide a patient information leaflet to every patient with AKI. Studies have shown that to bring about positive outcomes from nurses providing discharge education, there needs to be a nursing staff knowledgeable in doing this. Nurses need to assess the patients' ability to process the information by having an understanding of a number of factors that influence the patient understanding.[36] Some studies[37] show this was an hour per patient. Within the National Health Service, currently the staff to patient ratio, it is not possible for the nursing staff to be able to do this.

However, this project emphasised the importance of the provision of patient information, and therefore the AKI team have continued to provide patient information following the end of the project. The AKI team have spread the giving of patient information leaflet to all adult patients who have AKI stage 2 and stage 3 at the point of hospital discharge or shortly afterwards. For patients with AKI stage 1, more work will need to be done to ensure that they are able to receive an AKI patient information leaflet, and this work continues to look at other strategies that can facilitate achieving this. With new technologies, including patients having electronic access to their own medical records, work is considering the possibility of sending AKI patient information directly to patients. However, patients who do not have access to electronic devices need to be considered and an alternative developed to mitigate the risk of unequal access.

The effectiveness of educational content and impact by the provision of information was not fully assessed within this project, although this has subsequently been done after the implementation of an AKI nurse-led follow-up clinic. It is therefore not possible to comment on this within the constricts of this project.

This was a small scale, within one acute trust. However, there has continued to be a sustained reduction in AKI readmissions following the spread of AKI patient information leaflet to AKI stage 2 and stage 3 in this setting. Further work needs to be done to review whether there is equal impact from giving AKI patient information leaflet for all stages of AKI. There is also a need to better understand how the configuration of the patient information leaflets might impact on readmission rates. It was not possible to continue to assess the ongoing impact on readmissions within our organisation as following on from this project a nurse-led AKI follow-up clinic was set up.

CONCLUSION

This body of work sought to address readmissions through the provision of patient information to address the gaps in patient knowledge around AKI, specifically around preventing reoccurrence. Using QI methodology, acute medical ward areas were identified as areas with the highest readmission rates. This project has increased the amount of patients receiving information about the causes of AKI and methods of preventing its reoccurrence. A significant reduction was noted in the number of patients who have been readmitted to hospital within 90 days of discharge. To increase the spread and adoption of this project, an alternative method of delivery of patient information needs to be developed, and using technology for direction provision of patient information is currently being explored.

Further work will need to be done to look at the long-term implications of reducing AKI reoccurrence to assess whether this had any impact on the development of the health complications of recurrent AKI, such as CKD.

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