

Managing urinary tract infections in nursing homes: a qualitative assessment

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Pharm World Sci (2005) 27: 159–165

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Key words

Northern Ireland
 Nursing homes
 Prescribing
 Qualitative research
 Urinary tract infections

Abstract

Objective: To elucidate the steps in the management of urinary tract infections (UTIs) in elderly nursing home residents, in order to derive data which would assist in an economic evaluation of such infections.

Method: Maximum variation sampling was used to recruit General Practitioners (GPs) and nurses (who worked in nursing homes), into the study. Using semi-structured interviews, a topic guide was used to explore diagnosis, treatment and the role of GPs and nurses in the management of UTIs in nursing home residents. Thematic analysis was employed to identify the main themes.

Main outcome measures: A comprehensive description of the management of UTIs in nursing home residents that will be used in a future economic evaluation of the costs of this prevalent infection in this setting.

Results: Ten GPs and nurses respectively took part in the interviews. Three overarching themes emerged from the interviews: information, processes and decision-making. Health care professionals described the key symptoms for diagnosis (information), testing procedures to confirm the presence of an infection (processes); many variations in management pathways were described. The nurse was central to decision-making in treatment i.e. prescribing of an antibiotic. Most GPs reported that they accepted the nursing staff's assessment of the resident and seldom visited a patient in a nursing home for a UTI.

Conclusions: The management approach to UTIs varied greatly and was a more complex process than anticipated. Identification of the component steps will be used to perform an economic evaluation of UTIs in nursing homes.

Accepted June 2004

Introduction

Urinary Tract Infections (UTIs) are frequently encountered in today's nursing home elderly¹ and are the most common reason for antimicrobial prescriptions in long-term care facilities; they are responsible for the initiation of 20–60% of systemic antimicrobial courses in nursing home residents².

As many as 50% of the female and 40% of the male institutionalized patients have been reported having a UTI². The factors influencing this high prevalence include immobility which leads to incomplete bladder emptying, poor hygiene, which favours bacterial growth¹, and age-associated physiological changes, together with co-morbidities such as incontinence^{2, 3}. Nevertheless, the majority of nursing home residents with a UTI do not show symptoms of an infection; they are referred to as asymptomatic⁴. Current consensus is that asymptomatic UTIs should not be treated, taking

into account the failure to establish long-term effectiveness and that antibiotic resistance may be produced by treatment^{1, 5, 6}. This is in contrast to symptomatic UTIs.

For elderly persons who are often incontinent, cognitively and physically impaired, typical symptoms of UTIs such as urgency, pain or burning sensation passing urine, may be difficult to detect because they may not be able to express themselves clearly⁷. The absence of an elevated temperature in infections in the elderly has also been documented⁸, therefore a sudden decline in functional or cognitive status should always raise the question of infection¹. Often elderly patients with UTIs will present with symptoms such as delirium, confusion, lethargy and loss of appetite⁹. However, confirmation of a possible UTI is frequently sought through urinalysis, either by using dipsticks or a Mid-Stream Specimen of Urine (MSSU¹⁰). Prescribing of a short course of antibiotics (approximately five days) is the usual method of treatment.

This is a highly prevalent infection which accounts for a number of direct costs within nursing home care such as laboratory, medication, physician and nursing costs, as well as a range of indirect costs to the patient, including pain, suffering and side-effects of treatment¹¹. We were interested in establishing the overall economic costs of UTIs to nursing homes by identifying all steps in treatment e.g. steps in diagnosis, analysis of samples, treatment decisions. It was agreed that all potential steps in the management of this infection would be identified by qualitative means, i.e., semi-structured interviews. We had considered the use of structured questionnaires to gather such data, but felt that interviews would facilitate a more thorough and complete enumeration of all component steps to which costs could be attributed. This approach would also reveal how UTIs are currently managed within nursing homes and facilitate the elucidation of decision-making in this area of care. Semi-structured interviews have previously been employed to explore both GPs' and nurses' views on prescribing decisions and assessment procedures¹² (although not for the purpose of an economic evaluation) and therefore a similar approach was judged suitable for the planned research study.

Method

This research work aimed to identify the approaches used to manage and treat UTIs in a sample of nursing homes, through semi-structured interviews with nurses working in nursing homes and general practitioners (GPs) who provided services to those homes; the findings will be used for a future economic assessment of UTIs in nursing homes.

Topic guidelines for the interviews with the nurses and GPs were developed through consensus of the researchers, who had all reviewed relevant literature in this area. Trial interviews were carried out with members of the research group to determine the length of

time required for the interview. Briefly, the topic guides covered the following issues:

- Symptoms suggestive of a UTI and usual practice in managing those symptoms, including test procedures,
- The role of the GP/nurse in managing UTIs,
- Treatment of UTIs,
- Problems associated with UTIs.

Sampling of nurses and interview procedures

Convenience sampling was employed to sample nursing homes. This was employed for pragmatic reasons (for arranging interviews), but the research team considered that this approach would still enable a comprehensive overview of UTI management to be obtained. All nursing homes in one defined administrative area (known as a Trust; this contained 18 homes) in Belfast, Northern Ireland were identified from the most recent information available from the relevant administrative authority¹³. Maximum variation sampling was then employed to recruit 10 nursing homes (a mix of private/publicly owned homes, which varied in bed numbers from 26–100) and the nurse in charge/matron was invited to participate in this research project. It was agreed by the researchers that if data saturation had not been reached on completion of 10 interviews, the remaining 8 homes within this Trust would be approached. All but one nurse from those approached agreed; this nurse explained that several staff members were on sick leave and due to time constraints she was unable to participate in this project. Therefore, a further nursing home was randomly selected and the nurse in charge agreed to participate.

When arranging the interviews with the nurses, care was taken to ensure that a suitable quiet room was available for the interview and that the nurses were aware that the interviews were likely to last 20 to 30 minutes. All interviews with the nurses utilised the topic guide during the interview to provide some structure and direction. All interviews were tape-recorded and transcribed verbatim by the same researcher (AS) as soon as possible after the interview in preparation for qualitative analysis. The interviews took place in February 2001.

Sampling of GPs and interview procedures

All participating nurses were asked to provide a list of GPs caring for residents in the nursing home. The lists from all 10 nurses were compiled and the final list included 45 GPs from the same Trust area. Again, maximum variation sampling was employed to select 20 GPs from the compiled list; these GPs were sent a letter explaining the research project. A larger number of GPs were approached in the first instance (compared to nurses) because of the researchers' experience of low GP response rates in previous studies. Following this letter a researcher contacted each of the 20 GPs inviting them to participate in the project. From these 20 GPs, 6 agreed to participate and a suitable time was arranged to carry out the interviews. Again, care was taken to ensure that the interviewees were aware of the time required (maximum 20 min) and a quiet room was required to conduct the interviews to ensure that precise transcription was possible.

In order to increase the number of participating GPs, a further letter explaining the research project was sent to the remaining 25 GPs from the final list of

GPs. One GP from this list of 25 GPs was then randomly selected and invited to participate in the project by a researcher. If the GP agreed to participate, a suitable time for the semi-structured interview was arranged. If the GP did not agree to participate, a further GP was randomly selected and invited to participate in the research project. This process was repeated until 4 GPs had agreed to participate in the project (giving a total of 10 GPs). Again, it was agreed that if data saturation was not reached after 10 GP interviews, further GP recruitment would take place.

All 10 participating GPs were interviewed in their surgery using the topic guide. Again, the interviews were tape-recorded and transcribed verbatim in preparation for analysis. These interviews were carried out in September and October 2001.

Analysis

The tapes and transcripts were repeatedly studied and a thematic analysis was carried out to identify the main themes emerging from the interviews; as similar themes emerged from the transcripts, further sampling of GPs and nurses was deemed unnecessary. The analysis was undertaken by one researcher (AS) and confirmed independently by a second researcher (CMH). All transcripts were then used to develop a flow chart which described all the management approaches used to diagnose and treat UTIs in the participating nursing homes and which would assist in the economic evaluation of UTIs in nursing homes. Only the results of the thematic analysis have been present in this paper.

Results

A total of 10 interviews (lasting 20–30 min) were carried out with nurses; all nurses were matrons in nursing homes and all but one nurse were female. Table 1 summarises the demographic features of the interviewed nurses and the nursing home s/he represented.

The demographic features of participating GPs (7 male; three female) in terms of the number of partners in their practice and the number of their patients currently living in nursing homes have been summarised

Table 1 Demographic features of the nursing home participants represented

	Number of residents for which the nursing home was registered	Type of nursing home
Nurse 1	100	Voluntary
Nurse 2	34	Private
Nurse 3	49	Private
Nurse 4	48	Private
Nurse 5	35	Private
Nurse 6	36	Private
Nurse 7	33	Private
Nurse 8	26	Private
Nurse 9	72	Private
Nurse 10	86	Private

Table 2 Demographic features of the interviewed GPs

	Estimated number of nursing home patients for whom the GP provided care	Number of GPs in the practice
GP 1	Unable to report	2
GP 2	50	5
GP 3	Unable to report	5
GP 4	Unable to report	3
GP 5	48	3
GP 6	200–300	10
GP 7	30–40	3
GP 8	25	6
GP 9	12	10
GP 10	20–30	3

in Table 2. When estimating the number of patients currently living in nursing homes, some GPs estimated only the patients they personally attended, while other GPs estimated the total number of nursing home patients on the practice list. GP interviews lasted no longer than 20 min.

Emerging themes

Three overarching themes emerged from the analysis of the transcripts. These were:

- Information, e.g. symptoms,
- Processes, e.g. testing procedures,
- Decision-making e.g., prescription written or not.

Quotes from the transcripts were selected on the basis that they best illustrated the main theme in question.

Information

All nurses clearly identified the symptoms most commonly associated with UTIs in elderly nursing home residents. These symptoms included frequency, concentrated, strong-smelling urine, sometimes a raised temperature, and increasing confusion in residents who were referred to as “not being themselves” (Nurse 3).

Nurse 10 “Well, they (the residents) may present very classically with a temperature, they look unwell, they complain of burning, irritation when they are passing their urine, some supra-pubic pain or in some cases the onset can be quite insidious in that they – you don’t really notice anything except their behaviour may go a little off, they might appear vague or maybe a bit drowsy.”

GP 4 “...in terms of symptoms it would usually be something like they (the residents) are off their feet or they (the nursing home staff) will say there is a strong smell from their (the resident’s) urine or they (the residents) are feverish, but quite often is a combination of things.”

Processes

The processes mentioned by the interviewees were based on the testing procedures and the collection of a urine sample.

Dip-stick testing

The nurses reported urinalysis using a dip-stick as their first step in diagnosing a UTI prior to contacting the GP, however, occasionally, nurses would contact a doctor immediately after noticing possible symptoms of a UTI. The interviews with the GPs confirmed this.

Nurse 1 “We would do (a dip-stick test) and see if we can find anything that might indicate that there is an infection, you know, if there is blood or protein or something like that and contact GP and get them started on an antibiotic.”

GP 6 “... the patient is unwell and they (the nursing home staff) tested the urine and found protein in the urine.”

Some nurses were dip-sticking incontinence pads if it was not possible to collect a urine sample, however others did not support such a practice.

Nurse 4 “We have one lady who is on bed rest all the time, so she can’t use a commode or anything. You would have to actually dip-stick her pad rather than in the commode and that, which can be done, it is just more awkward, and then obviously if you wanted to send off a MSSU or something it is very awkward.”

Nurse 3 “We were actually told to never dip-stick pads. Never. It had been done in the past but never to do it.”

Difficulties collecting urine specimens from nursing home residents

All nurses reported great difficulties collecting urine samples for nursing home residents, especially for incontinent residents and the GPs were clearly aware of these problems.

GP 4 “Well, it depends again on the mobility of the patient. If they (the residents) are confined to bed and they are incontinent it is very difficult to do that (to take a urine sample), but if they are mobile - nurses would be good that way and would if they hadn’t already (taken a urine sample) would be happy to do it, if it is practical.”

Laboratory testing of urine samples

Due to the difficulties in collecting a urine sample, it was often not possible to send a urine sample off to the laboratory. For residents for whom this was possible, authorisation of such a test was not always sought from the GP. However, all nurses seemed to be aware that some GPs preferred to be asked prior to sending off a urine sample. This was supported in the GP interviews. Nevertheless, it became obvious that the decision whether or not to send off a urine sample often lay with the nurses.

Nurse 2 “...Through working with the GPs and getting to know them, you get to know yourself the GPs that wouldn’t object to you sending a specimen off and the ones that would say well you shouldn’t have done that because I didn’t tell you to do it... and as I say, some of them wouldn’t object if you did go ahead and send a specimen off without consulting them.”

- GP 1 *"...better nursing homes would actually say they have already taken a sample and sent it off to the laboratory..."*
- GP 6 *"...they (the nursing home staff) would usually ask our permission before they do that (send off a urine sample for laboratory testing)."*

The time between sending off a specimen of urine and receiving the results varied between 2 and 7 days. However, one nurse seemed to think that an additional delay occurred due to poor communication.

- Nurse 10 *"I don't think getting the result takes that long, but there seems to be a fair time, between the lab and the GP and back to us."*
- GP 1 *... then there is also the query of where they (the results) go to, some of the results go back to the nursing homes and not back to us, in fact they usually seem to go back to the nursing home not back to us. And then sometimes they would fax them through to us, the better nursing homes."*

One nurse confirmed that the results from the laboratory test were not necessarily fed back to the GP.

- Nurse 3 *"Very often we are not worrying GPs with the results from the lab, because the results come back contaminated. So you are really going by what you are telling him and a urinalysis and you are hoping that he will go with what you are maybe thinking and if he doesn't then you're just trying to pump fluids and keep up hygiene and if it (the infection) continues you just have to ring him back again and say that the situation has changed."*

Decision-making

The ultimate decision whether or not to treat a resident with an antibiotic was clearly made by the GP, as s/he issued the prescription. GPs reported that they were reluctant to treat residents with indwelling catheters and asymptomatic patients, but otherwise usually prescribed an antibiotic.

- GP 2 *"...more reluctant to treat if they (the residents) have indwelling catheters and they are well, but if they are unwell I usually would treat."*
- GP7 *"Patients with indwelling catheters that are asymptomatic, we don't treat unless they develop symptoms."*

However, it was evident that the nurse was the key player in this decision-making process. GPs rarely visited nursing home residents regarding a UTI and both nurses and GPs agreed that uncomplicated UTIs could be identified by the nurses and did not require further input from the GPs.

- Nurse 2 *"You get to know the people (the nursing home residents), and normally if it was, for example, a Friday, I would say to the GP maybe you would leave me a script for an antibiotic in case they should flare up over the weekend."*
- Nurse 8 *"It would depend on us, it would depend how pushy we were (if the resident was) very confused I would be quite pushy for an antibiotic, we would know them best, on a day-to-day basis you would know them as well as your own family. So you know if they are ill."*

- GP 9 *"most of things (seem) to be a fait accompli they (the nursing home staff) will say, look this patient had a dysuria, I have sent the sample off, have you got the report, and usually I am doing these things retrospectively."*
- GP 8 *"if they (the resident) have an acute onset of symptoms and the MSSU has gone, I am happy to treat with the nurse's assessment."*

However, one GP also identified other influences when deciding whether or not to treat a resident.

- GP 4 *"...you can get a bit of pressure from relatives or from practices - the nursing staff maybe work with 20 different GP practices and some maybe are happy to go quickly with an antibiotic and others hold back, but we would treat if there was strong presumptive evidence."*

During the interview, both nurses and GPs were asked whether GPs would visit a resident for a suspected UTI.

- Nurse 3 *"(laughter) you must be joking"*
- Nurse 2 *"We are very fortunate, the GP would come out, especially if we just phone and say well look so-and-so presented with pyrexia of unknown origin, they are generally off colour, often he (the GP) would come out."*
- GP 1 *"I wouldn't say never, but it is unlikely"*
- GP 4 *"You might be asked to go by the family, because clearly a UTI in an elderly person it could conceivably cause their death and clearly if somebody is clinically very unwell, we might be asked to go..."*

UTIs were usually treated with trimethoprim 200 mg for three to seven days. Occasionally, other antibiotics were mentioned such as ampicillin, however, interestingly, recurrent infections were treated no differently. In fact, one nurse reported that nursing home residents would never receive further investigations despite recurrent infections.

Summary of the management approaches used to diagnose and treat UTIs among nursing home residents

From the interviews many different management approaches emerged. Taking a urine sample obviously depended on whether the resident was continent. Sending the sample off for laboratory testing seemed to be encouraged by the majority of nurses and GPs. However, whether or not to treat while waiting for the results varied according to the resident's health status, the nurses' opinion and the length of time needed to obtain the results from the laboratory. The treatment approach was also influenced by the nurse's opinions.

- Nurse 8 *"[AS: If the dip-stick test is negative, what happens next?] Usually nothing, because doctors would say it costs too much money to send off a MSSU, usually nothing is done, we just observe the person and if we find they haven't improved in the next couple of days, then we will do another urinalysis."*
- Nurse 4 *"...but most likely the doctor will commence them on something straight away and the urine results come back and if they are resistant to their antibiotic, they will phone us and say, listen she is resistant to that and start her on something else."*

GP 6 "Well, if a patient is otherwise well, so if they don't have a temperature or other signs suggesting an infection I would usually ask for a urinary test, because you can end up doing a lot of unnecessary prescribing on the basis of just a dip-stick test. Unless the patient was toxic I would usually ask for a lab test or if - again - at the end of the week, if it was a Friday and you going to have to wait till Monday morning, I may start them (on an antibiotic) depending on how the patient was."

GP 10 "We have a policy with all the staff to have a sample sent and then giving them some medication until the report comes out, because it takes 36 hours."

All different pathways identified have been summarised in Figure 1.

Discussion

This study has provided an overview of the management of UTIs in some nursing homes in Northern Ireland. Although this study is a precursor to an economic evaluation of UTIs in nursing homes, the findings revealed the complexity of potential pathways and how decisions were made regarding treatment. Since this present study was undertaken, a qualitative approach has been used to explore how and why primary care staff make diagnostic and management decisions in patients presenting with urinary symp-

toms¹⁴; however, this latter study was not conducted in the nursing home setting.

The possible symptoms of UTIs were clearly identified by all interviewed nurses. A dip-stick urinalysis was most frequently reported as the first step in diagnosing a possible UTI. Interestingly, none of the nurses mentioned the reliability of these dip-sticks, or in any way questioned the results from these dip-sticks. As bacteriuria is prevalent in a large proportion of nursing home residents at any given time⁴, the low positive predictive value of these tests should be taken into account by the nurses when deciding how to manage residents with a possible UTI^{2, 15}.

The interviewed nurses reported that obtaining urine samples was very difficult for many residents. Several authors have previously highlighted these difficulties^{2, 16}; however, none of the authors have actually presented any solutions for this dilemma. If no other option exists, perhaps consideration should be given to the use of in-and-out catheterisation to gain a urine sample. This may be necessary in the light of increasing antimicrobial resistance (see below), although the procedure of in-and-out catheterisation in itself may introduce an infection¹⁶. Nevertheless, urine sample testing will only be useful, if the results are available in time to have an impact on the choice of treatment.

In the present study, the interviewees reported time delays from 2 to 7 days, before receiving the test results. This is a surprisingly large variation and has not

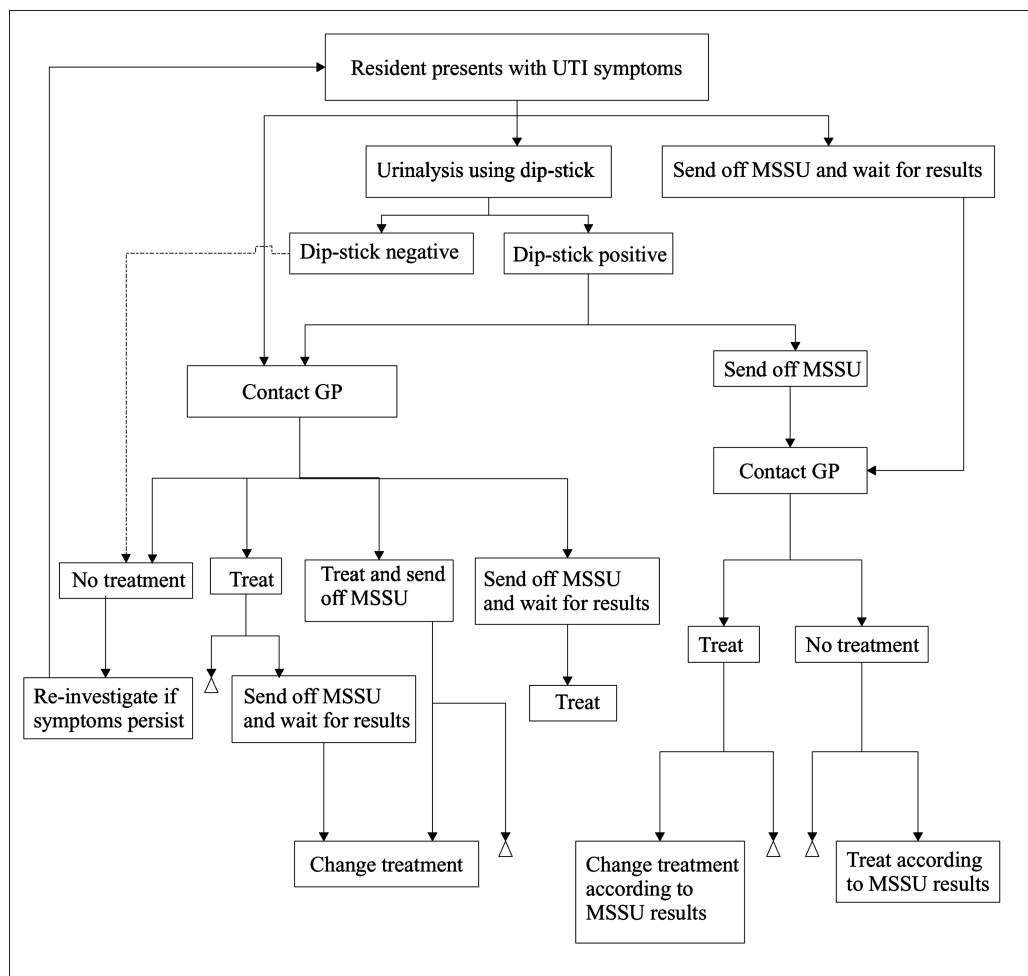


Figure 1 Various pathways used for diagnosing and treating UTIs in nursing homes. MSSU (mid-stream specimen of urine); Δ (treatment end point).

been considered in any published management guidelines. In addition, it became clear from the interviews that variation existed between the different GP practices, in terms of who was responsible for authorizing tests. Further variations, however, became apparent when focusing on the decision-making process.

Beier³ highlighted that nursing facilities in the US generally have less physician contact than hospitals and are characterised by a lack of organised medical staff. Due to infrequent physician visits and off-site laboratories the management of infections is difficult and mostly provided by nurses or by telephone with physicians³. Warren et al.¹⁷ reported that urinary tract infections were the most common indication for prescribing antibiotics in nursing homes; however, 31% of the most serious infections were not noted to have been examined by a physician. Therefore, the authors concluded that antibiotics were frequently prescribed for aged nursing home patients in the absence of a physician's examination as has been reflected in the findings from this study. Takahasi et al.¹⁸ noted that nursing home residents with a UTI were more likely to receive antibiotics in excessive dosage, a greater likelihood of adverse drug events and were more likely to be re-treated compared with community dwelling elders with a UTI.

A GP examination had rarely taken place prior to prescribing and the GPs seemed to prescribe mainly on the nurse's recommendations. One may argue that UTIs do not necessarily need to be investigated by a GP. Nazareth and King¹⁹ found that when GPs knew women patients well (who were presenting with UTI symptoms), they were less likely to prescribe antibiotics. It could be argued that GPs may not have a good knowledge of nursing homes residents. However, if these residents were placed in the community or in hospitals they would have contact with a physician. Therefore we may question whether it is appropriate that this access is denied to patients in nursing homes, where the prevalence of UTIs is the highest and UTIs are commonly judged as being complicated¹.

With the exception of asymptomatic and catheterised patients, GPs generally commenced residents on an antibacterial agent. One nurse stated that some GPs were "liberal" regarding their antibiotic prescribing, whereas with other GPs the nurse would have to "plead" for an antibiotic. In the light of ever increasing antimicrobial resistance these extreme variations were a surprising comment.

Highly resistant bacteria are more frequently isolated from nursing home residents than community dwelling elderly⁶, and this is thought to be influenced by empirical prescribing among these residents²⁰. Therefore procedures should be in place to follow the UK Antimicrobial Resistance Strategy and Action Plan published by the Department of Health in the UK²¹, and to support optimal prescribing policies and practices for one of the most frequent infections in nursing homes. Furthermore, the government has explicitly stated the need to improve diagnostic and antimicrobial susceptibility testing methods²¹; this study clearly supports the need to address these issues.

In 2002, Nicolle⁶ reported that there was still a need for "a framework for managing patients to ensure optimal patient care but limit pressure for further development of resistance". Furthermore, Brown¹⁶ carried out a systematic literature review and concluded that

there was a lack of research currently empowering nurses in care facilities to effectively manage UTIs.

Beier³ and more recently, Nicolle⁶ developed a protocol for treatment of symptomatic UTIs in nursing home residents. Nicolle⁶ suggested:

- A urine specimen for culture and susceptibility testing should be obtained prior to initiating antimicrobial therapy;
- If symptoms are not severe, antimicrobial therapy should be withheld until culture results are available;
- If it is necessary to initiate empirical therapy before culture results are available, prior antimicrobial history and local prevalence of resistance should be considered in antimicrobial selection;
- If empirical therapy is initiated therapy should be reviewed, and adjusted, if necessary, once pre-therapy culture results are available.

These guidelines emphasise a MSSU test, as did the guidelines published by Beier³, although the interviewed nurses in this study reported that obtaining the samples was very difficult for many residents. Clearly, protocols for the UK need to be developed to manage residents with a suspected UTI and in-and-out catheterisation as a means to collect urine samples must be accepted as a necessary diagnostic tool. Furthermore, opportunities presented by nurse prescribing (independent or supplementary²²) may provide a more pragmatic approach to UTI management, although potential effects on increasing antimicrobial resistance and decreased control of overall prescribing management should be considered.

This study was qualitative in nature and has certain limitations. The sample of nurses and GPs was limited to one defined administrative area, and only urban-based nursing homes and practices were included. The findings are based on the responses of those doctors and nurses who participated in the study and it is possible that other views have not been identified. However, data saturation was achieved in both samples (nurses and GPs) as evidenced by the recurrence of common themes and identification of the same contributing cost elements throughout the interviews. The study was more descriptive in nature than interpretative; we did not seek to develop theories from the thematic analysis. The study sought to identify each step of UTI management and all contributing elements; this will enable us to undertake the proposed economic analysis. Costs will be attributed to each of these component steps by reference to national accounting statistics²³ representative of unit costs surveyed across the United Kingdom.

Conclusion

In a recent publication, Fahey et al.²⁴ indicated that "poor monitoring of disease and unnecessary drug prescribing are more likely to occur in nursing home residents than in people living at home". This is partly reflected in the present study which demonstrated great variation in the management of UTIs between homes and practices. A similar methodological approach may be useful to chart how other drugs are initiated and whether management approaches differ as largely in other disease states. Such an approach extends into clinical decision-making and would require more in-depth interviews than those conducted in the

present study, perhaps supported by observational work. Findings from such studies may contribute to understanding what determines and motivates prescribing in long-term care, leading to the development of better models of care provision to vulnerable patients residing in nursing homes.

Acknowledgements

The authors wish to thank the GPs and nurses who participated in this study.

Carmel Hughes is currently being supported by a National Primary Care Career Scientist Award from the Research and Development Office, Northern Ireland.

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