Processes of Change in an Asthma Self-care Intervention

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Abstract

In this article, we present a qualitative study to explore the psychological and communication processes that occur within an intervention to improve self-care for people with asthma. In the context of a primary care based trial of the intervention, we collected data at 3 time points for 21 patients, comprising 2 audio taped consultations (nurse and patient together) and individual semistructured interviews 3 months after the second consultation. Using framework analysis, we identified both psychological processes (illness understanding, affective response to asthma and reasoned motivation) and patient-provider interactions (active patient involvement and individual tailoring). We used these findings to extend and refine the pre-existing theoretical model of behavior change underpinning the intervention, in particular with relation to patient-provider interaction processes. We conclude that it is important for developers and providers of asthma self-care interventions to attend to the style of delivery as well as the behavior change techniques involved.

In this article, we describe research that was designed to qualitatively examine the psychological and communication processes that underpin changes in self-care behaviors during the delivery of an asthma self-care intervention. In the United States, asthma accounts for more than 10 million outpatient visits. It also accounts for 500,000 hospitalizations each year (Akinbarni, Moorman, & Lui, 2011). Various researchers have suggested that poor asthma self-care is responsible for many asthma exacerbations and symptoms (Global Initiative for Asthma (GINA), 2009), including up to 75% of hospital admissions (Blainey, Beale, Lomas, & Partridge, 1994), and 75% of deaths from asthma (Burr et al., 1999).

Asthma self-care is complex. For it to be effective, patients need to understand the differing roles of asthma medications; use their medication accordingly; monitor asthma symptoms; adjust medication in response to worsening symptoms; recognize and avoid factors that trigger their asthma; and communicate well with health care providers to ensure their needs are addressed. However, control of asthma is not always optimal (Rabe et al., 2004). Qualitative researchers have found that people with asthma are unlikely to use monitoring tools or medications if they do not accept that they have asthma (Adams, Pill, & Jones, 1997; Anhoj, Nielsen, & Anhoj, 2004; Ring et al., 2011). Patients also often believe that using monitoring tools is burdensome and undesirable (Anhoj et al., 2004; Jones, Pill, & Adams, 2000; Pinnock, Slack, Pagliari, Price, & Sheikh, 2007).

Some people with asthma are skeptical about the efficacy of asthma medications (Choi, Westermann, Sayles, Mancuso, & Charlson, 2008). Others believe that they do not need to use medication during times when they do not have symptoms (Goeman, O'Hehir, Jenkins, Scharf, & Douglass, 2007). The cost of treatment (Douglass, Goeman, Yu, & Abramson, 2005) and quality of communication with health care providers (Moffat, Cleland, van der Molen, & Price, 2007) can also be barriers to medication use. In semistructured interviews, patients with poor asthma control reported that they would be reluctant to inform

their health care provider that they were not using their preventative asthma medication as prescribed and had negative perceptions of interactions with health care providers (Moffat et al., 2007).

A number of interventions to improve asthma self-care have been developed. There is evidence to suggest that such interventions can reduce asthma symptoms and unscheduled health care use and result in improved patient-reported quality of life (Gibson et al., 2002; Smith, Mugford, Holland, Noble, & Harrison, 2007; Tapp, Lasserson, & Rowe, 2007; Yorke, Flemming, & Shuldham, 2006). However, these interventions have varied widely in their theoretical underpinnings, the psychological processes targeted, and the behavior change techniques used and there is a wide variation in intervention effectiveness (Denford, 2011; Smith et al., 2007; Tapp et al., 2007). To help to maximize the effectiveness of such interventions, research is therefore needed to understand how such self-care interventions work and how their content and delivery can be optimized.

Although there is great potential for using qualitative methods to help understand the processes that occur in interventions, there is an absence of studies exploring such processes in asthma self-care interventions. The few qualitative researchers that have explored the effectiveness of asthma self-care interventions have focused mainly on barriers to the uptake of specific techniques to improve asthma control (as described above), rather than on exploring the interplay between intervention delivery processes, changes in patients' attitudes, knowledge and beliefs and changes in self-care behaviors. In a grounded theory study, Greaves (2002) identified important factors influencing patients' self-care of their asthma. From this, the last author developed a process model (Figure 1) to inform the development of the Managing Illness by Empowerment of Self-care and Harmonization of Patient and Practitioner Agendas (MESH) intervention.

INSERT FIGURE 1 ABOUT HERE

The process model (Figure 1) includes three phases. In the first phase, we hypothesise that patients' motivation to change their asthma self-care behavior is influenced by their understanding of their illness, their beliefs about the importance of changing their asthma self-care behavior, their confidence regarding their ability to change their asthma self-care behavior and their emotional response to asthma and its treatment. In phase two of the process model, we suggest that change can be promoted through patients making clear plans about how they intend to improve control of their asthma. In phase three, we have highlighted the need to support maintenance of any changes that have occurred, with particular attention to maintaining motivation and identifying and addressing any problems in implementing the patient's new self-care strategies.

Based on this process model, the authors developed the MESH intervention, which was the subject of a pilot study based in primary care in the United Kingdom. We used this opportunity to conduct a qualitative study to examine the process model in more detail. In the current study, we sought to answer the following research questions: What are the psychological and communication processes that occur during the MESH intervention, and how do these relate to changes in asthma self-care behavior? In addressing these questions we hoped to be able to refine and develop the process model underpinning the MESH intervention.

Methods

We conducted a qualitative study to explore the delivery of the MESH intervention. To explore the research question, we used thematic analysis of both consultation recordings and interviews with participants. We used recordings of the consultations to provide a direct account of the processes that occurred in the context of the consultation. In addition, we conducted semistructured interviews with patients shortly after they had completed the intervention to provide data about the patients' experiences of receiving the intervention.

Recruitment

We identified a list of patients aged 18 to 65 with poorly controlled asthma from searches of the electronic records held by general practitioners (GPs) in seven GP practices in South West England. To ensure that nurse had a minimum standard of asthma education, we selected practices on the basis that they had an asthma nurse with at least 2 years experience of working with individuals with asthma, and who were trained in asthma care to diploma level. We defined poorly controlled asthma in terms of the patient's need for emergency care and annual uptake of symptom control medication. Specifically, we required that participants had received an acute course of oral corticosteroid medication in the previous 12 months and either had made at least two asthma related unscheduled visits to a GP or hospital emergency department in the last 3 years, or were currently using an average of 5 or more puffs per day of reliever medication.

We drew a convenience sample, by asking each nurse to contact consecutive patients on the list of eligible patients, until a maximum of 4 patients had been recruited. The nurses invited patients to take part in the intervention, which took place over 3 months. A few weeks after the final consultation, the first author contacted the patients to arrange a telephone interview. Nine nurses from seven practices delivered the MESH consultations. Four nurses worked in rural locations, two in urban locations and one in a mixed (semirural) location. The patient sample comprised 7 men and 14 women, aged 19 to 68. Patients had experienced between two and seven asthma attacks requiring unscheduled health care use in 3 years prior to the consultations. We obtained written consent from all participants before they attended the first consultation.

Intervention

The intervention consisted of two semistructured consultations each lasting approximately 1 hour, two or three telephone contacts and a 3 month follow-up consultation lasting around 15

minutes. Nurses used a written plan to guide the content of each consultation. In the first consultation, the nurse assessed the elements specified in the motivation phase of the process model. The nurse then used open-ended questions to explore the patients' knowledge about asthma, self-care strategies and motivations to change their asthma self-care behavior (Leventhal, Meyer, & Nerenz, 1980).

The nurse then identified and discussed the patients' problems and concerns about asthma or their asthma treatments. The nurses were trained to use motivational interviewing techniques (Miller & Rollnick, 1991) to explore and enhance motivations and to exchange information about how asthma medications work and how patients can improve control of their asthma. Working together, patients and nurses completed a "situation map". They used this worksheet to display the patients' existing self-care strategies alongside "problem situations" that they had experienced and to identify gaps in their self-care strategies that might be associated with poor asthma control.

In the second consultation (which relates mainly to the action phase of the intervention), the patient and nurse referred to the situation map from the first consultation, to identify ways in which the patient's asthma self-care strategies could be changed to improve asthma control. The nurse made additional suggestions and helped the patient to develop a plan of action. This included setting specific goals, and making a social support plan (stating who else might be able to help and how). The nurse and the patient then worked together to identify potential barriers to changing the selected behaviors and discussed ways in which the patient could overcome these barriers.

Two weeks after the second consultation the nurse contacted the patient by telephone to identify any problems they were having with implementing the action plan. The nurse and patient discussed the patient's progress and the nurse sought to reinforce any successes, help the patient to find explanations and solutions for setbacks and to revise the patient's action

plan. The nurse also made up to two additional phone calls (at 2 week intervals) to review progress and to help solve any remaining problems. After 3 months, the nurse invited patients back for a brief (10 to 15 minute) face-to-face review of progress. Thereafter, the primary care provider continued to provide the normal asthma care process of annual reviews and treatment, as needed, of any acute asthma exacerbations.

Data Collection

To provide a descriptive account of the content of the consultations, we asked the nurses to audio record the consultations. After the third consultation, we conducted telephone interviews with the patients about their experiences of the intervention. We developed the semistructured topic guide used in these interviews from a review of the existing literature (Denford, 2011), and input from two of the asthma nurses who delivered the intervention. To enable the patients to tell their story, we included a sequence of open-ended questions designed to explore their initial perceptions of their asthma and the consultations, and how their perceptions changed over the course of the intervention. In line with the aims of our research, we then included more specific questions (if needed) to obtain patient perspectives on the specific processes and behavioral change techniques used in the intervention. We transcribed (verbatim) and anonymized all interview and consultation data.

Data Analysis

We analyzed a total of 35 consultation transcripts and 21 patient interviews. Data was missing for 3 patients at the first consultation, and 3 patients at the second consultation. This was because of equipment failure, forgetting, or (in one case) because the patient did not attend. We analyzed the interview data and the consultation data in accordance with the five distinct phases of framework analysis. In this method of thematic analysis, the researcher uses both inductive and deductive categorization to develop a framework, and then uses this framework to organize the data (Ritchie & Spencer, 2000).

First, we familiarized ourselves with the data through a process of listening to recordings, transcribing, reading and annotating the data. During the second phase of framework analysis, we identified a thematic framework. Because the intervention was developed from the MESH process model, we had a strong reason to believe that the processes described in the model would be evident in the data (Greaves, 2002), and therefore the process model became our initial framework. Over the course of the analysis, we either retained or dropped the original concepts in the framework, thereby inductively refining the original process model. MacFarlane & O'Reilly-de Brun (2012) advocate using a predefined coding template when there is evidence to suggest that key processes will be significant in the analysis.

To enhance the trustworthiness of the analysis (Guba, 1981; Shenton, 2004), two authors (the first and fourth author) checked the processes in the framework against the data (Whittemore, Chase, & Mandle, 2001) and any discrepancies were resolved by discussion. The fourth author frequently discussed the emerging framework and alternative coding approaches with the first author. We kept an audit trail of the coding by using a topic guide, making recordings and transcripts and by using NVivo software (QSR International, 2008) to organize the data, including memos, field notes, definitions and the history of the coding process. Both researchers also kept reflective notes on their starting perspectives and ideas and how these might have influenced interpretation of the data.

Throughout the analysis, we actively looked for new data that did not fit our framework, and considered alternative ways of exploring the data. We actively sought negative cases (i.e., cases that did not support emergent themes or fit with the emerging coding framework) and, we investigated these in detail to elicit explanations (Miles & Huberman, 1994). The first author checked her emerging interpretation with participants as

the interviews progressed. By following this procedure, we refined the original process model, adding new themes, and providing more detail of existing themes.

During coding of the data, we developed charts for each theme in the framework and for each participant. We copied text (or a summary of the text) from its original context into each chart. This allowed us to construct analyses case by case (across time) as well as cross-sectionally between cases (Holland et al., 2006). By triangulating data from the two sources at this stage, we were able to identify consistencies and discrepancies in the data for each patient. In the final stage of framework analysis we identified and described higher level themes (Braun & Clarke, 2006) and associations between them. We used these themes to develop a revised process model that was consistent with the data generated by the participants. The Torbay and Devon NHS (National Health Service) Research Ethics Committee approved the study procedures.

Results

We identified five main themes in the data. These include three psychological processes: illness understanding, affective response to asthma and reasoned motivation. There were also two patient-provider interaction processes: active patient involvement in consultations and individual tailoring of the content of the consultation to meet the needs of the patient. These themes are described in more detail below.

Illness Understanding

Patients had various beliefs and (in some cases) misconceptions about their asthma. Patients did not always recognize that they had asthma. One patient reported how she had "been the best customer of Pholcodeine [*a cough medicine] me. I can never even imagine it. Because I really believed that I had just got an irritating dry cough." Other patients did not know how to control their asthma, or realize that their asthma could be controlled with appropriate self-care. When speaking about asthma control, one patient stated, "I mean I have asthma and

there's nothing you can do about it. It's just you can live with a level can't you, but when it gets above a certain level it gets difficult." Another believed that asthma was not particularly bothersome "because you learn to live with it." Some patients did not understand that their asthma was poorly controlled or that asthma was a long term rather than an acute condition. For instance, one patient reported that "If I haven't had an attack for ages, I don't need my medication."

Over the course of the consultations, nurses were able to address any misconceptions that patients had and to increase patients' knowledge of their asthma. One patient described how the nurse "did the spirometry and said that I have cough variant asthma, so that was a bit of an eye opener." For another patient "the visual aids were really helpful for me to see the difference between healthy and asthmatic lungs. I had no idea that that was happening and needed looking after even when you didn't have symptoms or a cold." Patients regularly attributed changes in motivation and changes in self-care behavior to changes in illness understanding. After learning that she had asthma, one patient exclaimed "no wonder the cough medicine wasn't working. I should have been taking asthma medication from the start." For another patient, learning that she could control her asthma increased her motivation to change her self-care behavior:

> I think I thought that I had asthma and that was that, and if I have these problems it's because I have got asthma. And I think the fact that I was learning that I could do something about it, prevent the symptoms, stop it happening. It was a real awakening.

Following the consultation, one patient reported that he was now "taking it [asthma] much more seriously than I was before." This was because of a change in the way he understood the longer term consequences of not controlling his asthma. In his own words "if I carried on damaging the linings [of his lungs] with chest infections, not intentionally, but

having chest infection after chest infection um internally, it could be a problem when I get to fifty, fifty five, so I would rather do something now." Over the course of the consultation, another patient began to identify potential triggers of asthma, even though she had initially been skeptical that she could. In addition, she had found this to be helpful in guiding her self-care:

> When I first started [talking about triggers], I thought I don't know why I am doing this, I don't know what triggers my asthma, or what it's about. But actually now, she was saying 'well when does it, when have you noticed that you are wheezing,' and I said "I use this [air freshener brand] stuff and it absolutely makes me gasp", so now that I am aware of these things, it's something that I can do something about. And I have been adding to it, there are other things that make it worse, so, I have been adding to it, and I have been using it.

Affective Responses to Asthma

An important affective influence was concern about medication use. This included concern about becoming dependent and concern about the side effects of taking steroids. Some patients had concerns about having asthma that seemed to relate to their self-concept, such as concerns about not being a normal, fit and healthy person. An additional affective issue was concern caused by high levels of panic-fear emotions experienced during asthma attacks:

> You tend not to realize that you are getting worked up. And then you sort of, as you get worked up, your chest becomes tighter. And I usually cough first. That's usually my first sign that my breathings not going to be right. And then of course the more you cough, you start to worry because you think oh god your asthma is going to play up. And then like I say, it's like a vicious cycle really.

The nurses identified anxiety related hyperventilation in some patients (using open-ended questions and a brief hyperventilation screening questionnaire). One patient who took up the suggestion of learning breathing control techniques to address this reported some benefit. Patients described concerns about their medication as being an important reason for unwillingness to take the medication as prescribed. One patient reported that "I don't like taking my medication, because I think like, If you are constantly taking your steroid one, isn't that going to hurt your airways more, like taking it all the time?"

Additional in-depth analysis showed that those patients who had strong concerns about using their medication also reported that they were unlikely to use preventative medication on a regular basis even if their illness understanding was accurate. One participant knew that he should be using medication, but stated: "I should take it, but I'd rather not if I don't have to. I don't like taking drugs." In several cases, patients attributed changes in medication use to reductions in medication concerns following discussions with the nurse. For example, one patient was "a bit frightened of overdosing myself, so it's [attending the consultations] has definitely helped." When asked what had made another patient change their asthma self-care behavior, she replied:

> Well, she explained internally . . . exactly what the damage was that was being done
> by continually getting chest infections, um having it cleared up and then getting them
> again, and the cycle that occurs every year. In comparison to keeping it steady all the
> time. Whereas I had always thought that the inhaler was doing the damage.

Reasoned Motivation

During the coding, we defined the term "reasoned motivation" to describe a combination of the patients' confidence in their ability to change their asthma self-care behavior and the importance they placed on changing their asthma self-care behavior. One patient described

how "at the moment I enjoy the couple of cigarettes that I have and I don't feel ready to try again [to quit smoking]." Nurses attempted to assess and explore importance and confidence for all patients (this was a specific target of the intervention). Patients reported being more motivated to change their asthma self-care behavior following the intervention. For one patient, "learning that I could do something to control it, it definitely made me feel much more confident in my ability to control my asthma." For another patient, attending the consultation made her more aware of her asthma and the importance of controlling it:

> Attending [the consultation] keeps it [asthma] at the forefront of your mind. It's easy to forget and not spend the time taking care of yourself and looking after it properly, but it's more at the forefront of my mind now and yeah it's just made me realize that it is important.

Patients who reported that they had increased their motivation also reported changes in self-care behavior. One patient reported how her medication use had become habitual since the consultations and that she "definitely felt after the appointments that preventing the attacks was important. And to begin with, I had to remind myself almost daily that it was important and I had to take it. But now, it's just something I do." However, change in motivation was not always sufficient to lead to behavior change, because other processes often intervened. For example, one patient was very motivated to reduce his asthma symptoms, but his belief that he did not have asthma prevented him from taking his medication as prescribed: "I'd consider trying most things to make the, uh, breathlessness go away. I would take it [inhaler] if I thought it would help."

Patient–Provider Interaction Processes

Nurse–patient interaction styles differed considerably. In particular, there were notable differences in the extent to which the nurses encouraged patients to be actively involved

during the consultation (active patient involvement). There were also differences in the extent to which they tailored the consultation to meet the needs of the individual patient (individual tailoring). These two key interaction processes are described below:

Active Patient Involvement

Some nurses regularly used techniques to encourage the patient to be actively involved in the consultation. This included asking the patient's permission before presenting a medical viewpoint, making suggestions as opposed to directive instructions, and affirming the patient's role as the main agent of change and emphasizing partnership rather than an expert-and-recipient style of relationship. The same nurses encouraged patients to generate their own ideas about how their asthma could be controlled, and set their own priorities for action. When talking about the positive aspects of the consultations, one patient reported that "I was the instigator of that [action plan], rather than it forced on me. It wasn't directed to me, and I thought I could do that and that and then I could do this, and I could try this."

One patient enjoyed the experience of being "not just a passenger and passively doing what the doctor tells you." She emphasized this by continuing "But you can have an influence. Well you can have quite a lot of input toward getting asthma under control and that is quite a good thought really." However, there was variation in the extent to which nurses encouraged patients to be actively involved in the consultations, and in some instances, the nurse disregarded patient's ideas :

Patient (P): The most important thing for me is to lose weight.

Nurse (N): Well that's not really going to help in the short term. I've put down all the things that have affected you. You'd agree with that would you?

Generally, patients who reported being actively involved in consultations also reported making changes to their behavior. One patient described how he was able to "get my

side across. And the fact that I have a new medication that's better for me, that's testament to that." There were however, examples where we did not observe this association between active patient involvement and behavior change. Despite being unable or unwilling to make their own suggestions about ways to improve their asthma control, some patients reported that they had still changed their asthma self-care behavior in accordance with the nurses' advice. However, it is worth noting that the nurses had given these patients the opportunity to be actively involved, prior to making their own suggestions. Another participant described how he had felt actively involved in the consultation, but that he and the nurse were unable to agree on the actions to be included in his action plan. His views on the use of medication had not changed and a negative or discordant dynamic was evident throughout this consultation.

Individual Tailoring

The consultations were based on flexible use of a written (semistructured) consultation plan to guide the intervention. Following this plan, at the start of every consultation, nurses asked "Can you tell me how your asthma has affected you in the last few months?" We had trained the nurses to tailor the subsequent content of the consultation to address this problem. However, this did not always happen. Some nurses seemed to find it difficult at times to deviate from the text of the written consultation plan (regardless of the patients' concerns). For example, according to the plan the nurses should seek to address patients' concerns about the use of corticosteroids if (and only if) the patient has a fear of using steroids on a regular basis. However, although some patients reported that they were not concerned about the use of corticosteroids, the nurse still tried to address their (nonexistent) concerns and make reassurance about their safety.

> N: Do you have any concerns about steroids at all? Or the medicines that you are taking?
>
> P: No.

N: Ok, some patients are anxious about using their inhalers because it's a steroid, but it's important to know that . . .

Patients implied that individual tailoring of the intervention increased their motivation to change their asthma self-care behavior. One patient reported how "she [the nurse] really listened to what I was saying, and what she suggested, it really made sense to me you know? I was like 'Oh yes, I could do that.'" Another patient reported how "the nurse took a lot more time to find out me. You know, I have my prescription, but sometimes I forget to take it, so she spent a lot of time going on about how I could remember to take it. It wasn't just you know, here is the inhaler off you go. It was like, are you taking it, and why aren't you taking it. And I did I come away feeling you know this is what I should be doing"

Discussion and Conclusion

Discussion

We identified a number of processes that appeared to occur or change over the course of the MESH intervention. This included both patient processes and patient-provider interaction processes. We were able to use our in-depth analysis of the data and exploration of the relationships between these processes to develop and refine the theoretical model underpinning the MESH intervention. In doing this, we added depth to our understanding of the initial theoretical constructs and also added new constructs to capture the important processes of interaction between nurses and patients.

The revised model (Figure 2) includes three elements from the original process model (illness understanding, motivation, affective response to asthma (previously termed "emotional factors")) that were present in the data and were apparently relevant to producing changes in patients' self-care. However, we have reconceptualized the "decision to act" component from the original model as being a process that occurs implicitly as result of

engagement (or not) in the intervention processes of motivation and action planning. We have also incorporated two new patient-provider interaction processes into the revised model. These interaction processes (active patient involvement and individual tailoring) are important because they help us to understand how skilled practitioners might facilitate behaviour change processes.

INSERT FIGURE 2 ABOUT HERE

Figure 2 therefore shows both change processes and facilitators of these change processes. The solid lines represent proposed causal pathways and we have used dotted lines to suggest that one process might increase or decrease change in the other. In the revised model, two patient processes (illness understanding and affective response to asthma) influence patients' motivation to change their asthma self-care behavior. Following motivation, action planning then precedes behavior change. The two patient-provider interaction processes enhance change in intra-patient processes. Our analyses suggest that patients who are encouraged to be active in the consultation and who receive education and advice tailored to their needs and concerns are more likely to improve their understanding of their illness and change their asthma self-care behaviors. Changes in patients' understanding of their illness and their affective responses to having asthma also appeared to influence their motivation to change their asthma self-care behavior.

Our findings are corroborated by findings from other research which shows that patients who are reluctant to accept or admit that they have asthma are often reluctant to use their preventative medication or to monitor symptoms (Adams et al., 1997; Anhoj et al., 2004; Choi et al., 2008). We have added to these findings by suggesting that when these beliefs were addressed, patients reported making changes to their asthma self-care behavior. In our study, when nurses addressed beliefs about the need to take medications even in the absence of symptoms, patients started using their asthma medication on a regular basis. Previously

researchers exploring patient perceptions of medication dose-adjustment plans, mobile phone monitoring, and internet monitoring have also suggested that patients want such tools to be tailored to their individual needs and circumstances (Pinnock et al., 2007; Ring et al., 2007). These external findings support our revised model, in which we suggest that tailoring the content of the consultation to meet the needs of the individual is crucial to its success.

In a systematic review of the literature, Gibson et al. (2002) concluded that interventions that include education, self-monitoring, action planning, and a regular review are more effective for changing asthma control than interventions that do not include all four of these techniques. In our research, we were able to provide support for the use of two of the techniques identified by Gibson et al, but with some important qualifications. These are inclusion of asthma education (as long as it includes the key elements of illness understanding and is tailored to address gaps in patients' knowledge and beliefs) and action planning (as long as plans are tailored to address gaps in patients' self-care strategies, and patients are actively involved in the decision making process). Our revised model has some similarities to Self Regulation Theory (Leventhal et al., 1980) in that we have identified similar domains of illness understanding as being related to motivation and self-care behaviors and in that both emotional and cognitive processes are associated with self-care decision making.

The findings described in the current research are also consistent with the wider literature on patient-centered care (Britten & Weiss, 2003; Michie, Miles, & Weinman, 2003) and other research which suggests that adopting a patient-centered approach can improve the effectiveness of interventions (Lewin, Skea, Entwistle, Zwarenstein, & Dick, 2001). Overall, our research provides support for the original intervention model. However, we have also identified that the way that the nurse-patient interaction is delivered might be as important as the formal content of the intervention. This key message might help to inform current debate in the field of behavioral intervention about how to identify and describe the content of

interventions. In particular, we suggest that there is a need to pay attention to the interactional elements of interventions (patient-provider interactions) as well as the technical content (the specific behavior change techniques). This is an important idea, as current taxonomies of behavior change techniques describe only behavior change techniques and not interactional process (Abraham & Michie, 2008).

Strengths of the Current Research

To our knowledge, this is the first in-depth qualitative analysis of the processes of delivering a theory based asthma self-care intervention. We constructed both between and within case narratives and the in-depth exploration of the relationships between processes further strengthened the analysis. The use of direct observation of in vivo consultation processes is an important strength of the current research. In combination with interview data, this seems to be a useful qualitative methodology for examining intervention delivery and behavior change processes in the context of health behavior interventions.

The small number of existing process evaluations of asthma self-care interventions have relied on post intervention interviews to explore patients' thought processes (Pinnock et al., 2007; Ring et al., 2011). By triangulating consultation transcripts with interview data we were able to identify important patient-provider interaction processes that we might have missed using post intervention interview data alone. We collected data longitudinally, over three time points. This facilitated the construction of individual narratives about change and the exploration of how changes in self-care behavior related to intervention processes.

Limitations

We conducted our research alongside a pilot trial of the MESH intervention, which was the first attempt at delivering this intervention, rather than in the context of a mature optimized intervention with experienced health care providers. The lack of experience of the nurses in delivering the intervention might have led to variation in the way that the consultations were

delivered. However, for the purpose of our research, this variation was useful because we were able to compare and contrast cases where certain intervention processes were or were not delivered as intended. For example, we were able to compare consultations in which nurses tailored the content to the individual patient, with consultations in which nurses did not do this.

The pilot study context did however restrict our ability to purposively sample participants for interview. The variation observed in terms of patient characteristics and in patients' understanding and history of asthma suggests that we included a wide range of perspectives. However, the patients were all registered at rural or semirural practices in one region of the United Kingdom (Devon). In this area, there is a wide range of education levels and socioeconomic status, but limited ethnic variation. These aspects of the sample, and also that the nurses were all women might limit the transferability of our findings.

Because of the wide geographical spread of the practices involved, we opted to conduct interviews by telephone. This might have limited the depth of data that we elicited somewhat because of a lack of availability of visual social cues and reduced possibilities for developing a good interview ambience (Opdenakker, 2006). However, other researchers using qualitative telephone data have judged the data to be rich, vivid, detailed, and of high quality (Novick, 2008). This was also our experience.

We are content that we achieved a high level of data saturation in relation to most of the emergent themes, in that we generated no substantial new themes or ideas from the last six to eight transcripts analyzed. However, on some subthemes, we consider data saturation to be low: In particular, we found little data on the topic of using stress management for people with significant asthma-related anxiety, because only 3 participants had experienced such anxiety. Because of the short term nature of data collection, we obtained no data relating to

the final stage in the original process model (maintenance of changes in asthma self-care behaviors).

In the current research, the perspective we brought to the analysis was predominantly psychological. The prior training of two of the researchers in health psychology primed ideas about illness identity, emotional processes, and motivation. We recognize that, using a different theoretical framework at the start of the analysis, we could have organized the data differently or using different terminology. However, we believe that the processes included in the revised process model were clearly evident and that the model represents a sufficient way to describe the data.

Practice Implications

Based on our research, we can make a number of practical recommendations for health care providers and intervention developers regarding the delivery and design of interventions targeting asthma self-care. However, we would like to emphasize that the following recommendations are tentative and require additional research and testing. To maximize the effectiveness of asthma self-care interventions, health care providers could aim to elicit and discuss patients' understanding of their illness and to address any important gaps. Particular attention might be given to patients' beliefs about the identity, cause, controllability, consequences and perceived timeline of the condition. Health care providers could aim to elicit and address patients' concerns about asthma treatment, including stress or anxiety induced symptoms. Health care providers could explore and seek to enhance patients' expectations for asthma control and their motivations to improve asthma control (e.g., by identifying the main source of bother for that patient from living with asthma).

With regard to delivery style, providers should use open-ended questions and other empathy building techniques (e.g., reflective listening, rolling with resistance) to encourage patients to be actively involved in identifying ways to improve their asthma. They should also

tailor the content of consultations to meet individual needs and concerns. Future research is needed to evaluate the long term effectiveness and cost effectiveness of the revised MESH intervention on patient satisfaction and health related outcomes. Further research is needed to explore the processes associated with the maintenance of changes in asthma self-care behaviors following participation in the MESH intervention, and the impact of stress management techniques for people with evidence of stress induced asthma or hyperventilation.

Conclusion

Through our analysis, we were able to develop a revised model of processes of change in asthma self-care behaviors. This includes important interactional as well as psychological processes. In this model we have described the complex interactions that occur between internal patient processes, interactional processes, and patient self-care behavior. The way in which asthma self-care interventions are delivered seems to be equally as important as the intervention content.

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