Patient and provider perspectives on methicillin-resistant *Staphylococcus aureus*: A qualitative assessment of knowledge, beliefs, and behavior

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Background: Methicillin-resistant *Staphylococcus aureus* (MRSA) is a frequent cause of healthcare-associated infection. Individuals with spinal cord injuries and disorders (SCI/D) are at high risk of MRSA colonization and infection. The Department of Veterans Affairs (VA) released guidelines to prevent the spread of MRSA in Veterans with SCI/D; however, available patient educational materials did not address the unique issues for this population.

Objective: To assess perceptions of SCI/D providers and Veterans with SCI/D regarding MRSA and their educational needs about MRSA prevention, with an ultimate goal of developing patient educational materials that address the issues unique to SCI/D.

Methods: Purposive samples of SCI/D providers (six groups) and Veterans with SCI/D (one group) at two VA facilities participated in 60–90-minute focus group sessions. Qualitative data were analyzed using latent content and constant comparative techniques to identify focal themes.

Participants: Thirty-three providers (physicians and nurses working in inpatient, outpatient, and homecare settings) and eight Veterans participated.

Results: Three overarching themes emerged from the analysis: knowledge about MRSA, hand hygiene, and barriers to educating Veterans with SCI/D.

Conclusions: SCI/D providers and Veterans with SCI/D identified gaps in general MRSA knowledge, gaps in knowledge of good hand hygiene practices and of required frequency of hand hygiene, and barriers to educating Veterans with SCI/D during inpatient stays. Future educational materials and strategies should address these gaps.

Keywords: Spinal cord injuries, Veterans, Infectious disease, Paraplegia, Tetraplegia, Hand hygiene, *Staphylococcus aureus*, Methicillin resistant, Patient education, Prevention

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Introduction

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a frequent cause of community- and hospital-acquired

infection in the United States and has been on the rise for the past two decades.¹ In hospitalized patients, MRSA infection increases the risk of in-hospital death, length of stay, and hospital charges.^{2,3} The prevalence of MRSA in hospitalized individuals with spinal cord injury and disorders (SCI/D) is of additional concern, with estimates of MRSA colonization and/or infection ranging from 7.7% to nearly 30% as compared to estimates of 0.2 to 2.8% in other hospitalized patients.⁴⁻⁸

MRSA prevention often involves the bundling of multiple strategies to improve outcomes.⁹ Thus, isolating one bundle component to assess its effectiveness independent of the other components can be difficult.^{10,11} Bundled interventions often include a patient education component¹⁰ and previous studies have identified the importance of MRSA education in preventing MRSA.¹¹⁻¹⁴ To promote desired behavior change, it is necessary to understand knowledge and attitudes of patients toward a particular topic or behavior; several studies have explored these areas.^{13,15-20} Hand hygiene is an integral part of MRSA prevention and it remains one of the easiest and most effective ways in which individuals can prevent the spread of MRSA.²¹⁻²³ Several studies suggest that patient education can not only be used as a tool to increase hand hygiene compliance among patients,^{11,24} but may also be used to empower patients to encourage healthcare workers and others around them to use hand hygiene.^{11,25}

In order to better understand what may be missing from current educational strategies for individuals with SCI/D, it is important to know the existing knowledge, attitudes, beliefs, and behaviors of these individuals as well as for providers who are educating patients. The Theory of Planned Behavior^{26,27} and the Health Belief Model (HBM)^{28,29} propose that future behavior is predicted by past behavior, by attitudes and perceptions, by normative beliefs, by perceived self-efficacy (one's perception of their ability to enact a particular behavior), and the influence of both barriers and facilitators to the desired behavior. Understanding patient and provider perspectives will contribute to the development of educational interventions tailored for individuals with SCI/D.

As a first step toward the development of a revised SCI-specific education, this study was designed to qualitatively assess providers' perceptions and specific behaviors related to current educational practices and educational materials for patients with SCI/D about MRSA prevalence, colonization and prevention; as well as provider perceptions regarding the extent of information regarding prevalence and spread they

believe patients with SCI/D need to know. Exploring provider current practices, beliefs, and their perceived barriers and facilitators to educating patients with SCI/D and the knowledge and attitudes of those patients related to MRSA allows for the identification of existing strengths as well as areas for improvement in the development of MRSA educational materials for patients with SCI/D.

Methods

Study design and setting

This study used a cross-sectional observational design and focus groups conducted with Veterans Affairs (VA) SCI/D providers and Veteran participants with SCI/D (between July and September 2009) at two VA SCI/D centers. Institutional review boards at the two study sites approved this study.

Procedures

Seven focus groups were conducted: four with nurses, two with physicians, and one with Veterans with SCI/D. The focus groups with nurses incorporated a broad range of nursing staff including licensed practical nurses, registered nurses, and Bachelor's-prepared Registered Nurses who work with Veterans with SCI/D. A large number of providers were recruited for the focus groups because it was essential to identify the processes that were being used for educating patients about MRSA, provider perceptions of those processes, as well as the range of MRSA information that providers thought patients needed to know. A larger number of focus groups were conducted with nurses in recognition of their prominent role in patient education. Providers were informally invited to join the focus groups during staff meetings through a study flyer. Interested individuals who contacted the study team directly were sent an informational letter with details about the purpose of the study. Interested providers were subsequently invited to join scheduled focus groups.

A convenience sample of Veteran participants with SCI/D was recruited at one VA facility through posted study flyers. The Veteran focus group was not intended to be a representative sample. Instead, the purpose was to get a general sense of what they knew about MRSA, what they wanted to know about MRSA, and how they preferred to learn about it. They were provided an informational letter at the beginning of the focus group and a facilitator answered questions the patients had prior to starting the focus group discussion.

All focus groups used a similar procedure; beginning with each focus group participant completing a short, anonymous demographic questionnaire. Veteran

participants were asked to describe their level of injury, age at injury, race, marital status, education level, and self-reported history of MRSA. Providers were asked to describe their discipline (e.g. physician or nurse), the care setting in which they worked (inpatient, outpatient, home care, and residential care), and gender. Upon completion of the questionnaire, we received verbal consent from participants and the focus group discussion began; lasting between 60 and 90 minutes. Veterans received a \$10 honorarium for their participation. Providers were not compensated for their participation in this study.

Focus group guides

The research team developed semi-structured focus group guides based on a literature review of relevant MRSA topics^{12–20} such as understanding patient knowledge, awareness, and attitudes toward MRSA and MRSA prevention behaviors such as hand washing. The process also included incorporating subsequent feedback from an expert panel (consisting of experts in infectious disease, patient education, SCI/D medicine, and nursing) and inclusion of any additional topic areas identified by the panel. Separate guides were developed for providers and for Veterans. The provider guide included questions regarding knowledge about MRSA (e.g. perceived severity), perceptions and self-reported use of MRSA prevention strategies, and provider perceptions of Veterans' understanding of MRSA. The patient guide included a similar set of questions regarding knowledge, self-reported behaviors related to MRSA, and perceptions of MRSA prevention strategies (including strategies they use themselves, and those they observe others using). Both groups were also asked about their perceptions of current MRSA educational materials. Providers participated in a general discussion on what information addressing SCI/D risk factors should be included in the brochures, as well as the educational strategies that should be used to convey the information to Veterans with SCI/D, caregivers, and visitors.

Data analysis

Demographic data were summarized for all study participants using descriptive statistics. Audio-recordings were transcribed verbatim and compared with the original recordings to ensure transcription accuracy. All personal identifiers were removed and the transcripts were distributed to the coders.

Transcripts were analyzed in multiple rounds using latent content and constant comparative techniques to organize the content into themes or categories,^{30,31}

which involves deriving basic concepts (themes) from the data and comparing with other data to facilitate meaningful categorization of the themes.^{32,33} This process is fundamentally different from a survey approach in that comments within a certain theme are typically not quantified or reported as a count. The focus groups were independently coded by two members of the research team and the first round of analysis resulted in a list of common thematic categories across the Veteran focus group and provider focus groups. Subsequent rounds of analysis involved the selection and organization of transcript excerpts into these categories, and further refinement of categories as needed based on discussions between the two coders.

Results

Demographics

The seven provider focus groups included a total of 33 providers; 24 nurses and 9 physicians (e.g. Table 1). The providers represented a variety of healthcare settings (i.e. inpatient, outpatient, and homecare), with many working in multiple settings. Eight Veterans with SCI/D participated in the focus group, with most (six Veterans with SCI/D, 75%) reporting tetraplegia (e.g. Table 2).

Focus group findings

There were several areas where gaps emerged including: (1) knowledge about MRSA, (2) communication of patient MRSA status, (3) hand hygiene, and (4) existing barriers to educating Veterans with SCI/D. Descriptions and selected examples of the scope of responses are presented below (e.g. Tables 3–5).

Table 1 Provider demographic characteristics

Composition	N	Percentage
Gender	33	
Female	26	75.8
Male	8	24.2
Provider type	33	
Nurse	24	72.7
Registered Nurse	13	54.2
Bachelor of Science Registered Nurse	7	29.2
Licensed Practical Nurse	4	16.6
Physician	9	27.3
Patient care setting*	32	
Inpatient	15	46.9
Multiple	8	25.0
Residential care	5	15.6
Home care	2	6.3
Outpatient	1	3.1
Other nurse education	1	3.1

*Data missing for one provider.

Table 2 Patient demographic and injury characteristics

Composition	N	Percent
Gender		
Male	8	100.0
Race/ethnicity		
Caucasian	4	50.0
African American	4	50.0
Marital status		
Married	3	37.5
Divorced/separated	3	37.5
Living with a partner	1	12.5
Single/never married	1	12.5
Education		
High school	3	37.5
Some college	2	25.0
Associates degree	0	0.0
Bachelors degree	2	25.0
Graduate degree	1	12.5
Level of injury (self-reported)		
Paraplegia	2	25.0
Tetraplegia	6	75.0
History of MRSA colonization		
Yes had MRSA	2	25.0
Not had MRSA	5	63.5
Unsure	1	12.5

Knowledge about MRSA

The focus groups began by exploring current Veteran and provider knowledge related to MRSA. For Veterans, the discussion focused mainly around general facts and information about MRSA. The

provider discussion began with more general information about MRSA and moved to a broader discussion about specific questions Veterans with SCI/D have about MRSA including: patient knowledge about MRSA, prevention, MRSA status, the need for educational materials that addressed SCI/D-specific risks, hand hygiene, and existing barriers to educating Veterans with SCI/D.

When Veterans with SCI/D were asked, *What do you know about MRSA?*, answers included: “Just thought it was a communicable disease that can be passed on from one person to another”, and “It is supposed to be some form of virus you normally catch in a hospital. But that is all I know about it”, and “It’s a disease that could be transferred between patients when you come in contact with them”.

However, Veterans with SCI/D also had many questions about MRSA. They asked questions like: “What is it? You haven’t told us what it is. How can we tell you something if we don’t know what it stands for?” and “You’re asking us questions, and we don’t know what it is, so how can we ... give you an answer”.

Because so few Veteran participants had a clear understanding of MRSA, facilitators went over some of the topics that were covered in the general educational materials available in VA (including a brief explanation about what MRSA is, what the general risk factors are

Table 3 Knowledge about MRSA

Knowledge about MRSA		
Theme	Group	Relevant quotes
Perceived lack of research evidence on practical information about MRSA	Nurse	‘I was just wondering if there are statistics that show how long [MRSA] ... lives on a surface?’
	Physician	‘We do say things to them, the only thing is, we ourselves are not sure totally. What should we tell them... I tell my patients to be cautious with contact... do this and that. But, suppose they are in [a] diaper, what do they do with [the] diaper? It has to go somewhere, and you don’t know who is collecting it, or things like that. You know, we aren’t sure how to instruct them [with these types of things].’
Perceived severity of MRSA in SCI/D	Patient	‘They have you on isolation for a while, so it must be serious.’
	Nurse	‘Well, most of them are colonized already, so... I guess, the way I look at it, most often have it already. How serious it is, that is hard to say.’
	Physician	‘We have had more people that have had more significant illnesses that staff could see. I think they have a much better appreciation of the seriousness of C. diff than they do for MRSA because they don’t see that a person has been sick because of [MRSA].’

Table 4 Hand hygiene

Hand hygiene		
Theme	Group	Supporting quotes
Hand hygiene for veterans with SCI/D	Nurse	‘I dont know if there is a need for [patients with impaired hand function] to wash their hands because they are not in contact with their bodies (i.e. blowing their nose).’
	Physician	‘No, we don’t teach them hand washing as part of the rehab process.’

Table 5 Barriers to educating veterans

Barriers to educating veterans		
Theme	Group	Supporting quotes
Education about nasal swabbing procedure	Patient	'All I know is that I had two cotton swabs up my nose and no explanation.'
Veterans' understanding of complex health issues	Nurse	'A lot of them are not in the medical or healthcare field, so their level of understanding, you know, how we can relate it to them in laymen's terms or in detailed information, the seriousness of [it].'
Need for specialized educational materials on MRSA for SCI/D	Nurse	'[The MRSA policies] don't take spinal cord and spinal cord problems into consideration.'

for everyone, and what they can do to prevent spreading it). The ensuing discussion indicated that participants were better oriented to be able to discuss different aspects of MRSA (e.g. severity, testing, contact isolation, hand washing, or gloves/gowns) but still reflected their lack of understanding of the connection between these issues/activities. Some Veterans with SCI/D asked: "So you're saying MRSA isn't just for hospitals"? and "Since the beginning of finding MRSA, have they found out that it has grown or mutated into any other strains or anything else like that"? Other questions that emerged were: "[What are the] symptoms [of MRSA]? Overall damages? Or damages as it progresses"? and similarly, "What is the outcome of MRSA or what possible things can come from MRSA"?

There was discussion among the Veterans with SCI/D that indicated that they either did not remember or had not been given information by their providers about MRSA. Representative examples include: "They didn't tell me nothing", and "They told us nothing. That's frustrating". However, providers described situations in which they were unable to answer patients' and/or caregivers' questions, suggesting that dialogue about MRSA between Veterans, caregivers, and providers happens at least some of the time but may also suggest the absence of productive or memorable discussions. For example, a nurse had a caregiver ask: "Can I touch my husband? Can I kiss him"?

Providers also had questions about MRSA such as: "Is it always treated? It's not always treated, right"? [Nurse] and, "Transmission is a risk, but how do we advise them to isolate themselves after they leave [the hospital]"? [Nurse] Providers also described Veterans who had asked questions about transmitting MRSA to their loved ones via direct contact (e.g. holding a grandchild, kissing, hugging, or sleeping with a spouse); but they felt that the lack of available evidence and/or their lack of knowledge about the available evidence prevents them from answering some of these questions. Some comments on this topic from providers included this one from a nurse: "I still don't feel like I have

good answers for some of those questions because of the unknowns". One physician said: "On some level you can answer those questions, but most of them [related to transmission] are hard, we don't know" (e.g. Table 3).

Perceptions of severity of MRSA also came up in both focus groups. An example of a comment from a patient was: "It must be serious because of the certain types of things that they're doing when we come into the hospital" (e.g. Table 3).

During the provider focus groups, there was little-to-no distinction in the discussion between MRSA colonization and MRSA infection. Comments ranged from: "I don't think it is looked at as terminal" [Nurse] and "I appreciate the de-emphasis of the severity of MRSA because being a long-term chronic condition [for persons with SCI/D], [colonization] can go on for ten, twenty years" [Nurse], to "It's a deadly bug" [Nurse] and "It's very serious" [Nurse]. One physician stated: "When it comes to having colonization, I can't tell you whether it is serious or not, so I have to admit I have an education problem when it comes to what we consider colonization versus infection" (e.g. Table 3).

Hand hygiene

Veterans with SCI/D reported that they were confident that their providers were good about washing their hands. Patient comments included: "[providers] put on gown and gloves and they constantly wash their hands with alcohol", and, "they follow procedure pretty good. Even with going to therapy, the therapists, they're constantly [washing their hands] too". When Veterans with SCI/D were asked if they would feel comfortable reminding a provider to wash their hands one patient insisted: "I've never had to remind them [to wash their hands]".

When Veterans with SCI/D discussed their own hand washing practices, they indicated that they wash their own hands very frequently. Comments included: "I always wash my hands, it's just habit" and, "signs are

up all the time reminding you to wash your hands, wash your hands, wash your hands, so we hear that”.

When the providers were asked if they thought Veterans feel comfortable reminding them to wash their hands, one comment was: “Sometimes, the patients are afraid to ask the nurses, the doctors and the caregiver who come in not to start without at least putting on gloves or washing their hands” [Nurse]. Addressing this topic, one nurse suggested: “I think one of the things we definitely need to do is teach our patients how not to be afraid to ask people to wash their hands before they [touch them]”.

Providers noted that there was a difference in the necessity for, and ability to, perform hand hygiene for Veterans with tetraplegia. Provider comments on necessity for hand hygiene included: “I don’t know if there is a need for them to wash their hands because they are not in contact with their bodies” [Nurse], and “a lot of them cannot use their hands, especially the quads” [Nurse] (e.g. Table 4). In the patient focus group one Veteran participant said that: “[sometimes] they think ... that I don’t use my hands, but I feed myself”. One nurse’s comment on ability was: “Paraplegics that are up in the chair and functional, I’ve seen them wash their hands. Like, they will roll under the sink, they can do it themselves”. However, a discussion among providers noted that Veterans with tetraplegia routinely need assistance to have their hands washed and this usually is done: “during A.M. care” [Nurse] but that, “we should probably do it more often that would be good” [Nurse]. When providers were asked if patients ask to have their hands washed more often, one nurse said: “some patients do”.

Barriers to educating veterans with SCI/D

Given the high rates of MRSA colonization in Veterans with SCI/D, providers indicated that they believed that there is a strong need for alternate and improved ways to educate them, to ensure that they really understand how to prevent MRSA transmission and infection. One provider stated: “I think the goal is [to develop] better educational tools, [our] education department is looking at how we can better serve the nurses [to provide better education for the patients]” [Nurse].

Providers indicated that it was sometimes challenging to educate Veterans with SCI/D about complex health information and indicated that it is important to keep an open dialogue and present the information in a manner that is easily understood. Some of the comments from providers were: “I want to just assume that the conversations we have [about MRSA] are being absorbed [and that the Veterans are] digesting it, and if they

have questions, they are free to ask us” [Physician], and “so many [of the existing educational materials] are written so far beyond what [the patients] are capable of understanding. Our patients here need [materials written at] a fifth or sixth grade reading level” [Nurse] (e.g. Table 5).

Providers also reported successful strategies for communicating information to Veterans in their care including using repetition or asking the Veteran to repeat back in their own words or demonstrates that they have absorbed the information. Comments included: “I think we can reiterate what is being taught by bringing out the materials and going over it again” [Nurse], and “You can always ask them to do a demonstration. Once you teach them something, you can ask them to demonstrate it back to you to see if they understand” [Nurse].

At the conclusion of the focus groups, we provided the participants with copies of the current brochures on MRSA testing and prevention being used at their respective facilities. Direct reflection on the existing educational materials revealed that providers felt that materials to address SCI/D risk factors were important. One nurse stated: “You want to put spinal cord injury in here somewhere, because if they don’t see their population there, they think it doesn’t apply [to them]” (e.g. Table 5).

Further discussion on the existing materials revealed that providers felt some of the current educational materials/brochures had too much information in a short amount of space and that the materials were too detailed. Comments included: “Wait, there are too many words? I think that is it. I mean, I think it has to get to the point so that you can just read it, just one blurb” [Physician], and “I think all of the brochures are probably too wordy for initial educational sessions with patients” [Nurse]. This prompted a more general discussion about MRSA education, in which providers stated that educational materials for MRSA should be simple and brief. Comments included: “you have to make it as simple as possible, we can’t use all the big terms”, and “So, if it’s simple, I think [using] the basic rule of disseminating information with brochures would be good: what is it? How does it infect me? What do I do?” [Nurse]

Providers also discussed potential strategies for conveying the information in ways that increased Veterans’ ability to understand the information, especially for those who tested positive for MRSA at admission. A number of providers discussed the need for Veterans with SCI/D to hear about MRSA from many different sources, using multiple methods. Several strategies were mentioned by providers including

using closed-circuit television in the hospital to run short infomercials on MRSA, the use of Veteran group discussions, as well as one-on-one education with a provider about MRSA. Several providers stated that Veterans with SCI/D and caregivers would benefit from individualized education about MRSA especially after they have tested positive. Comments included: “after they get a positive screening, they should have somebody come sit down and say, “hey, you tested positive, let me tell you what this is” [Nurse]. Veterans with SCI/D expressed interest in receiving information at the time of the MRSA test as well. One Veteran said: “They should give us a pamphlet. [So] we’ll have an idea, you know, what they’re doing swabbing our nose”.

Discussion

The primary purpose of the focus groups with Veterans with SCI/D and their providers was to gain insight into what Veterans with SCI/D understood about MRSA and to discuss with clinicians (1) what were their current practices and the barriers and facilitators to educating patients, (2) what they felt patients need to know about MRSA, and (3) what was the best way to impart this knowledge. We had systematic, wide-ranging, and comprehensive discussions with a diverse group of stakeholders. We identified gaps in MRSA educational materials and prevention strategies and identified ways to address these gaps via content and delivery of an MRSA educational intervention that will be tested in future studies.

Important topics for Veterans with SCI/D

One of our primary goals of this study was to identify the topics that SCI/D providers felt patients with SCI/D needed to know about MRSA, and determine the gaps that existed in the currently available educational materials. Two key areas identified by providers as gaps included needing additional information on SCI/D-specific risk factors for getting MRSA and information on caring for wounds or pressure ulcers. Many of these topics are specific for this population and provide highly relevant and customized information to these patients. In response to this need, the study team created two educational sections dedicated to these topics (i.e. risk factors such as contact with bodily fluids through the use of catheters and self-care that requires wound dressing changes).

Educational modality

Beyond the gaps in topic areas that should be covered during education about MRSA, we discovered that the

modality of delivering the education might be negatively contributing to patient learning and should be revamped. Patients indicated interest in having more information about MRSA; however, providers suggested patients often seem disengaged and uninterested in receiving information about MRSA. While this statement is a broad summation, this point is critically important. We did not observe a lack of interest or desire from patients to learn more about MRSA. Providers indicated they had great interest in providing patients with education. Therefore, we posit that a means for making the connection to share this information between patients and providers is part of the problem that contributes to the current gaps.

In response to these findings, the study team created an educational strategy that included a flip chart to be used as a visual cue and also included talking points for the nurses to facilitate discussion. This educational strategy encourages both the provider and the patient to engage in conversation which is essential to active learning and ensures that patients both understand and are able to apply the information in their own situation.

Patient activation

There is literature that shows that hand hygiene is one of the most effective ways to prevent the spread of infectious organisms when done appropriately.^{34,35}

As a result of these findings, the study team developed materials that included basic information on hand hygiene, but also tailored information for patients with SCI/D. It also encouraged the patient to act as their own advocate for hand hygiene, encouraged the patient to ask for assistance if they cannot wash their hands themselves, and provided detailed information on how to ensure that hand hygiene by others was properly performed. Since hand hygiene is such an important component of MRSA prevention, we also developed a hand hygiene checklist which requires the patient to demonstrate their hand hygiene technique to a nurse. This demonstration provides an opportunity for the nurse to both reinforce the idea that hand hygiene is important but also to identify areas where a patient’s hand hygiene technique might be lacking. This is an effective strategy, especially in populations with low health literacy.

In addition to encouraging and empowering the patient to do hand hygiene, the educational materials also encouraged patients to actively engage with their provider by asking about their MRSA status. Providing patients with opportunities for and encouragement of active engagement will increase the

likelihood of knowledge retention and positive behavior change over time.

Barriers to educating veterans with SCI/D

Despite the high prevalence of MRSA colonization in Veterans with SCI/D, Veterans in our study described themselves as having little-to-no basic knowledge or understanding of MRSA colonization or infection and of their own status. Barriers identified over the course of the focus groups indicated the need for targeted materials, covering both basic and population-specific topics, with an easy-to-understand message delivered in a consistent and engaging manner that also provided the patient with a clear way to meaningfully engage with their providers about MRSA prevention behaviors.

Identifying barriers to patient education was essential in developing an educational intervention that can be incorporated into clinical practice. Our educational intervention was developed with sensitivity to the barriers that may be encountered while trying to implement it and provides some flexibility to help combat those barriers.

Clinical application

We used the study findings and recommendations about populations with low health literacy^{34,35} to develop an educational intervention and adapted the staff training strategy of return demonstration of skill for patient education,³⁶ both of which may result in more effective comprehension and retention of the information by the patient.^{36,37} The intervention addresses some of the barriers to educating Veterans with SCI/D we identified in this study. Topics covered in the educational intervention includes basic information about MRSA, risk factors for persons with SCI/D, things the patient can do to prevent the spread of MRSA, instructions on proper hand hygiene, and information about caring for wounds. A return demonstration of skill component is included covering five key facts the patient should remember from the education as well as a hand hygiene demonstration.

Limitations

There are several limitations to this qualitative study. Focus groups for both providers and Veterans with SCI/D were small due to the limited time frame of the study; future studies may consider larger samples. Additionally, focus groups generally do not allow for examination of the frequency or magnitude of the views expressed among participants. Many issues that emerged, as noted, appeared to resonate across all participant groups, yet each group contributed unique

perspectives. This study focused on participants in the VA SCI/D system of care and issues for MRSA prevention in Veterans with SCI/D, so it is unclear if the findings can be generalized to the private sector or the general population. Future studies may wish to consider including other health care systems as well as other health care professionals, such as therapists and medical technicians to obtain additional insights regarding MRSA prevention among those with SCI/D. Finally, future studies may also wish to include family and other informal caregivers of individuals with SCI/D to obtain additional insights regarding information needs related to MRSA.

Conclusions

Our data indicate that educational messages designed to increase knowledge related to MRSA and MRSA prevention are needed, and that materials designed to address issues specific to the SCI/D population are lacking. Our results further suggest that given the life-long nature of SCI/D (and its associated risks); educational strategies and materials should focus on increasing knowledge about MRSA and MRSA prevention for Veterans with SCI/D, providers, and caregivers. Our results support National Institute of Health recommendations that educational materials and strategies for complex problems like MRSA prevention and treatment must take literacy levels and comprehension into account and should focus on information retention.³²

Educating Veterans with SCI/D about MRSA prevention is complex and involves a variety of stakeholder groups (Veterans with SCI/D, providers, and caregivers), in different settings (SCI/D unit, other acute care units in the hospital, nursing home, and the community). Providing factual information that supports understanding and retention of information about MRSA is vital to patient and provider comprehension. Improving comprehension of information pertaining to MRSA will promote better prevention strategies for reducing MRSA colonization and infection in Veterans with SCI/D. Our ongoing collaborative efforts with our partners in the VA Office of SCI/D Services strengthens our ability to ensure that the findings of this project will be used to further VA efforts in reducing MRSA colonization and infection in Veterans with SCI/D.

Acknowledgements

Funding for this project was provided by the Department of Veterans Affairs, Office of Research & Development, Health Sciences Research and

Development Service, Quality Enhancement Research Initiative (RRP 09-125).

References

- Centers for Disease Control and Prevention. National Nosocomial Infections Surveillance (NNIS) System Report, data summary from January 1992 to June 2004. *Am J Infect Control* 2004;32:470–85.
- Kuehnert MJ, Hill HA, Kupronis BA, Tokars JJ, Solomon SL, Jernigan DB. Methicillin-resistant-*Staphylococcus aureus* hospitalizations, United States. *Emerg Infect Dis* 2005;11(6):868–72.
- Elixhauser A, Steiner C. Infections with methicillin-resistant *Staphylococcus aureus* (MRSA) in US Hospitals, 1993–2005. 2007 April Report No.: HCUP Statistical Brief #35.
- Maeder K, Ginunas VJ, Montgomerie JZ, Canawati HN. Methicillin-resistant *Staphylococcus aureus* (MRSA) colonization in patients with spinal cord injury. *Paraplegia* 1993;31(10):639–44.
- Mylotte JM, Kahler L, Graham R, Young L, Goodnough S. Prospective surveillance for antibiotic-resistant organisms in patients with spinal cord injury admitted to an acute rehabilitation unit. *Am J Infect Control* 2000;28(4):291–7.
- Evans CT, LaVela SL, Weaver FM, Priebe M, Sanford P, Niemiec P, et al. Epidemiology of hospital-acquired infections in veterans with spinal cord injury and disorder. *Infect Control Hosp Epidemiol* 2008;29(3):234–42.
- Gorwitz RJ, Kruszon-Moran D, McAllister SK, McQuillan G, McDougal LK, Fosheim GE, et al. Changes in the prevalence of nasal colonization with *Staphylococcus aureus* in the United States, 2001–2004. *J Infect Dis* 2008;197(9):1226–34.
- Frazee BW, Lynn J, Charlebois ED, Lambert L, Lowery D, Perdreau-Remington F. High prevalence of methicillin-resistant *Staphylococcus aureus* in emergency department skin and soft tissue infections. *Ann Emerg Med* 2005;45(3):311–20.
- Aboelela SW, Stone PW, Larson EL. Effectiveness of bundled behavioural interventions to control healthcare-associated infections: a systematic review of the literature. *J Hosp Infect* 2007;66(2):101–8.
- Jain R, Kralovic SM, Evans ME, Ambrose M, Simbartl LA, Obrosky DS, et al. Veterans affairs initiative to prevent methicillin-resistant *Staphylococcus aureus* infections. *N Engl J Med* 2011;364(15):1419–30.
- Tisinger CK. Empowering your patients in the fight against methicillin-resistant *Staphylococcus aureus*. *J Am Acad Nurse Pract* 2008;20(4):204–11.
- Noble DB. Patient education on MRSA prevention and management: the nurse's vital role. *Medsurg Nurs* 2009;18(6):375–8.
- Gould DJ, Drey NS, Millar M, Wilks M, Chamney M. Patients and the public: knowledge, sources of information and perceptions about healthcare-associated infection. *J Hosp Infect* 2009;72(1):1–8.
- McBrien S, Felizardo GR, Orr DG, Raymond MJ. Using focus groups to revise an educational booklet for people living with methicillin-resistant *Staphylococcus aureus* (MRSA). *Health Promot Pract* 2008;9(1):19–28.
- Criddle P, Potter J. Exploring patients' views on colonisation with methicillin-resistant *Staphylococcus aureus*. *Br J Infect Control* 2006;7(24):24–8.
- Gill J, Kumar R, Todd J, Wiskin C. Methicillin-resistant *Staphylococcus aureus*: awareness and perceptions. *J Hosp Infect* 2006;62(3):333–7.
- Hamour SM, O'Bichere A, Peters JL, McDonald PJ. Patient perceptions of MRSA. *Ann R Coll Surg Engl* 2003;85(2):123–5.
- Jolley S. Assessing patients' knowledge a fears about MRSA infection. *Nurs Times* 2008;104(27):32.
- Newton JT, Constable D, Senior V. Patients' perceptions of methicillin-resistant *Staphylococcus aureus* and source isolation: a qualitative analysis of source-isolated patients. *J Hosp Infect* 2001;48(4):275–80.
- Brooks L, Shaw A, Sharp D, Hay AD. Towards a better understanding of patients' perspectives of antibiotic resistance and MRSA: a qualitative study. *Fam Pract* 2008;25(5):341–8.
- Trick WE, Vernon MO, Welbel SF, Demarais P, Hayden MK, Weinstein RA. Multicenter intervention program to increase adherence to hand hygiene recommendations and glove use and to reduce the incidence of antimicrobial resistance. *Infect Control Hosp Epidemiol* 2007;28(1):42–9.
- Girou E, Legrand P, Soing-Altrach S, Lemire A, Poulain C, Allaire A, et al. Association between hand hygiene compliance and methicillin-resistant *Staphylococcus aureus* prevalence in a French rehabilitation hospital. *Infect Control Hosp Epidemiol* 2006;27(10):1128–30.
- Johnson PDR, Martin R, Burrell LJ, Grabsch EA, Kirsas SW, O'Keefe J, et al. Efficacy of an alcohol/chlorhexidine hand hygiene program in a hospital with high rates of nosocomial methicillin-resistant *Staphylococcus aureus* (MRSA) infection. *Med J Aust* 2005;183(10):509–14.
- McGuckin M, Taylor A, Martin V, Porten L, Salcido R. Evaluation of a patient education model for increasing hand hygiene compliance in an inpatient rehabilitation unit. *Am J Infect Control* 2004;32(4):235–8.
- McGuckin M, Waterman R, Portena L, Belloa S, Caruso M, Juzaitis B, et al. Patient education model for increasing handwashing compliance. *Am J Infect Control* 1999;27(4):309–14.
- Ajzen I. Theory of planned behavior. *Organ Behav Hum Dec Process* 1981;50:179–211.
- Godin G, Kok G. The theory of planned behavior: a review of its applications to health-related behaviors. *Am J Health Promot* 1996;11(2):87–98.
- Becker M. The health belief model and personal health behavior. *Health Educ Monogr* 1974;2:324–54.
- Rosenstock IM. The health belief model and preventive health behavior. *Health Educ Monogr* 1974;2(354):386.
- Neuendorf KA. The content analysis guidebook. Thousand Oaks, CA: Sage Publications; 2002.
- Strauss AC, Corbin JM. Basics of qualitative research: grounded theory procedures and techniques. Newbury Park, CA: Sage; 2011.
- Glaser B, Strauss AL. The discovery of grounded theory. Chicago: Aldine Publishing Company; 1967.
- Lincoln YS, Guba EG. Naturalistic inquiry. Newbury Park: Sage Publications; 1985.
- Centers for Disease Control and Prevention. National MRSA Education Initiative: Preventing MRSA Skin Infections. Centers for Disease Control and Prevention 2008 [accessed 2012 Jun 22]. Available from: <http://www.cdc.gov/mrsa..>
- Entwistle VA, Mello MM, Brennan TA. Advising patients about patient safety: current initiatives risk shifting responsibility. *Jt Comm J Qual Patient Saf* 2005;31(9):483–94.
- National Institute of Health. Making Health Communication Programs Work. 2008 April 2.
- Houts PS, Doak CC, Doak LG, Loscalzo MJ. The role of pictures in improving health communication: a review of research on attention, comprehension, recall, and adherence. *Patient Educ Couns* 2006;61(2):170–90.