CRITICALLY APPRAISED TOPIC

FOCUSED CLINICAL QUESTION

For a 20-year-old male patient low education level and complete tetraplegia from a traumatic SCI, is health-literacy conscious patient education materials on SCI more effective for patient learning than current standard of care (with medical terminology)?

AUTHOR

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CLINICAL SCENARIO

CK is a 20-year-old male patient with C5 complete tetraplegia secondary to a gunshot wound to the neck, admitted to acute inpatient rehab 2 months post-injury. He presents with an injury classified as ASIA A, level C5. His injury is functionally complete with use of biceps (C5) on the left side and write extensors (C6) on the right side. His impaired sensation, reliance on a power wheelchair, and limited use of his upper extremities requires him to have assistance to complete activities of daily living.

He has an excellent support system during both recovery in the hospital with his girlfriend and at his discharge location with his mother and sisters as carepartners. Since his mother and sisters are busy during the day and cannot be present during rehab time, CK is responsible for learning how to direct his care for mobility. He is also responsible for learning about his injury, as well as the complications and comorbidities that occur as a result, so that he can be prepared for adverse events such as autonomic dysreflexia, which is life threatening.

Due to his lower level of education, he had a difficult time understanding education on the anatomy and physiology of an SCI, how it affected his long-term function, and what medical complications could occur as a result. He attended classes taught by Nurses, Physical Therapists and Occupational Therapists that used education materials with language that he did not understand. The information in class did not make sense and did not seem relevant at the time; however, would be more important for after discharge. The "standard of care" education was not an effective intervention to prepare this patient for home.

SUMMARY OF SEARCH

[Best evidence appraised and key findings]

- 8 articles relevant to the PICO question that met the inclusion and exclusion criteria were identified from the search. Articles included 2 literature reviews, 2 randomized controlled trials, 2 single-group repeated measure, 1 quasi-experimental, and 1 qualitative design.
- No study specifically compared health-literacy conscious patient education with standard of care (SOC) education. However, the studies that were chosen examined either effectiveness of SOC education alone, or better-than-SOC education in the form of peer education, individualized education, problem-solving education, etc.
- There is some low-level evidence to support better-than-SOC education will improve knowledge, learning, and other health outcomes; however, little evidence to show that better-than-SOC education is superior to SOC education.
- Overall, there is little available evidence examining patient education as a treatment for individuals with SCI and available studies use poor research methodology that are subject to bias.

CLINICAL BOTTOM LINE

There is little evidence to support the theory that SOC education (with medical terminology) can be improved with methods such as individualized education, problem-solving education, or peer-based education. However, all currently available evidence is from poorly designed and executed studies. It would not be harmful to the patient to use methods described in the literature, as it may improve the experience and knowledge of CK before discharge.

This critically appraised topic has been individually prepared as part of a course requirement and has been peer-reviewed by one other independent course instructor

The above information should fit onto the first page of your CAT

SEARCH STRATEGY

Terms used to guide the search strategy			
Patient/Client Group	**I**ntervention (or Assessment)	**C**omparison	**O**utcome(s)
Spinal Cord Injur* Tetrapleg* Quadripleg*	Health Literacy Information Literacy Patient Education Health Education Learning style	Standard of care Usual care Medical Terminology	Learning Comprehension Understanding

Final search strategy (history):

Show your final search strategy (full history) from PubMed. Indicate which "line" you chose as the final search strategy.

1. (((((spinal cord injury[MeSH Terms]) OR ((Spinal Cord Injur* OR tetrapleg* OR quadripleg* OR spinal cord ischemi*)))) AND ((((Health Literacy OR Information Literacy))) AND ((patient education[MeSH Terms]) OR ((Patient Education OR Health Education))))) AND ((Standard of care OR usual care OR medical terminology))) AND ((Learning OR Comprehension OR Understanding))
2. ((((spinal cord injury[MeSH Terms]) OR ((Spinal Cord Injur* OR tetrapleg* OR quadripleg* OR spinal cord ischemi*)))) AND ((((Health Literacy OR Information Literacy))) AND ((patient education[MeSH Terms]) OR ((Patient Education OR Health Education))))) AND ((Learning OR Comprehension OR Understanding))
3. **((((spinal cord injury[MeSH Terms]) OR ((Spinal Cord Injur* OR tetrapleg* OR quadripleg* OR spinal cord ischemi*)))) AND ((patient education[MeSH Terms]) OR ((Patient Education OR Health Education)))) AND ((Learning OR Comprehension OR Understanding))**
4. ((((spinal cord injury[MeSH Terms]) OR ((Spinal Cord Injur* OR tetrapleg* OR quadripleg* OR spinal cord ischemi*)))) AND ((Health Literacy OR Information Literacy))) AND ((Learning OR Comprehension OR Understanding))
5. ((((spinal cord injury[MeSH Terms]) OR ((Spinal Cord Injur* OR tetrapleg* OR quadripleg* OR spinal cord ischemi*)))) AND ((((Health Literacy OR Information Literacy))) AND ((patient education[MeSH Terms]) OR ((Patient Education OR Health Education))))) AND ((Standard of care OR usual care OR medical terminology))
6. (((((spinal cord injury[MeSH Terms]) OR ((Spinal Cord Injur* OR tetrapleg* OR quadripleg* OR spinal cord ischemi*)))) AND ((((Health Literacy OR Information Literacy))) AND ((patient education[MeSH Terms]) OR ((Patient Education OR Health Education))))))

In the table below, show how many results you got from your search from each database you searched.

Databases and Sites Searched	**Number of results**	**Limits applied, revised number of results (if applicable)**
Pubmed, search history above	136 results, 7 relevant articles	Removed comparison of "Standard of care OR usual care OR medical terminology" and broadened search by removing "Health Literacy OR Information Literacy"
CINAHL ((((spinal cord injury[MeSH Terms]) OR ((Spinal Cord Injur* OR tetrapleg* OR quadripleg* OR spinal cord ischemi*)))) AND ((patient education[MeSH Terms]) OR ((Patient Education OR Health Education)))) AND ((Learning OR Comprehension OR Understanding))	58 results, 8 relevant articles	Removed comparison of "Standard of care OR usual care OR medical terminology" and broadened search by removing "Health Literacy OR Information Literacy"
Cochrane (spinal cord injury OR quadripleg* OR tetrapleg*) AND (patient education or health education) AND (health outcome* or learn* or	75 results, 4 relevant articles	Removed comparison of "Standard of care OR usual care OR medical terminology" and broadened search

understand*) in Title Abstract Keyword - (Word variations have been searched)		by removing "Health Literacy OR Information Literacy"
PEDro Title: Spinal Cord Injury Therapy: Education Subdiscipline: Neurology	32 results, 3 relevant articles	Modified search for PEDro search function
Web of Science (spinal cord injury OR tetrapleg* or quadripleg*) AND (patient education OR health education) AND (health literacy or information literacy) AND (learn* OR knowledge OR comprehension)	6 results, 1 relevant article	Removed comparison of "Standard of care OR usual care OR medical terminology" and broadened search by removing "Health Literacy OR Information Literacy"

INCLUSION and EXCLUSION CRITERIA

Inclusion Criteria
- Patient with SCI or spinal related injury causing tetraplegia or paraplegia - Includes education as an intervention, preferably better-than-SOC patient education, such as peer education, individualized education, or problem-solving based education - Includes outcome examining effectiveness of education - Potential study types include RCTs, Qualitative Studies, Systemic Reviews, Meta Analyses, Case Studies, Case Series, Clinical Trials, etc. to synthesize the best available evidence for comparison
Exclusion Criteria
- Not published or translated into English - Pediatric patients - Patients with cognitive deficits

RESULTS OF SEARCH

Summary of articles retrieved that met inclusion and exclusion criteria

For each article being considered for inclusion in the CAT, score for methodological quality on an appropriate scale, categorize the level of evidence, indicate whether the relevance of the study PICO to your PICO is high/mod/low, and note the study design (e.g., RCT, systematic review, case study).

Author (Year)	Risk of bias (quality score)*	Level of Evidence**	Relevance	Study design
Bernet (2019)[1]	**CASP Qualitative Checklist** (no scoring system): -6 "Yes" -3 "Can't Tell" -1 "No"	2b (due to small sample size, selection bias, and differences between 2 administrator's interviews)	Low	Qualitative
Gélis (2011)[2]	**AMSTAR Score:** 3 points	1a	Moderate	Systematic Review
Chaffey (2017)[3]	**AMSTAR Score:** 5 points	1a	High (studies of PE with peer mentor educators)	Systematic/ Scoping Review
Gassaway (2019)[4]	**Downs and Black**	4 (poor quality cohort study)	High	Quasi Experimental

	Checklist: 15/29 points			
Schubart (2012)[5]	**Downs and Black Checklist:** 13/29 points	4 (poor quality cohort study)	High	Pre and post single group pilot test
Rintala (2008)[6]	**PEDro Scale:** 5 points	2b (<80% follow up)	Moderate (outcome measure was heavily influenced by confounding factors)	RCT
Evans (2014)[7]	**PEDro Scale:** 8 points	1b	High (individualized MRSA ed vs standard of care ed)	RCT
May (2006)[8]	**Downs and Black Checklist:** 18/29 points	4 (poor quality cohort study)	Moderate	One group repeated measure design

BEST EVIDENCE

The following 2 studies were identified as the 'best' evidence and selected for critical appraisal. Rationale for selecting these studies were:

- **Chaffey et al. (2017)**[3]

  Overall, Chaffey et al. examined the research focusing on peer-delivered patient education in a scoping review that was conducted to map relevant literature in a particular field of interest rather than assess quality of studies. Due to the nature of the broad search for literature, it did not score well on the AMSTAR Systematic review checklist. Much of the research examined different constructs related to patient learning (quality of life, attitudes toward subject matter, etc.) in order to assess effectiveness of the intervention, making it difficult to compare studies. The meta-analysis criteria in the AMSTAR was not applicable, and thus the study scored lower, due to the inconsistent outcomes across studies. The studies themselves included a variety of poorly designed and uncontrolled quasi-experimental, pre-and-post treatment and qualitative research. However, after examining the search results that answered my PICO question, the evidence available were not good quality overall, so it was more helpful to examine multiple poor-quality studies together, rather than separately. The outcomes examined by the studies included as a whole indirectly measure the effectiveness of PE, looking at measures such as quality of life, self-efficacy, medical complications, and community engagement. This is relevant to the PICO question because the research was focused on individuals with SCI, with patient education as an intervention, had outcome measures measuring effect of patient education, and was focused on patient education that was better than standard of care.

- **Evans et al. (2014)**[7]

  Evans et al. was a randomized controlled trial (RCT) evaluating the feasibility and effectiveness of an individualized education program for patients with SCI, to teach them about MRSA. The study scored 8/11 points on the PEDro Scale for RCTs, with points taken off for lack of blinding educators, lack of blinding outcome administrators, and lack of intent to treat. The measures used to evaluate the program included a multiple-choice test and two surveys examining change in behavior. There was a large potential for bias in the administration of the education and outcomes, as the educators and assessors were not blinded to group allocation. Once again, it is also difficult to examine construct validity of results between groups when the measures used during this study are unvalidated with unknown psychometric properties. This study can be classified as 1b level evidence, with >80% follow up; however, the reported confidence intervals were wide for the between group differences in all the outcomes. This study is highly significant to the PICO question, as it compares the standard of care education in the VA to individualized MRSA education delivered by a nurse.

SUMMARY OF BEST EVIDENCE

(1) Description and appraisal of **"Health Education by Peers with Spinal Cord Injury: A Scoping Review"** by **Chaffey, 2017**[3]

Aim/Objective of the Study/Systematic Review:
The objective of this scoping review was to examine studies that have used peer education programs to address health education in adults with SCI.
Study Design [e.g., systematic review, cohort, randomised controlled trial, qualitative study, grounded theory. Includes information about study characteristics such as blinding and allocation concealment. When were outcomes measured, if relevant] Note: For systematic review, use headings 'search strategy', 'selection criteria', 'methods' etc. For qualitative studies, identify data collection/analyses methods.
Chaffey et al. is a "scoping review" without meta-analysis and the goal of examining, as opposed to appraising, relevant literature. **Search Strategy:** Three steps determined studies included in the scoping review. Firstly, electronic data bases (CINHL, Medline, Embase, Informit Health, and Pubmed) were searched with the search terms: • Spinal Cord Injury, SCI, spinal injury, parapleg*, tetrapleg*, quadripleg* • Health, health knowledge, health literacy, health promotion • Peer counseling, mentorship, peer support, peer train*, mentor*, peer educat*, peer led, peer based Similar terms were combined with "OR" and all sets of terms were combined together with "AND." The search was limited to articles published between 2000-2015. The authors also searched relevant articles found in the references of chosen articles as well as grey literature from SCI organizations. In the second step, the authors obtained articles that seemed relevant to the author's objectives, based on abstracts. In the third step, studies were selected using the inclusion and exclusion criteria: **Selection Criteria:** Authors selected 8 studies, 5 with qualitative synthesis and 3 with quantitative synthesis to include in the scoping review based on the following criteria: Inclusion: • Published in English, between the years of 2000-2015 • Must include a description of the program design, focused on just the health education programs or programs that included peers as an aspect of the program Exclusion: • Literature reviews, case descriptions, or opinion pieces • Studies that included informal peer mentoring or support without education
Setting [e.g., locations such as hospital, community; rural; metropolitan; country]
Studies included in this review were conducted in the UK, Uganda, Canada, Malawi, and the USA. Settings included hospitals, phone conferences, participant homes, support groups, and a peer training camp.
Participants [N, diagnosis, eligibility criteria, how recruited, type of sample (e.g., purposive, random), key demographics such as mean age, gender, duration of illness/disease, and if groups in an RCT were comparable at baseline on key demographic variables; number of dropouts if relevant, number available for follow-up] Note: This is not a list of the inclusion and exclusion criteria. This is a description of the actual sample that participated in the study. You can find this descriptive information in the text and tables in the article.
The scoping review examined 8 studies including four qualitative designs (1 qualitative action research with mixed methods), 1 phenomenology study, 1 pre-post-test, 1 quasi-experimental non-controlled pre-test/post-test and 1 longitudinal descriptive design. All studies assessed programs for individuals with SCI,

either newly acquired or chronic. In the research examining programs for acute SCI, 3 studies used hospital-based programs and 1 study began peer support upon discharge. In research examining programs for chronic SCI, 2 studies included programs in low and middle income countries (Uganda and Malawi), 1 program was conducted in the participants homes, while another was over the phone. Between the 8 studies, there were 137 participants total (53 male, 29 female, 55 unreported sex) with a large range of adult and older adults ages, when reported.

Intervention Investigated

[Provide details of methods, who provided treatment, when and where, how many hours of treatment provided]

Control

None of the 8 studies included control groups.

Experimental

Peer educators were the only source of education in 4 out of the 8 programs studied, with the peer educators as only part of the education program in the other 4.

- 3 studies focused on hospital-based programs, with peer education as a component of the patient education. Peer mentors helped ease adjustment to new life circumstances, offered wisdom regarding past experiences, problem solved, and role modeled.
- 1 study conducted a peer education program that was available to participants after hospital discharge, the timing of this program focused on cognitive behavioral intervention to address patients' personal goals or medical complications.
- 1 study examined a peer support program over the phone, with health education and discussion of personal experiences regarding topics chosen by the group (equipment, home renovations, relationships, self-care, physical activity, weight control, etc.)
- 1 study included a program with a home-based peer mentor personal trainer that focused on strength training, self-efficacy, and fitness-related behaviors
- The final 2 studies examined the same program conducted in two different low-income countries. The program consisted of a 1 week course taught by peer educators with SCI regarding topics like wheelchair skills, transfers, bowel and bladder, skin care, sexuality and relationships, etc.)

Outcome Measures

[Give details of each measure, maximum possible score and range for each measure, administered by whom, where]

Outcomes for these studies looked to measure data and constructs surrounding participant satisfaction with programs, perceived topics learned, self-efficacy, secondary complications, adjustment, and quality of life (QOL). Outcomes for the 8 studies included:

- Semi-structured individual interviews (3)
- Hospital admission data
- Focus group qualitative data (2; 1 in person and 1 over telephone)
- Leisure Time Physical Activity Questionnaire for People with SCI
- Self-reported participant satisfaction
- Generalized Perceived Self-Efficacy Scale
- Self-reported data to peer mentors regarding medical complications, depression, anxiety, rehospitalizations, physician visits
- Hope Scale and Herth Hope Scale
- Positive and Negative Affect Scale
- Life Satisfaction Survey
- MOS SF-36

Main Findings

[Provide summary of mean scores/mean differences/treatment effect, 95% confidence intervals and p-values etc., where provided; you may calculate your own values if necessary/applicable. You may summarize results in a table but you must explain the results with some narrative.]

The qualitative data from the studies reviewed found that participants reported positive experiences. A variety of outcome measures found positive changes regarding participant's hope, adjustment, quality of life, and self-efficacy. The studies that examined medical complications found a decreased occurrence with peer education. Health outcomes improved after all peer education programs in the two studies that used this outcome, with reduced rates of medical complications and hospitalizations. All the included studies reported improvements with constructs surrounding self-confidence and self-belief for participants, improving health-related quality of life post-discharge.

Original Authors' Conclusions

[Paraphrase as required. If providing a direct quote, add page number]

Programs with peer education are a "promising" (pg.151) approach to improving patient education for individuals with SCI, with improvements in self-efficacy for managing personal health. Few studies were located examining this topic, with peers' roles differing depending on the program.

Critical Appraisal

Validity

[Summarize the internal and external validity of the study. Highlight key strengths and weaknesses. Comment on the overall evidence quality provided by this study.]

AMSTAR Score: 6/11; (1) priori design provided: yes; (2) two independent data extractors: no; (3) comprehensive search: yes; (4) grey literature: yes; (5) list of studies: yes; (6) characteristics of studies: yes; (7) quality assessment: no; (8) quality assessment used in conclusions: no; (9) appropriate methods to combine studies: NA; (10) publication bias assessed: NA; (11) conflict of interest stated; yes.

Strengths:

- **Comprehensive Search Strategy**: 5 Electronic data bases were searched (CINAHL, Medline, Embase, Informit Health, and PubMed). Search terms encompassed multiple types of SCI and peer education, using appropriate synonyms. Articles were limited to after the year 2000 in order to focus on more recent research.
- **Lack of Publication Bias**: The authors examined references of articles found and grey literature from SCI organizations. Articles were limited to those published in English; however, the review included studies conducted in low-income countries such as Uganda and Malawi.
- **Discussion of Results:** Authors organized and summarized the results of the 8 articles well, despite the differences in study designs and outcome measures. Table 1: Summary of Reviewed Articles, gave a broad overview of information and allowed comparison of key aspects studies.
- **Best Available Evidence:** Although studies included were poorly conducted and designed, the authors included the best available evidence relevant to the objective of their study.

Weaknesses:

- **Selection Bias:** Only one independent searcher and data extractor.
- **Lack of Quality Assessment:** Quality of studies was not evaluated by the author due to the nature of a "scoping review" as opposed to a "systematic review." The authors did not determine the quality of the evidence or risk of bias in the studies when evaluating results.
- **Comparison of Included Studies:** Studies chosen all include different designs, peers play varying roles in education, and studies use different outcome measures used to assess effectiveness. The large variation in measures and lack of quantitative data make calculating effect size impossible.
- **Weak Internal Validity:** Studies included in this scoping review do not include control groups, limiting the knowledge on the effectiveness of the independent variable (peer education) on the dependent variable (outcomes).
- **Discussion of Limitations:** The authors did not include a section on the limitations of their study design.
- **External Validity:** Due to the studies poor internal validity, it cannot be generalized to a larger population and also demonstrates poor external validity.

Overall Evidence Quality: This review includes low quality evidence.

Interpretation of Results

[This is YOUR interpretation of the results taking into consideration the strengths and limitations as you discussed above. Please comment on clinical significance of effect size / study findings. Describe in your own words what the results mean.]

This scoping review provides low quality evidence for the inclusion of peer mentor education in the recovery from SCI at different stages. The results of this study are preliminary due to the limited amount of evidence available; however, the evidence presented has low internal validity with a lack of control group and blinding. Due to the nature of the self-proclaimed "scoping review" the author did not attempt to appraise the available evidence or discuss the strengths and weaknesses of the included articles. The author also did not include a section evaluating the limitations of their own review, further decreasing the internal validity.

The participants included in these studies were representative of the wide variety of individuals with SCI. The studies also included the intervention that was being examined in multiple settings and during a variety of different times during recovery, ranging from acute to chronic. Since the participants are representative of this population at multiple times of recovery, it is unfortunate that the studies included are not internally valid, as they cannot be externally valid and generalizable.

The search strategy the authors used was sound, although the methods of choosing articles to include would have demonstrated less selection bias with a second searcher. The evidence provided was the highest quality available when the article was published, and further research is needed to determine if this intervention can be considered valid, important and applicable to an individual patient.

Applicability of Study Results

[Describe the relevance and applicability of the study to your clinical question and scenario. Consider the practicality and feasibility of the intervention in your discussion of the evidence applicability.]

This study has high relevance as it is closely connected to the clinical scenario of a patient who is not able to learn with standard of care education. Use of a peer educator would reduce the use of medical terminology during education and would therefore likely also address the clinical question of using health-literacy-conscious education. The author notes relevant results from a few of the studies surrounding positive changes in self-efficacy, medical outcomes, and lack of hospital readmissions. These address the goal of patient education in the rehab setting: to address complications that occur after SCI, before they happen.

However, it is debatable that the intervention would be appropriate to implement without valid, high-quality evidence to support change in outcomes. Despite the relevance of the study, the applicability to this patient is only appropriate if the intervention does not harm the patient or reduce the quality of care given. Most inpatient rehabilitation programs have a peer mentor program that can be utilized for education, making the intervention feasible and unlikely to harm the patient, since the peer mentor would be under the supervision of a therapist. Adding a peer education component to the education program, but not completely replacing the standard of care may be a good solution until more research is available on the use of peers for education in SCI.

(2) Description and appraisal of **"Implementing a patient education intervention about Methicillin-resistant Staphyloccus aureus prevention and effect of knowledge and heavier in veterns with spinal cord injuries and disorders: A pilot randomized controlled trial"** by **Evans, 2014**[7]

Aim/Objective of the Study/Systematic Review:

The objective of this study was to evaluate the feasibility and effectiveness of implementing an individualized education program to teach patients about Methicillin-Resistant Staphyloccus Aureus (MRSA).

Study Design

[e.g., systematic review, cohort, randomised controlled trial, qualitative study, grounded theory. Includes information about study characteristics such as blinding and allocation concealment. When were outcomes measured, if relevant]

Note: For systematic review, use headings 'search strategy', 'selection criteria', 'methods' etc. For qualitative studies, identify data collection/analyses methods.

This study was a blinded, blocked-randomized control trial

- Randomization was blocked to ensure an even distribution of usual care (control) and intervention participants at each site.
- Pre-sealed and numbered envelopes delivered appropriate education materials (control or intervention) to participants. Research assistance were blinded to the participants allocation until they opened the envelope, after seeing the education materials they were no longer blinded.

- Outcomes were measured before and after education. The pre-test was administered following the participant consenting to participate and the post-test was administered 7-10 working days after education.

Setting

[e.g., locations such as hospital, community; rural; metropolitan; country]

2 Veterans Affairs (VA) Centers in the Midwest, recruiting participants from inpatient, outpatient, and long-term care units.

Participants

[N, diagnosis, eligibility criteria, how recruited, type of sample (e.g., purposive, random), key demographics such as mean age, gender, duration of illness/disease, and if groups in an RCT were comparable at baseline on key demographic variables; number of dropouts if relevant, number available for follow-up]

Note: This is not a list of the inclusion and exclusion criteria. This is a description of the actual sample that participated in the study. You can find this descriptive information in the text and tables in the article.

72 patients with SCI were asked to participate in this study and 69 patients consented to participate. Trained research assistants attempted to recruit all potential subjects that were admitted to inpatient rehab or had clinic appointments at the VA. Participants were eligible if they were at least 18 years old, cognitively intact, and available for telephone follow-up. They were deemed ineligible if they had significant active mental health comorbidities (i.e. dementia, schizophrenia), moderate-to-severe traumatic brain injury (TBI) or a terminal diagnosis.

37 patients were randomized to the intervention group and 32 to the usual care group. 8 participants total were lost to follow up, 7 participants in the intervention group and 1 in the control. 5 of the participants in the intervention group were lost due to lack of nurse availability to administer education, 1 patient was too sick to participate, and 1 patient was not available for follow up. In the control group one patient was not available for follow up.

61 patients completed the pre and post tests and were the only ones included in the analysis. The participants were mostly male (95.1%), white (63.9%) and had tetraplegia (63.9%). Participants were had a mean age of 64.3 years and a mean duration of injury of 20.5 years. Groups were similar across demographic and baseline characteristics.

Intervention Investigated

[Provide details of methods, who provided treatment, when and where, how many hours of treatment provided]

Control

Participants received a standard facility brochure from the research assistance on MRSA. If the participants had questions they were referred to their primary care provider.

Experimental

Intervention group participants received a brochure with information on:

- What is MRSA?
- What puts someone with SCI at risk?
- What puts others at risk?
- What can you do to prevent the spread of MRSA?
- Important things to remember when cleaning your hands

Nurses used an education flip chart with information from the brochure to facilitate interactive discussion. Patients were encouraged to ask questions, then asked to teach back the 5 main components of the education. If the patient was unable to teach a component back, the nurse would review the concept then ask the patient to teach it back in their own words. The patient was asked to demonstrate proper handwashing technique or recite the steps if the patient was unable to wash their hands themselves due to impaired hand function. After the intervention the patient received a copy of the brochure. There was no set timeframe for education, but nurses stated that they spent an average of 25 min on education.

Outcome Measures

[Give details of each measure, maximum possible score and range for each measure, administered by whom, where]

Outcomes were administered by a trained research assistant before and after administration of education (control and standard of care)

Primary Outcomes: (completed before and after education)

- Knowledge about MRSA (22 questions, answer choices: true/false/I don't know)
- Self-reported hand hygiene behavior (8 questions, answer with 5 point Modified Likert scale) completed in person with an RA or over the phone.

Secondary Outcomes: (completed after education)

- Patient's attitudes and change in behaviors toward MRSA (5 questions, yes/no or multiple-choice answers for follow up question) completed in person with an RA or over the phone.
- Evaluation of intervention elements for intervention group participants and nurses administering education (patients asked about clarity of education and perceptions of materials, nurses asked about quality and implementation of intervention)

Main Findings

[Provide summary of mean scores/mean differences/treatment effect, 95% confidence intervals and p-values etc., where provided; you may calculate your own values if necessary/applicable. Use a table to summarize results if possible.]

- The mean change in knowledge between groups was not statistically significant (p = 0.81)
- The mean number of improved hand hygiene behaviors between groups was not statistically significant (p = 0.83)

Participant Knowledge

	Control (Standard of Care) N=30			**Intervention** (Individualized Education) N=31		
	Pre-Test	**Post-Test**	**P Value**	**Pre-Test**	**Post-Test**	**P Value**
Mean Score out of 21 questions (SD, min-max score)	11.65 (5.38, 1-19)	13.10 (5.01, 3-19)	0.06	13.20 (3.80, 2-20)	14.90 (3.55, 3-20)	0.02
Mean Change pre to post (95% CI)	1.45 (-0.08-2.98)			1.7 (0.25-3.15)		

The data collected for this outcome measure, the number of correct questions out of 21, is best described as ordinal. Though authors ran a t-test to test the main hypotheses, treating the data as if it was continuous, a sign-ranked test would be preferred to test ordinal, nonparametric data.[9] Overall, the main findings showed that differences between pre and post education scores for the control group were not statistically significant. The p value for the control group (p = 0.06) is greater than the cut off for a 95% confidence interval ($p<0.05$) and the confidence interval passes through 0 (CI = -0.08 - 2.98). In the intervention group, the difference in knowledge pre and post education is small, but statistically significant. The p value (p = 0.02) makes the result statistically significant, meaning the authors are 98% sure that the intervention produced the change in score. However, the large confidence interval of 0.25 – 0.31 reported by the authors does not inspire confidence that results represents a true treatment effect. A larger sample size would be required to obtain a better approximation of the treatment difference. Comparing the mean change in score out of 21 questions, the control group's score improved by 1.45 on average, compared to the 1.70 more questions for the intervention group. It is easier to see when comparing 1.45 to 1.7 that there is no statistically significant difference between the control and intervention groups (p=.81).

The authors do note a possible difference between education sites, with Site A's intervention group having a higher change in score on average. However, an ANOVA controlling for the site showed no difference in knowledge change score by the treatment group.

Hand Hygiene Behavior Improvement

The data for this outcome measure was collected using a 5-point Likert scale, and thus is best described as ordinal. The authors used a t-test to examine the main hypothesis; however, a Wilcoxon Signed Rank would have been a better test as it does not assume the data to be parametric.[9] The control group improved an average of 2.40 hand hygiene behaviors (1.94 SD, 0 - 7 CI) while the intervention group improved 2.5 hand hygiene behaviors (2.23 SD, 0 - 7 CI). For this measure, the p value between groups was not statistically significant at p = 0.83.

Patient Attitude and Change in Behavior Post-Education

Question	**Odds Ratio (95% CI)**	**Fisher Exact P**
Have you changed your handwashing behavior since your discussion with the RA or nurse?	3.67 (1.26-10.64)	0.02
If yes, how has it changed? (answers not nominal)	NA	NA
Do you intend to clean your hands more often?	10.80 (1.25-93.44)	0.02
Have you asked your provider about your MRSA status?	4.38 (1.32-14.5)	0.03
Do you intend to ask your provider about your MRSA status?	0.65 (0.15-2.95)	0.70

The data for this outcome measure is best described as nominal with the choices yes, no, or unsure being the primary answer choices. The authors used the Fisher's exact test to compare control group to the treatment group, which is appropriate as the data is comparing two individual groups instead of examining a pre and post. [9] The intervention group was 3.67 times more likely to change handwashing behavior post-education (p = 0.02, CI = 1.26 - 10.64) and 4.38 times more likely to have asked their provider about MRSA status post-education (p = 0.03, CI = 1.32 - 14.5). The intervention group was also 10.80 times more likely to answer "yes" when asked if they intend to clean their hands more often (p = 0.02, CI = 1.25 - 93.44).

Evaluation of Implementation

The intervention group was the only group that was asked the evaluation questions. Nurses spend 25 min on average doing intervention education and reported the quality of the education was high or very high. The nurses also reported the intervention education materials provided the right amount of information at the appropriate reading level and was effective at increasing patients' knowledge. One of the two sites reported difficulty dedicating the nurses' time to providing education. 86.2% of the participants in the intervention group reported the brochure was interesting, 80% agreed the discussion was clear, 76.7% agreed it was informative and 96.7% agreed it was believable. 30% of the intervention participants thought the discussion was scary but 80% thought it was informative.

Original Authors' Conclusions

[Paraphrase as required. If providing a direct quote, add page number]

The authors found this intervention has the potential to be a feasible alternative to standard of care education, but time was limited in one VA facility. The results support a more targeted teaching style compared to only giving the patient a brochure. Patients in both groups improved their knowledge about MRSA and preventative practices but the knowledge scores were not significantly different between the two groups. Intervention subjects were more likely to report improved hand hygiene and increased engagement with providers about MRSA. The authors predict that in the future the intervention has the potential to reduce rates of MRSA and transmission in veterans.

Critical Appraisal

Validity

[Summarize the internal and external validity of the study. Highlight key strengths and weaknesses. Comment on the overall evidence quality provided by this study.]

PEDro Scale Score: 8/10; (1) eligibility criteria: yes; (2) random allocation: yes; (3) allocation concealed: yes; (4) groups similar at baseline: yes; (5) blinding of all subjects: yes; (6) blinding of therapists: no; (7) blinding of assessors: no; (8) measures of one key outcome obtained by >85% of subjects: yes (88%); (9) intent to treat: no; (10) results of between-group statistical components: yes; (11) study provides both point measure and measure of variability: yes.

Strengths:

Participant Sample: Participants were recruited from two separate VA locations, from multiple sites of care, thus giving some diversity in the time since the onset of SCI. Eligibility criteria ensured they had no barriers to learning that would affect results. The control and intervention groups had no significant differences between them in regard to demographics or baseline characteristics.

Internal Validity (Randomization & Control): The randomization of the participants into control and intervention groups was well executed. Randomization was stratified to ensure that there would be a relatively even distribution between groups across the two sites. Pre-sealed envelopes with control or intervention education materials ensured randomization within each site. The control group education was also well executed as the "standard of care" during which the patient was given a VA brochure and told to follow up with their primary care provider if they had questions.

Feasibility: Overall, the "above standard of care" education is feasible to apply to clinic, with an average of 25 min spent educating, answering questions, evaluating, and reteaching unlearned concepts.

Weakness:

Internal Validity (Blinding): As with many physiotherapy research designs, there was a lack of blinding during administration and outcome measures during this study. Although the patients were blinded to which group they were in, the research assistants and nurses knew which group the participants were part of based on the research materials they were using for education. In addition, the research assistant administering the post-education surveys were not clearly blinded as they were taking data, resulting in potential bias.

External Validity: Due to the research being conducted at VAs, the majority of participants were male (95.1%) and older (mean age = 64.53 [SD = 11.10, min-max = 23-81). A majority of participants had some college (45.9%) or graduated college (23.0%). This sample is potentially too different from the normal population to generalize the findings to all individuals in different settings. However, it is worth noting that the variety of settings participants received education in (inpatient, outpatient, long-term care) is well encompassing of many different timelines and continuums of care that require education.

Outcomes Utilized: Outcomes used in this study are unvalidated to measure learning and have a huge potential for bias. The post-tests were completed 7-10 days after education was delivered, which may not be enough time in order to truly measure learning or change in behavior. As the authors note, the knowledge pre and post-test has the potential for a ceiling effect, with some questions more susceptible than others. The "self-reported hand hygiene behavior" measure and the "patient's attitudes and change in behaviors" measure are very similar, with a huge potential for response bias based on the wording of questions and method by which it is administered. The authors note that the post-test surveys were administered by a Research Assistant in-person or via phone, indicating that the data has the potential to be subject to response bias, as the participants may answer in a way they think the research assistant wants to hear or in a way that is more socially acceptable.

Overall Evidence Quality: The data derived from this RCT gives low quality evidence for using individualized patient education to improve knowledge about MRSA in patients with SCI.

Interpretation of Results

[This is YOUR interpretation of the results taking into consideration the strengths and limitations as you discussed above. Please comment on clinical significance of effect size / study findings. Describe in your own words what the results mean.]

Knowledge acquired through individualized education was not determined to be statistically superior to knowledge acquired during standard-of-care education in this pilot study. While change in pre to post score in the intervention group was statistically significant with a $p = 0.02$ ($p<0.05$), the wide confidence interval indicates that the sample was likely too small. The timeline for assessing learning (7-10 days post intervention) and the risk of bias during change in behavior surveys make the results carry less weight. However, it is encouraging to see that the intervention group was more likely to positively change behavior related to handwashing and screening for MRSA; although, again, with wide confidence intervals. A study with a larger sample size and less potential for bias (with online or written surveys) would be needed to determine the effectiveness of this individualized patient education.

Applicability of Study Results

[Describe the relevance and applicability of the study to your clinical question and scenario. Consider the practicality and feasibility of the intervention in your discussion of the evidence applicability.]

This study is very relevant and applicable to the PICO question because it addresses a similar population and intervention. Not only does it examine the feasibility and effectiveness of an individualized education (taking health literacy into consideration), it also compares the intervention to the standard of care. The participants in the study all had a diagnosis of SCI, a majority tetraplegia, similar to the patient. However, the average age in the study was much older than the 20-year-old patient in the PICO question. This intervention would be feasible to implement with low cost and time associated with it; however, based on this study it was not proven to be more effective than the standard-of-care education. The likelihood of doing harm with the proposed intervention is low and the intervention did statistically improve the patients' knowledge and change their behaviors in the intervention group, making it feasible to try the intervention for the patient in the PICO question.

SYNTHESIS AND CLINICAL IMPLICATIONS

[Synthesize the results, quality/validity, and applicability of the two studies reviewed for the CAT. Future implications for research should be addressed briefly. Limit: 1 page.]

Overall, the best available literature, that is relevant to the clinical scenario, gives low quality evidence to support better-than-standard of care (SOC) education as superior to SOC education. Evidence discovered through the search process and research analysis supports the use of modalities such as peer education, problem-solving education and individualized education as safe alternatives for SOC education; however, there was little evidence proving the intervention is valid.[2,3,7,10]

Chaffey et al. reviewed data from studies, including qualitative studies, that found themes revolving around patients' improved hope, adjustment, quality of life, and self-efficacy.[3] They also found low-level evidence indicating that health outcomes can improve with peer education, reducing rehospitalizations.[3] However, it is worth noting that all studies included in this scoping review had poor internal validity due to the lack of control groups, further limiting external validity.[3] Interventions examined in this review were closely connected to the clinical scenario, as the use of peer mentors would decrease reading level of the education materials and improve health literacy.[3]

In Evans et al., evidence demonstrated better internal validity due to use of a control group and randomization; however, data collection was highly subjected to bias.[7] The results of this study showed a small, but statistically significant change in knowledge for the individualized education group; however, the confidence interval was wide and the mean change in knowledge between groups was not statistically significant.[7] Another outcome showed that the intervention group was more likely to change behaviors related to handwashing after education, but again with a wide confidence interval.[7] The mean number of improved hand hygiene behaviors was not statistically significant between groups for this measure either. Overall, these results indicate that the individualized education are not statistically superior to the standard of care intervention.[7] The randomization and control group methodology were well executed for this study, but the blinding was not effective. The data collection was also highly subject to response bias, as the research assistant administered the post-test questions in person or over the phone.[7] The participants were potentially too dissimilar from the patient in the clinical scenario to justify external validity; however, individualized education would improve health literacy and allow for more direct discussion regarding the relevance to the patient's current situation.

Measuring and quantifying the construct of knowledge as an outcome in patient education was a barrier for all of the studies. Further, other articles not included in this CAT found that knowledge does not always translate to the ability to apply information and problem-solve difficult situations.[8] None of the measures examining patient learning or knowledge were validated or had known psychometric properties. However, a variety of other outcome measures were also used to examine constructs associated with improved knowledge, such as self-efficacy, quality of life, health outcomes, etc. Using improved knowledge as a mediator to other more meaningful outcomes improves buy-in and relevance for this research.

More research is needed to examine peer education, problem-solving education and other better-than-SOC education methodologies compared to the current SOC, in order to validate this modality. Although the literature does not support these educational interventions as superior, one must hesitate before drawing the conclusion that they are not effective, since the evidence was obtained by low quality research with poor internal and external validity. The evidence does not prove that better-than-SOC education is less effective than SOC education, and qualitative studies included in Chaffey et al. show that many people had positive experiences with them. As most settings already include elements, if not full programs, revolving around patient education, it would not cause harm to the facility or patient apply these concepts.

Future research on this topic is warranted should involve methodology emphasizing internal validity in order to examine the efficacy of this intervention. A control group of patients educated with the SOC, randomization for the groups, and a blinded data analyser are all feasible components to implement. Primary outcomes should include tests of knowledge and problem-solving strategy to implement information learned and secondary outcomes should examine other constructs that would ideally improve with improved learning such as hospital readmissions, self-efficacy, etc.

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