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| **CRITICALLY APPRAISED TOPIC** |

**FOCUSED CLINICAL QUESTION**

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| For the caregiver of a 20-year-old male patient with complete tetraplegia from traumatic spinal cord injury (SCI), is an additional caregiver education program during the transition period from hospital to home more effective than the current standard of care (general on-site rehabilitation facility discharge training) to prevent caregiver burnout (including but not limited to fatigue, depression, or injury)? |

**AUTHOR**

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**CLINICAL SCENARIO**

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| CK is a 20-year-old male patient with C5 complete tetraplegia due to a gunshot wound to the neck who was admitted to acute inpatient rehabilitation 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 wrist 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. Factors influencing negative outcomes for caregivers of individuals with SCI include high burden of care and poor quality of life.1 Challenges also arise from the change in the nature of the relationship between the individual with SCI and family.2 In addition, individual situations arise at home unique to each patient and their environment that might not be specifically addressed before rehabilitation discharge. Preventing burnout and supporting the transition into a caregiver role is directly linked to CK’s quality of life due to his reliance on their assistance. CK will discharge home with his mom and sisters, who were unable to attend most inpatient rehabilitation education sessions. Barriers to the standard of care caregiver education included timing of sessions during business hours and low education level for comprehension of information. Therefore, additional caregiver education during the transition period home that is more accessible and convenient to their schedules is necessary, as Sara’s CAT will address the second barrier.  |

**SUMMARY OF SEARCH**

[Best evidence appraised and key findings]

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| Of the eight studies best meeting the established inclusion/exclusion criteria, 4 were RCTs, 2 qualitative studies, and 2 systematic reviews. * Several articles included conclusions confirming negative caregiver outcomes and, therefore, the importance of caregiver education but not specific strategies to do so
* Emerging support for problem-solving training and psycho-educational programs for caregivers
* Prevalence of protocols and studies in recruitment suggest this is a growing research topic
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**CLINICAL BOTTOM LINE**

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| While the current literature on caregiver education for SCI is limited in quantity and quality, there is evidence to support problem-solving training as an effective intervention, as evidenced by improvements in caregiver depression and quality of life. Online videos are supported as an effective method of delivery for education for this population. Additional research is necessary to validate this combination and reveal other potential mediators impacting education for caregivers of individuals with SCI.  |

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| ***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**

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| **Terms used to guide the search strategy** |
| **P**atient/Client Group | **I**ntervention (or Assessment) | **C**omparison | **O**utcome(s) |
| Caregiv\*Famil\* Relative\* Care partner\* Spinal cord injur\*Tetrapleg\*Quadrapleg\*  | Education\* “Formal education” “Transition program”“Transition planning”  | “Standard of care”“Standard care”“Usual care”  | BurnoutFatigueDepression Injury Burden “Quality of life”  |

**Final search strategy (history):**

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

1. Caregiv\* OR family\* OR care partner\* OR relative\*
2. Spinal cord injury[MeSH Terms] OR spinal cord injuries[MeSH Terms]
3. Spinal cord injur\* OR tetrapleg\* OR quadrapleg\*
4. #2 OR #3
5. Education\* OR “formal education” OR “transition program” OR “transition planning”
6. “Standard of care” OR “standard care” OR “usual care”
7. Burden OR fatigue OR burnout OR depression OR injury OR “quality of life”
8. **#1 AND #4 AND #5 AND #6 AND #7**

**(((((((caregiv\* OR family\* OR care partner\* OR relative\*))) AND (((spinal cord injury[MeSH Terms]) OR spinal cord injuries[MeSH Terms]) OR (spinal cord injur\* OR tetrapleg\* OR quadrapleg\*)))) AND ((Education\* OR “formal education” OR “transition program” OR “transition planning”))) AND ((“Standard of care” OR “standard care” OR “usual care”))) AND ((Burden OR fatigue OR burnout OR depression OR injury OR “quality of life”))**

*More often, this strategy was used to widen the search:*

1. Caregiv\* OR family\* OR care partner\* OR relative\*
2. Spinal cord injury[MeSH Terms] OR spinal cord injuries[MeSH Terms]
3. Spinal cord injur\* OR tetrapleg\* OR quadrapleg\*
4. #2 OR #3
5. Education\* OR “formal education” OR “transition program” OR “transition planning”
6. Burden OR fatigue OR burnout OR depression OR injury OR “quality of life”
7. **#1 AND #4 AND #5 AND #7**

**((((((caregiv\* OR family\* OR care partner\* OR relative\*))) AND (((spinal cord injury[MeSH Terms]) OR spinal cord injuries[MeSH Terms]) OR (spinal cord injur\* OR tetrapleg\* OR quadrapleg\*)))) AND ((Education\* OR “formal education” OR “transition program” OR “transition planning”))) AND ((Burden OR fatigue OR burnout OR depression OR injury OR “quality of life”))**

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

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| **Databases and Sites Searched** | **Number of results** | **Limits applied, revised number of results (if applicable)** |
| **PubMed****CINAHL** **Clinicaltrials.gov** **Cochrane****Web of Science** | **2****1****35****35** **189** | **316 – excluded (“standard of care” OR “standard care” OR “usual care”) to widen search.** **20 – applied filters: published within 5 years, Clinical Trials, Reviews** **5 – additional results from “similar articles”** **224 - excluded (“standard of care” OR “standard care” OR “usual care”) to widen search.****53 – applied filters: published within 10 years, Academic Journals** **Spinal Cord Injur\* AND (caregiver OR transition period) to widen search.** **Excluded (“standard of care” OR “standard care” OR “usual care”) AND (burden OR fatigue OR burnout OR depression OR injury OR “quality of life”) to widen search.** **Excluded (“standard of care” OR “standard care”) to widen search.** **88 – applied filters: rehabilitation** **5 – applied filters: rehabilitation, Reviews**  |

## INCLUSION and EXCLUSION CRITERIA

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| **Inclusion Criteria** |
| * Population of caregivers of patients with SCI
* Intervention of caregiver education for transition period from hospital to home
* Evaluation with self-report outcome measures, such as burden measures, quality of life measures, depression measures, injury measures, or burnout measures
* Article types including: Randomized controlled trials, systematic reviews, meta-analyses, case series, and case studies
* RCT in recruitment phase (ClinicalTrials.gov) (as this is a newer topic of research)
* Qualitative studies (themes uncovered would be appropriate for this clinical question)
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| **Exclusion Criteria** |
| * Not published in English
* Education for caregivers of patients with cognitive impairment
* Poster presentations
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**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).*

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| **Author (Year)** | **Risk of bias (quality score)\*** | **Level of Evidence\*\*** | **Relevance** | **Study design** |
| **Elliott TR et al. (2009)3**  | **PEDro scale score: 5/11** | **2b** (right at the 80% follow-up marker, moderate effect sizes)  | **High** RCT assessing a specific educational intervention (PST), relevant outcomes, and relevant comparison intervention (“usual care”); however, intervention is different from the one that would be administered in our Capstone (online videos)  | **Randomized Controlled Trial**  |
| **Schulz R et al. (2009)4** | **PEDro scale score: 9/11**  | **2b**(95% CI was very wide across several different outcome measures including burden and health symptoms outcomes)  | **Moderate** RCT assessed a dual-target intervention (targeting both the caregiver and the individual with SCI/care recipient) as compared to a caregiver only condition and a control condition. This is less relevant for the intervention itself but is helpful for supporting the need to target both caregiver and care recipient for our Capstone.  | **Randomized Controlled Trial** |
| **Molazem Z et al. (2014)5**  | **PEDro scale score: 7/11**  | **1b**  | **Moderate** Small sample size with sampling from one location, which limits the ability to generalize these findings to all family caregivers. Also in terms of relevance to our Capstone, this intervention utilized group discussion, which would not be possible in our online video format. However, the positive results do provide background information that encourages us to include an interactive feature or discussion board on our intervention.  | **Randomized Controlled Trial** |
| **Dyck DG et al. (2016)6** | **PEDro scale score: 6/11** (based on implementation of the exact plan described)  | **1b**(subject to change once the study is complete based on results and actual follow-up)  | **Low** No current results to apply to our Capstone; however, it does include relevant outcomes, comparison intervention, and hypothesis about effectiveness of education intervention based on timing after discharge (very relevant based on our focus on the transition period from hospital to home)  | **Randomized Controlled Trial** |
| **Hoffman J et al. (2011)7**  | **CASP Checklist:****7 “yes”** **2 “can’t tell”** **1 “no”**  | **2b**(not included on level of evidence table but comparable to RCT and then downgraded due to lack of methodological rigor)  | **High** Uses the same intervention of online videos for the same population of SCI. Background information for the basis of the study matches the need for this population (gap in easily accessible post-injury education).  | **Qualitative study**  |
| **Jeyathevan G et al. (2019)2**  | **CASP Checklist:** **9 “yes”** **0 “can’t tell”** **1 “no”** | **1b** (not included on level of evidence table but comparable to RCT in terms of method description, rigor, etc.)  | **Moderate** No interventions included because looking at themes to understand and uncover the emotional, psychological, and relationship challenges post-SCI. These themes will be beneficial for background information to guide possible framework for our education and training (or as potential frameworks to consider for coping strategies and communication). Helps with the needs assessment for our Capstone.  | **Qualitative study**  |
| **Baker A et al. (2017)1**  | **AMSTAR score: 7/11**  | **3a**(*all* research designs that had been peer reviewed were included)  | **High** Although review of both TBI and SCI, results were discussed for SCI independent of TBI results. Table of specific interventions to support caregivers of individuals with SCI (some of which able to be applied potentially online, some of which included relevant comparison). SCI studies include Elliott 2009 and Schulz 2009 (above).  | **Systematic Review (scoping)**  |
| **Moreno A et al. (2017)8**  | **AMSTAR score: 4/11** | **3a** (protocol includes case reports)  | **Low** No current results to apply to our Capstone; however, it does include relevant background information that can be used in our needs assessment. It also includes relevant information about the continuum of care including the transition period from hospital to home/reintegration into the community.  | **Systematic Review (protocol for a scoping study)**  |

\*Indicate tool name and score

\*\*Use Portney & Watkins Table 16.1 (2009); if downgraded, indicate reason why

**BEST EVIDENCE**

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

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| * **Baker A, Barker S, Sampson A, Martin C. Caregiver outcomes and interventions: a systematic scoping review of the traumatic brain injury and spinal cord injury literature. *Clin. Rehabil.* 2017;31(1):45-60. doi:10.1177/0269215516639357.1**

I chose this article for critical appraisal in the CAT because of the breadth of research that it covers as a systematic review and the high relevance. I feel the systematic review covers the caregiver experience for caregivers of patients with SCI in depth and has SCI population statistics independent from the TBI population information. In addition, the article includes both outcomes (primarily negative outcomes but also positive outcomes) as well as interventions to support caregivers of patients with SCI, which are both relevant to my PICO question. While the quality score was decreased by the inclusion of all peer reviewed articles, the topic has limited research so I actually think this was a positive as it was highly sensitive in catching all possible articles on the subject. * **Hoffman J, Salzman C, Garbaccio C, Burns SP, Crane D, Bombardier C. Use of on-demand video to provide patient education on spinal cord injury. *J Spinal Cord Med* 2011;34(4):404-409. doi:10.1179/2045772311Y.0000000015.7**

Although this article does not have a high-quality score, it is extremely relevant to my PICO in terms of providing data and feedback themes on a specific additional caregiver education intervention. In addition, this specific intervention method (online videos) is directly related to our Capstone format, which is a big reason that I continued to come back to this article as one to select for the CAT. For me the high relevance subjectively outweighed the higher quality of some of the other articles because it can directly affect our implementation of this intervention as opposed to providing general background on the topic. While I find the background information helpful, it is included in the Baker et al. systematic review included in the CAT as well, so this qualitative study provides depth to the systematic review’s breadth.  |

**SUMMARY OF BEST EVIDENCE**

**(1) Description and appraisal of “Caregiver outcomes and interventions: a systematic scoping review of the traumatic brain injury and spinal cord injury literature” by Baker et al. 2017.1**

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| **Aim/Objective of the Study/Systematic Review:** |
| To assess the caregiver experience in the traumatic brain injury (TBI) and SCI populations based on the current literature to identify (primary) factors affecting positive and negative outcomes and (secondary) interventions and their effectiveness  |
| **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. |
| Baker et al. is a systematic review of all research designs on caregiver outcomes and interventions for the TBI and SCI populations. **Search Strategy**: A literature search was performed in CINAHL, Cochrane Library, Medline, and PsycINFO with parameters including published in English from January 1990 to December 2015. TBI and SCI caregiver organization websites were searched for articles meeting the inclusion criteria. The following search terms with their associated spelling derivatives were used in PsycINFO: (caregiver OR informal care OR unpaid care) AND (acquired brain injury OR traumatic brain injury OR spinal cord injury) AND (care service OR support program OR group support OR online support OR 1:1 support OR peer support) AND (ability to care OR care burden OR preparedness OR strain OR cost OR family function OR resilience). These terms were then adapted for the remaining three databases and organization websites. Results were combined and duplicates deleted using EndNote X7. Due to sheer volume, one author searched the databases for articles using the selection criteria below and a second author cross-checked the eligibility of the first author’s findings. Lastly, the reference lists were searched for any additional eligible articles that the search strategy missed. **Selection Criteria** * Inclusion:
	+ Caregiver providing support to an adult (18 years or older) with TBI or SCI
	+ Intervention for caregivers including services, support programs, group support, online support, 1:1 support, or peer support
	+ Assess caregiver outcomes of ability to care, burden, emotional distress, preparedness, strain, cost, family functioning, or resilience
	+ Peer-reviewed systematic reviews, primary studies (RCTs), and case studies
* Exclusion: specific exclusion criteria not provided.

**Data Collection Methods**: TBI and SCI data were organized separately. * Primary aim (factors affecting outcomes) summarized by author, year published, and factors associated with positive or negative caregiver outcomes
* Secondary aim (interventions) summarized by author, year published, country, intervention methods, and intervention effectiveness

**Data Analysis**: TBI and SCI data were assessed separately using qualitative, narrative analysis. Caregiver outcomes and interventions were grouped into themes or like-categories, and lastly compared across populations to look for similarities and differences. **Quality Assessment**: Downs and Black Instrument (ranging 0 to 31 with 31 indicating a high-quality study) was used to complete a quality assessment for caregiver interventions and their effectiveness. The authors decided a quality assessment for factors affecting positive and negative caregiver outcomes was not applicable.  |
| **Setting**[e.g., locations such as hospital, community; rural; metropolitan; country] |
| All interventions for caregivers of individuals with SCI were performed in the outpatient, community setting in America with the exception of one study, which was conducted in India. The authors who performed the systematic review are located in Melbourne, Australia, working within universities, including Australian Catholic University and Monash University.  |
| **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. |
| After assessment for eligibility criteria and cross-review by the second author, 105 studies were included in the systematic review for qualitative synthesis. * SCI caregiver outcomes: 18 studies reporting negative (15) and positive (3) outcomes
* SCI caregiver interventions: 4 studies
* TBI caregiver outcomes: 62 studies reporting negative (51) and positive (11) outcomes
* TBI caregiver interventions: 21 studies

Of the 4 studies on SCI caregiver interventions, quality assessment via Downs and Black Instrument ranged from 17/31 to 26/31 with (2) level of evidence of II, (1) level of evidence of III, and (1) level of evidence of IV. Participant demographics (all in reference to the SCI caregiver, not care recipient) were as follows:

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| **Article**  | **Gender** | **Age (average)**  | **Relationship**  | **Severity** |
| Elliott (2008) n=122 | 88% female  | Not specified  | Higher proportion of spouse > parent | Not specified  |
| Rivera (2003) n=2 | Majority female | 38 years | All spouse  | C4 quadriplegia  |
| Schulz (2009) n=173  | 75% female  | 53 years  | Higher proportion of spouse > parent | Assist required for 5 ADLs/day  |
| Sheija (2005) n=37  | 94% female  | 35 years | All spouse  | Not specified  |

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| **Intervention Investigated**[Provide details of methods, who provided treatment, when and where, how many hours of treatment provided] |
| *Control* |
| Of the 4 studies assessing interventions for caregivers of individuals with SCI:* 3 of the 4 studies included a control group of standard of care education only, described as “education only control group” (p. 57) for Elliott (2008) and “information-only control group” (p. 57) for Schultz (2009)
* Rivera (2003) did not include a control group, as it is a case study/series *(unclear from systematic review description, but n=2 suggests case series)*
 |
| *Experimental* |
| Of the 4 studies assessing interventions for caregivers of individuals with SCI:* 3 of the 4 studies used problem-solving training as the intervention, including Elliott (2008), Rivera (2003), and Schultz (2009)
* Elliott (2008) delivered problem-solving training via videoconferencing
* Rivera (2003) implemented problem-solving training via “Project FOCUS” (p. 57) format
* Schultz (2009) involved two experimental groups, including one with caregiver-only treatment of psychosocial problem-solving training and one with “dual-target” (p. 57) treatment of complementary problem-solving training for both caregiver and care recipient
* The remaining article, Sheija (2005), involved peer support groups for 7 sessions as the intervention
* Details on frequency, duration, topics, and leader/facilitator of the sessions were not included for any of the 4 studies
 |
| **Outcome Measures**[Give details of each measure, maximum possible score and range for each measure, administered by whom, where] |
| Among the 4 studies assessing interventions for caregivers of individuals with SCI, a variety of outcome measures were used to evaluate effectiveness by assessing depression (Elliott (2008), Schultz (2009)), social functioning (Elliott (2008)), emotional distress and coping skills (qualitative data only, Rivera (2003)), quality of life (Schultz (2009), Sheija (2005)), health symptoms (Schultz (2009)), general health (Sheija (2005)), and mental health (Sheija (2005)). Baker et al. did not include specific measures used to evaluate these outcomes.  |
| **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.] |
| Overall, problem-solving training was found to be an effective intervention for caregivers of individuals with SCI, as evidenced by improvement on at least one outcome measure in all 3 studies involving this intervention.

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| **Article** | **Results** |
| Elliott (2008) | -Decrease in depression (*p*<0.05) at 6-month post-intervention follow-up-Increase in social functioning (*p*<0.05)  |
| Rivera (2003) | -Decrease in emotional distress (qualitative data)-Increase in useful coping skills (qualitative data)  |
| Schultz (2009)  | -Increase in quality of life -Decrease in health symptoms -Decrease in depression Improvement above defined by at least 0.5 standard deviation (SD) from baseline to 12-month post-intervention follow-up  |

Regarding peer support groups, the intervention was found to be effective, as evidenced by increase in general health (*p*=0.003), mental health (*p*=0.001), and quality of life (*p*=0.001) as compared to the control group. Of the 18 studies addressing the primary aim for caregivers of individuals with SCI, the top 3 factors reported with a negative outcome were determined to be high levels of caregiver burden (7 studies), poor caregiver adjustment (3 studies), and poor caregiver quality of life (3 studies). In addition, the top 3 factors reported with a positive outcome for caregivers of individuals with SCI were found to be good family functioning (1 study), good coping skills (1 study), and good social support (1 study).  |
| **Original Authors’ Conclusions**[Paraphrase as required. If providing a direct quote, add page number] |
| There is good evidence supporting the effectiveness of problem-solving training as an intervention for caregivers of individuals with SCI, which helps to address negative outcomes including high levels of burden of care which is prevalent in the literature.  |
| **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.] |
| **Internal Validity**: AMSTAR score of 8/11, including a priori design provided: yes; two independent data extractors: yes; comprehensive search: yes; status of publication: no; list of studies: yes (in supplemental materials online); characteristics of studies: yes; quality assessment: yes; quality assessment used in conclusions: yes; appropriate methods to combine studies: yes; publication bias assessed: no; conflict of interest stated; no (yes for systematic review, no for individual studies included). **Strengths:*** Selection criteria: Baker et al. clearly defined the inclusion criteria that was applied by population, intervention, outcome, and research design.
* Search strategy: All search terms are inclusive to all potential spelling derivatives and relevant combination of terms to allow for a highly sensitive search that identifies as many articles as possible to assess for eligibility.
* Quality assessment: Downs and Black Instrument identified for each study included in the systematic review and these scores were referenced in the authors’ conclusions. However, some of the quality assessment scores for the SCI caregiver intervention studies were low (including 17/31 and 20/31), which impacts the internal validity as discussed below.
* Organization of data: The inclusion of two populations and two objectives for each of those populations created the potential for disorganized presentation; however, the authors analyzed the results for each population separately assessing for similarities and differences that transcended population at the end in the discussion. This allowed the data to be clear while also providing a comprehensive interpretation of the results.

**Weaknesses:** * Selection bias: While two authors reviewed the articles, the databases were searched by one author and the results were cross-checked by a second author for eligibility. This means that there is potential for an increased risk of selection bias due to lack of independent searches of the databases.
* Publication bias: No inclusion of grey literature and articles limited to the English language.
* Weak internal validity: Presentation of data is limited to *p*-values and qualitative data only, which limits the interpretation and increases the potential for bias in understanding of the effect of the individual studies included. In addition, some studies included had low quality assessment scores.
* Weak external validity: Discussed below.

**External Validity**: The generalizability of the results is weak due to the limited knowledge about the participant demographics and heterogeneity of the known participant characteristics. For example, the review grouped the entire spectrum of injury severity together, meaning the findings could differ based on mild versus more severe care recipients. The majority of caregivers for individuals with SCI who participated in the interventions were the spouse of the care recipient, making these results less applicable to parent caregivers. In addition, there is no mention of demographics such as education level of the caregivers; therefore, it is difficult to determine if problem-solving training would have the same effect on caregivers if the studies had been controlled for these factors. The level of evidence of this article is 3a, as a result of the inclusion of all research designs and not limiting the study to high quality RCTs.  |
| **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.] |
| Qualitatively, it is clear that problem-solving training and peer support groups are effective interventions for caregivers of individuals with SCI, as evidenced by improvement in outcomes such as depression, quality of life, and more. The *p*-values of *p*<0.05 provided from Elliott (2008) indicate that the decrease in depression and the increase in social functioning are statistically significant. However, without any additional quantitative data, understanding of effect size, power, and confidence interval is not possible. As a clinician, the effect size would be beneficial to be able to calculate as it would suggest whether the improvements are clinically significant, and if so, to what degree the clinical impact is based on small versus large effect size (i.e. larger effect size, more impact clinically). Luckily, these weaknesses could be nullified with further investigation of the original studies to determine the quantitative data. From a broader perspective, this systematic review validates interventions targeting the caregivers, not just the care recipient, for improved outcomes and that problem-solving training has the most support in the current literature for this population of SCI caregivers. In addition, the primary aim results support using burden of care, adjustment, and quality of life as outcome measures for caregiver interventions, which then help to validate confidence in the outcome measures used for intervention in the secondary aim results.  |
| **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.] |
| Baker et al. has high relevance to the clinical scenario, as it addresses the population, intervention, comparison, and outcome in the clinical question. Additionally, the systematic review identifies specific interventions that are “additional” caregiver education, which provides more clarity in answering the question as the intervention is more tangible according to this evidence. Problem-solving training and peer support groups are applicable to CK’s caregivers, as they were unable to attend a majority of the education sessions while he was in inpatient rehabilitation. This intervention will provide the skills to help reason through commonly encountered problems and work through possible solutions, which will help promote self-efficacy in their care for CK in the future. Peer support groups will help provide similar information that might have been missed prior to discharge from inpatient education or misunderstood due to health literacy, which will be more conversational and less medical terminology in a peer support group setting. Practicality and feasibility of the study results for CK’s caregivers are dependent on the delivery method of the intervention. As mentioned, timing was a barrier to educational opportunities for CK’s caregivers during inpatient rehabilitation; therefore, problem-solving training available in flexible, convenient formats or peer support groups that occur outside of business hours would increase the practicality and feasibility for this clinical scenario.  |

**(2) Description and appraisal of “Use of on-demand video to provide patient education on spinal cord injury” by Hoffman et al. 2011.**

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| **Aim/Objective of the Study/Systematic Review:** |
| To assess the quality and effectiveness of the online video format for patient education by examining website accessible videos of in-person educational lectures and discussion series compared to in-person sessions themselves by evaluating both online viewers and in-person attendees  |
| **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. |
| Hoffman et al. is a qualitative study. **Data Collection**: * Brief survey to evaluate the quality and effectiveness of the education format (both online and in-person) as self-reported by participants based on their satisfaction and attitude changes
* 422 surveys completed by in-person participants, 66 surveys completed by online participants (self-selected)
* Comments from online viewers
* Google Analytics for statistics on total video hits and demographics of individuals who viewed the online video website between April 1, 2009 and March 31, 2010

**Analyses Methods**: * Quantitative ratings from survey, which was formatted on a scale of 1 to 5 with 1 meaning strongly disagree and 5 meaning strongly agree
* Mean rating and standard deviation calculated for each group separately
* Comments presented by viewer category (other/caregiver, individual with SCI, or health care professional) and assessed by the authors to draw qualitative conclusions

**Blinding and Allocation Concealment**: No participants or researchers were blinded during this study. |
| **Setting**[e.g., locations such as hospital, community; rural; metropolitan; country] |
| **In-person**: Educational forums held/located at the University of Washington (UW) serving the Northwest Regional Spinal Cord Injury System (NWRSCIS) which includes individuals from Washington, Idaho, Montana, and Alaska. **Online**: International audience/reach given prerequisite requirement of access to the Internet. The geographic breakdown of online viewers and survey participants is provided below under Participants.  |
| **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. |
| While there were 2510 online video views and 422 in-person attendees at the SCI Forums, it is difficult to state that n=2932 because there could have been participants who attended or viewed videos more than one time. Recruitment was voluntary. Participants of both groups included individuals with SCI, health care professionals, and others (caregivers, friends, family, students). While the target population was individuals with SCI, the proportion of each category of viewers or attendees is provided below for both the online and in-person groups. The larger proportion of family/friends that participated in-person as compared to online could be explained by the need for some individuals with SCI to have caregiver assistance to be able to attend in-person themselves.

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| **Participant Category** | **Online (%)** | **In-person (%)** |
| Individual with SCI | 42.4 | 45.3 |
| Health care professional  | 21.1 | 23.5 |
| Student | 24.2 | 10.9 |
| Family/friend  | 12.1 | 20.4 |

Given the voluntary nature of participation in both the in-person sessions, online videos, and completion of the survey, specific demographic information on the participants is not available outside of the geographic distribution provided below. Statistic generators reveal that 2.6% of all online viewers participated in the survey, which was distributed geographically as indicated below.

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| --- | --- | --- |
| **Region** | **Online Viewers (%)** | **Survey Participants (%)**  |
| Western Washington | 7.3 | 13.6 |
| Eastern Washington | 0.7 | 4.5 |
| Idaho  | 0.4 | 3.0 |
| Montana | 0.2 | 0 |
| Alaska | 0.2 | 0 |
| Other states | 66.6 | 65.2 |
| Outside USA  | 25.0 | 13.6 |

 |
| **Intervention Investigated**[Provide details of methods, who provided treatment, when and where, how many hours of treatment provided] |
| *Control* |
| The in-person SCI Forum sessions held at UW represent the standard of care for community-based SCI education since 1987 for this NWRSCIS population. Educational treatment was provided by expert speakers including medical specialists and rehabilitation professionals, or community members with experiential knowledge, as coordinated by the NWRSCIS. The frequency and duration of the sessions are not included in the article; however, in Table 1, the “date posted” column suggests that the in-person SCI Forums occurred approximately once per month as there were no months associated with multiple video titles.  |
| *Experimental* |
| The online videos of the SCI Forums were posted to the Internet within 3 to 6 months of the in-person session. Treatment providers and the lack of information about frequency and duration from above are applicable to the online group as well.  |
| **Outcome Measures**[Give details of each measure, maximum possible score and range for each measure, administered by whom, where] |
| The primary outcome measure was a brief consumer survey based off of the Department of Education’s National Institute of Disability and Rehabilitation Research’s (NIDRR) recommendations. The survey evaluated the quality and effectiveness of the education format (both online and in-person) as self-reported by participants based on their satisfaction and attitude changes. The survey consisted of 4 questions for the in-person group and 8 questions for the online group with all questions rated on a 1 to 5 scale with 1 meaning strongly disagree and 5 meaning strongly agree. Questions are included below:* **Both groups**
	+ I learned new information from this forum.
	+ I changed my attitude about something as a result of this video (or forum).
	+ Information presented in this video (or forum) will benefit me.
	+ I will probably change my behavior or take some kind of action as a result of this video (or forum).
* **Online only**
	+ The information in this video was useful to me.
	+ The video was easy to watch on my computer.
	+ I could understand the information presented.
	+ Video is a better way to present this information than a written report or article.

Online viewer comments were also used as a qualitative outcome measure. Google Analytics was used to assess video viewership data from April 1, 2009 to March 31, 2010. By nature of the data collected (qualitative and total hits), there were no maximum possible scores or ranges for these measures.  |
| **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.] |
| Overall, 91% of online participants favored the video format to written information, including 88% agreed or strongly agreed with learning new information, 52% changing their attitude, and 61% likely to change their behavior or take action as a result of the video.

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| **Question** | **Average rating (in-person)** **Mean (SD), n=422** | **Average rating (online)** **Mean (SD), n=66** |
| I learned new information from this video (or forum)  | 4.47 (0.68) | 4.35 (0.77)  |
| I changed my attitude about something as a result of this video (or forum)  | 3.73 (1.03)  | 3.62 (1.09)  |
| Information presented in this video (or forum) will benefit me  | 4.25 (0.86)  | 4.21 (0.82)  |
| I will probably change my behavior or take some kind of action as a result of this video (or forum)  | 3.86 (0.99)  | 3.79 (1.07)  |
| The information in the video was useful to me | n/a | 4.41 (0.80) |
| The video was easy to watch on my computer  | n/a | 4.38 (0.70)  |
| I could understand the information presented  | n/a | 4.47 (0.71) |
| Video is a better way to present this information than a written report or article  | n/a | 4.55 (0.66)  |
| \*\*Rating on a 1-5 scale, 1=strongly disagree to 5=strongly agree No statistically significant between group differences between in-person and online ratings  |

**Online participants’ comments from evaluation survey by viewer category:**Other (caregiver, family, friend, student)* Benefit of receiving information from individuals with SCI, described as “priceless”
* Increased chance of using the resource when listening to a speaker as compared to reading an article
* Helpful information (ranging from student in neurology rotation to parent)

Individual with SCI* Planning to use the videos in training sessions with new caregivers
* Better understanding of information, leading to increased confidence and more informed participation in care
* New ways to cope discovered through conversations with others living with SCI

Health care professional* Benefit of having these videos to direct patients to for up-to-date information
* “Easy to understand language,” clear, concise format
* Increased enjoyment when listening to a speaker as compared to reading a “boring” article

Overall, there were 2510 online video views in 1 year as compared to 422 in-person attendees at the SCI Forums over 3 years.

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| **Most frequently viewed videos**  | **Total hits**  |
| Stem cells and regeneration of the spinal cord: practical barriers and new cell technologies | 527 |
| Conversations about…living with spinal cord injury | 361 |
| Autonomic dysreflexia  | 287 |
| Using hypnosis for spinal cord injury pain management  | 221 |
| Universal fitness: fitness after SCI  | 200 |

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| **Original Authors’ Conclusions**[Paraphrase as required. If providing a direct quote, add page number] |
| The authors concluded that the online video format is an effective education delivery method, as evidenced by the nearly six-time greater reach of the online format in just one third of the amount of time, wide geographic distribution of online audience reaching beyond the intended target population of individuals with SCI, and 91% satisfaction rating (agree or strongly agree) that the video format is preferred over a written report of the same information.  |
| **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.] |
| **Internal Validity:** The CASP checklist was used to assess the quality of this qualitative study, receiving 7 yes, 1 no, and 2 can’t tell as detailed below. * 1) Clear statement of the aims of the research? yes
* 2) Qualitative methodology appropriate? yes
* 3) Research design appropriate? can’t tell
* 4) Recruitment strategy appropriate? yes
* 5) Data collected in a way that addressed the research issue? yes
* 6) Relationship between researcher and participants considered? yes
* 7) Ethical issues taken into consideration? can’t tell
* 8) Data analysis sufficiently rigorous? no
* 9) Clear statement of findings? yes
* 10) How valuable is the research? yes

**Strengths**: The objective of the study is clearly presented and the nature of the information is qualitative to allow the opportunity for themes to emerge as well as to avoid limiting the results to known benefits of online videos and to allow new information to be presented in the comments section of the survey. The research design was appropriate, as the survey was developed “based on NIDRR recommendations to disseminate information to consumers that would lead to new knowledge, a change in attitude, and/or change in behavior.” (p. 405) Furthermore, the study design allowed for the opportunity to uncover unexpected results, including the benefit to health care professionals looking for reliable education materials to train their patients with SCI, students, and staff. **Weaknesses**: Data analysis is not sufficiently rigorous, and for this reason, a reasoning or justification for using qualitative design over a more rigorous design would have been beneficial for readers to understand the authors’ thought process. In addition, with evaluation only taken at one point in time, it is difficult to assess the treatment effect size as there is no comparison of the progress over time. The potential bias due to self-report, as there is no confirmation of the validity of the participants’ self-reported answers. The voluntary nature of participation in the control versus experimental group and survey itself are disadvantages of the study design. **External Validity:** The generalizability of the findings to the general public is limited due to the lack of information regarding key demographics outside of geography and relationship to the SCI topic. In addition, because only 2.6% of online viewers volunteered to participate in the survey, the results may only be applicable to those who also value this form of media and the effectiveness is potentially overestimated for the general population. The level of evidence of this article is 2b. Overall, while the quality is lower due to the lack of rigor in the study design, the value of the research is important, especially if it is able to direct research of increased quality in the future.  |
| **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 qualitative study provides support for online video as an effective education intervention tool for individuals with SCI and their caregivers as well as health care professionals. With no statistically significant differences between group ratings (as reported in the article), it indicates that individuals are equally as satisfied with the information being presented regardless of being in-person versus online. The quantitative and qualitative results both indicate the recurrent theme that video is the preferred method over written material of the same information. With evaluation only taken at one point in time, it is difficult to assess the treatment effect size as there is no comparison of the progress over time. For example, if the participants had been evaluated prior to viewing the video or re-evaluated after a certain amount of time during which they did not participate in other interventions, the self-report findings could have been validated by actual outcomes of behavior change due to information learned in the videos, not just presumptions that could be overestimated by bias of one’s own ability to change. Providing the quantitative data in terms of an odds ratio (as opposed to mean and SD) could have increased clarity of between group differences, by indicating how much more or less likely the online group was to learn or change attitudes as compared to the in-person group. Clinically, these results are important despite weaknesses, as the results do validate this education delivery method as one that can be suggested to avoid barriers such as location, time, and convenience that are present with the in-person form of education. By nature of the study, there is a lack of internal validity as participant blinding and allocation concealment were not possible. Participants chose control versus experimental group based on convenience, personal preference, and proximity to in-person forum location.While frequency and duration of the experimental intervention is unknown, it is suggested that date posted did not affect total video hits, as videos posted several years prior to the year of analysis (April 1, 2009 to March 31, 2010) still received a significant amount of views.  |
| **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.] |
| Hoffman et al. has high relevance to the clinical scenario, as these exact videos or any in the online format would be accessible to CK’s caregivers for additional education. The population and intervention match the clinical question with the control group of in-person sessions further supporting the online format, as in-person sessions have already been established as not practical or feasible for CK’s caregivers. While the results are difficult to generalize to the public due to lack of key demographics, the results are applicable to the effectiveness of the format itself as compared to written information, which is the alternative option for CK’s caregivers who are limited by timing barriers to attend in-person sessions as determined during their difficulties attending inpatient rehabilitation education sessions.  |

**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.]

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| **Synthesis of Results**: While the literature on educational interventions for caregivers of individuals with SCI is limited in quality and quantity, the current research reveals applicable themes. First, the primary factors affecting negative outcomes for caregivers include high levels of caregiver burden, poor caregiver adjustment, and poor caregiver quality of life.1 Outcome measures that assess these qualities are appropriate for the evaluation of future caregiver education intervention studies. Second, there is substantial evidence to support problem-solving training as an effective intervention in particular, as evidenced by statistically significant improvements in depression and social functioning as well as increases in quality of life, increases in coping skills, and decreases in health symptoms (although statistical significance unknown).1 The literature also supports peer support groups as improving caregiver outcomes of mental health, general health, and quality of life; however, there is less quantity of research on this intervention.1 Third, an online video format is an effective education delivery method for caregivers of individuals with SCI, as evidenced by the greater reach quantitatively of the online format and the qualitative preference of the video format over a written report of the same information.7The quality of the Baker et al. study could be improved by inclusion of more quantitative data to illustrate the effect size, power, and confidence intervals of the problem-solving training intervention to better understand its impact and future research needed. Increased methodological rigor (i.e. creating a high-quality RCT) would be useful to validate the effectiveness of the online video format for educational interventions for caregivers of individuals with SCI. **Applicability to the Clinical Scenario**: The low quality of evidence was considered, but the relevance outweighed that factor, as the remaining six articles were less applicable to the clinical scenario. The online video format will help to remove the barrier of inconvenient timing that has been a limiting factor for CK’s caregivers in the past. Problem-solving training are applicable to CK’s caregivers, as they were unable to attend a majority of the education sessions while he was in inpatient rehabilitation. This intervention will provide the skills to help them reason through commonly encountered problems and work through possible solutions, which will help promote self-efficacy in their care for CK in the future.Problem-solving training via online videos are supported by evidence and meet the needs of CK’s caregivers. More research on this exact combination is needed; however, the current research suggests these methods will at least do no harm or withhold information, as compared to the standard of care for caregiver education, in the meantime. **Implications for Future Research**: The prevalence of protocols and studies in recruitment suggest that caregiver education is a growing area of research currently. With the quantity aspect being addressed, hopefully the high-quality piece discussed above will accompany the increasing number of studies. However, most research focuses on one aspect of this topic. Different combinations (format, specific intervention, dual-target, etc.) will have different mediators affecting the outcomes. Therefore, future research is warranted to validate the particular combination of problem-solving training via online videos.  |

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