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Adjustable Velcro Compression Devices

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Adjustable Velcro Compression Devices Benchmark Study

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NURS 5382: Capstone

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Contents

Executive Summary

Edema and venous ulcers are often a life limiting diagnosis and condition. The prescribed care for venous ulcers is extensive, time consuming and expensive. Patient wounds can also be odorous. The standard treatment is compression therapy with the use of inelastic bandages changed three times weekly by a licensed practitioner. In the home health setting, compression wrap therapy is a financial and time-consuming burden with low success rate for long term positive results. Home health companies are overly burdened with patients, a nursing shortage and new demands for value based purchasing and decreased funding for patients with chronic conditions that require extensive wound care supplies.

Adjustable Velcro compression devices (AVCDs) are an approach to compression therapy that has not only been proven to be more effective than the standard inelastic compression bandages, but they are significantly cheaper and less time consuming providing the patients opportunity for self-care. AVCDs provide an opportunity for patients to have consistent compression that can be applied by themselves or other family members. AVCDs can also be removed when needed to provide necessary wound, skin and hygiene care. AVCDs promote greater patient compliance due to patient reported increased comfort. AVCDs significantly reduce costs by having a one-time purchase of the AVCD that is often covered by insurance instead of ongoing need for new supplies that may not be reimbursed by insurance companies to the home healthcare agency. Therefore, it is recommended that for patients with ongoing dependent edema and venous ulcers to use AVCDs instead of the standard multilayer compression bandages to promote patient satisfaction, healing of wounds, time efficiency and cost savings for home health care companies.

1. Rationale for the Project

In the outpatient home health care setting, two of the disease processes of the aging population that are time consuming, expensive and decrease patient's quality of life are lymphedema and venous stasis ulcers. Patients have often arrived in such a state due to non-compliance or complex comorbidities that lead to immobility and inability to care for their needs. For patients needing compression therapy, the current standard treatment is a conventional multi-layer compression wrap or inelastic bandage that is often hot, uncomfortable, costly, and not able to be applied correctly by the patient or patient's family to achieve the level of compression necessary for a good outcome.

In the Memorial Hermann Home Health company there are two specific examples of the cost and benefits of AVCDs. The first example, patient A, was a 50-year-old male with multiple co-morbidities including advanced liver disease, lymphedema, lower extremity neuropathy, lower extremity wounds, history of non-compliance, bilateral lower extremity wounds and hypertension. During his time as a patient, he obtained wounds to his bilateral lower extremities that were not healing due to the extensive edema. He then became a patient at a Memorial Hermann outpatient wound care center. He was wheelchair bound with limited ability for transportation and would often miss his wound care appointments. His prescribed wound care treatment involved expensive wound care products with collogen and three times a week multi-layer compression wrap. Every visit the RN would find the patient's leg wraps either cut or pulled off due to patients' inability to tolerate the compression 24 hours a day. The patient had no way to reapply the compression wraps once compromised. No improvement was made on wounds despite aggressive treatment due to the extensive lymphedema. The wound care clinic after months of treatment then ordered the patient a Sigvaris adjustable Velcro compression wrap

that the patient found to be comfortable and was able to remove when needed. The patient was compliant with his treatment for the first time under the care of Memorial Hermann outpatient and home health services. The patient's wounds began to show improvement within the first several days and all his bilateral wounds were healed in less than 4 weeks with his bilateral lower extremity edema that had previously been 4+ pitting edema to non-pitting edema. The patient was then able to be discharged from home health due to met goals and no longer needing home health services as he was self-sufficient in his care.

Patient B is a 70-year-old female who had been treated for comprehensive venous ulcers to her bilateral lower extremities. Her other past medical history was primarily negative outside of a history of breast cancer 35 years prior. Memorial Hermann Home Health had been seeing the patient a year and a half. In a 4-week period, the patient was seen 11 times as she would be seen three times weekly including one week seeing her wound care doctor for one visit. Her multilayer ordered wraps consisted of saline for cleaning, 4x4s, collagen, ABD pads, xeroform, rolled gauze and ace wraps. After 18 months of treatment, her wounds would improve and then once again decline with no real improvement towards healing. The patient was not able to take a shower or bath due to her wounds and she often stayed secluded from everyone including her family. There is no current planned discharge date at this time due to non-healed ulcers and goals not being met.

2. Literature Synthesis

Multiple studies conducted have provided sufficient evidence to justify the effectiveness of AVCDs. Twelve articles were identified for review which consisted of randomized control trials, case study cohorts, and systematic reviews. Whether the studies were individual case studies or larger scale randomized controlled studies, each study concluded that AVCDs are

effective and cost efficient with greater patient compliance leading to improved quality of life. Recent studies have proven that AVCDs can produce greater outcomes than the multilayer short bandage wrap systems (Cox & Bousefield, 2021).

If this change is not implemented as the current population continues to age, there will be greater incidence of patients suffering from these disorders. In patients greater than 65, it is estimated that 3-4% of the population is affected (Probst et al., 2021). In the over 85 population alone, it is estimated that there will be an increase in population by 144% from 2010 to 2031. As patients age, their comorbidities also increase. These comorbidities, such as arthritis, also prevent a patient from effectively using the current standard of treatment due to their difficulty in application (Todd et al., 2019). A greater incidence of patients will significantly increase patient care costs and greater stress on home health care companies that cannot sustain patients that require visits three times weekly for short bandage compression wrap therapy. To be more specific, patients are often in treatment from 6 months to 5 years and the estimated cost associated with these disorders was 15 billion dollars in 2011 (Phillips et al., 2018). As Medicare reimbursement moves toward a new model of value-based purchasing, patient outcomes are closely monitored. Home health care companies will need to become increasingly efficient at providing alternatives for patients that require long term care with minimal improvements. Effective treatment must address all these issues to promote compliance.

Benigni et al, (2018) in two different studies compared different types of wraps for different lengths of time with the same outcome and determined that AVCDs were more effective. Borman et al, (2021) in a prospective randomized single blind study of 38 patients, compared a multilayer short bandage with a Circaid AVCD. The AVCD was not only proven to be effective but also shown to provide improved quality of life. Mosti et al. (2020) conducted a

study of 66 patients and not only provided evidence that AVCDs are more effective, but also significantly more cost effective due to patient's ability to self-apply. Lee (2018) studied five patients including patients that had wounds that would not heal, and all the patients' wounds showed significant improvement while improving the patients' quality of life and being cost effective. Bradley et al. (2017) studied ten patients who had long term ulcers and demonstrated that AVCDs were more effective, safer due to improved mobility attributed to patients being able to wear shoes, improved quality of life, and being able to manage their own compression.

3. Project Stakeholders

There are several identified stakeholders. First and foremost, the biggest stakeholder is the patient. It is the patient who has decreased quality of life due to their chronic conditions that are life limiting. Improving these conditions provides increased comfort and greater quality of life. Other stakeholders are the administration of the home health care company that are financially responsible for managing the company and making sure the best cost-efficient care is being provided. Another stakeholder is the physician who is responsible for managing the care of the patient to promote healing. The final stakeholder is the President of the entire Memorial Hermann Health System. The Memorial Hermann Home Healthcare Company is used to provide support to the entire system. Any financial benefit and increased patient care outcomes and effectiveness impacts the system as a whole.

4. Planned Implementation

There are 9 major steps to implement this evidence-based change.

Preparation Phase (Week 1, Steps 1-3)

The first steps (1-3) comprise the preparation phase. This will take place during the first week of the project. The first step is to provide education to the field staff and managers. This

will allow them to understand the benefits, purpose, and scope of the project to be implemented. The staff will also learn how to measure patients for the correct size of device, how to order the devices and what patients qualify for their use.

The next step of the preparation phase is to identify patients that qualify for an AVCD. Managers will assess their current census for any patients currently receiving compression therapy. Other patients that will be considered are patients that have venous insufficiency and are not currently being treated with compression therapy, but their disease process suggests that compression therapy would be effective in their treatment plan.

The third step to the preparation phase during the first week is to educate as many physicians as possible. Primarily physicians in the Memorial Hermann Medical Group as well as the primary care providers that are directly involved with the patients that are currently receiving compression therapy. After education has been provided, new orders from the physicians will be obtained. The selected patient will need to be educated on the proposed change and treatment plan. The requested change would then be discussed with the physician to obtain orders to update the patient's plan of care. If a protocol is developed for identifying patients who qualify and preparation for the order including measurements needed from the patient, this protocol would be enacted at this time. This step will take an approximate time of 2 weeks. If a protocol is developed and can be faxed to a physician for approval, this could decrease the time needed by 1 week. This allows for time to collect the data and to also speak with the physicians. The second group of steps is the implementation phase in which the AVCDs are to be ordered through the patient's insurance. This will take approximately 2 weeks to allow for shipping times and insurance approval. Once the AVCDs arrive at the patient's home, the next step is for the patient to be provided with an educational session to discuss how to properly apply the AVCD. From the

initial educational visit and initial application to the end of the evaluation period will be approximately 8 weeks for a total of a 12-week evidence-based change implementation plan.

Supplies Phase (Steps 4-5, Week 2)

Step 4 consists of the home health nurse making a home health visit with the client and obtaining the necessary measurements to order the correct device size. For step 5 the home health nurse will then order the device through the medical supply company that Memorial Hermann Home health currently uses for patient care supplies.

Implementation Phase (Steps 6-7, Weeks 3-4)

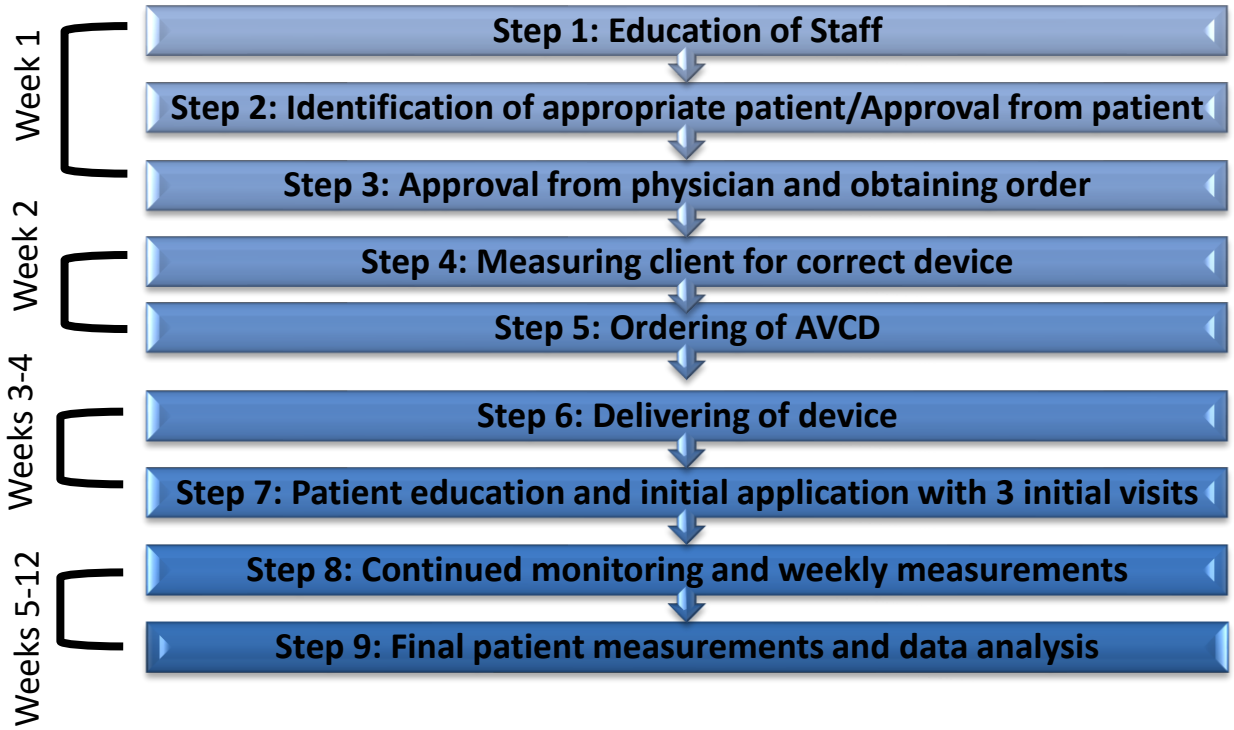
During the implementation phase, Step 6 is when the device is delivered to the home. Step 7 involves initial measurements of wound and accurately and thoroughly determining the extent of edema. Measurements of the wounds must be taken and recorded along with a picture if wound pictures are a part of the agency protocol and integrated into the Swift wound management application on the home health care nurse's agency tablet. 3 different calf measurements will be taken and recorded. Those intervals will be one inch below the knee, mid-calf and an inch above the ankle. The home health nurse will then return for two additional visits within the next 7-10 days to answer any questions, and follow up on fit, patient compliance and further educational needs.

Data Collection and Evaluation Phase (Steps 8-9, Weeks 5-12)

Once the patient's education and compliance has been completed, the home health nurse will provide weekly visits to obtain measurements for evaluation. Each weekly visit during weeks 5-11 the home health nurse will record the patient's daily weight, wound care measurements and pictures using Swift and the patient's three calf measurements.

Week 12 is the final project week where data will be collected, assimilated, and analyzed. Patient satisfaction will be recorded narratively by the home health care nurse during their last visit with the client before the trial ends.

5. Timetable/Flowchart



Steps for Implementation	Description of Step	Time Frame
Step 1-3:	1. Education of staff – Topics included: What are AVCDs, AVCD benefits to patient and company, how to measure for correct device size, how to order AVCDs 2. Identification of qualified patients – patients with edema and venous ulcers that are currently being treated with compression therapy or their disease process suggests it would be beneficial to have compression therapy. Approval of patients – patient must agree to wear AVCDs if obtained. 3. Approval of physician to implement change – AVCDs must be ordered by the physician.	1 weeks
Step 4-5:	4. Measuring of patient – specific measurements must be taken to determine the correct sizing for the patient 5. Ordering of correct device – based off measurements and	1 weeks

	insurance approval	
Step 6-7:	6. Delivery of device to patient's home address. 7. Patient and family education and initial application.	2 weeks
	8. Continued monitoring – home health nurse to visit weekly to measure calf circumference along with wound measurements of all wounds present and document daily weights. 9. Final evaluation of change – final measurements taken for observation period. If favorable, patients to continue wearing until physician ordered to stop and/or wounds are healed.	8 weeks

6. Data Collection Methods

The data that needs to be collected is first, the patient's daily weight. The patient will weigh initially at the start of the implementation phase and then daily while keeping a daily log. The second factor would be multiple measurements of the lower extremities to measure the patient's edema. These measurements would need to be an assessment of the type of edema present, non-pitting, 1+, 2+, 3+, or 4+. And then three circumference measurements will be taken at the base of the ankle, the middle of the calf and just below the knee. The lower extremity measurements will be done on a weekly basis, preferably on the same day each week. Each location will be slightly marked with a permanent marker so that each week, the measurements are taken at the same location.

Data regarding the patient's wounds also needs to be collected. Patient's wounds need to be measured weekly and the entire surface area of the patient's wounds calculated. The most accurate way to consistently obtain these measurements is to instill the use of the Swift WoundTrack application that can be installed and integrated with their current Home Care Home Base software using their Samsung tablets. This software calculates all the necessary statistics regarding the wound size and provides necessary graphs and charts to show how the wounds are progressing.

After collecting all the data from patient's using both AVCDs the data will be examined and compared using both descriptive and inferential statistics. The descriptive statistics that will be applicable for this change project are the range and mean. The range is important to see how small to how large the wounds are being assessed in the study as well as the range of edema that was being included. It is also important to take each category at every weekly interval and have a mean of each category for both edema and wound size. This will provide an easy side by side comparison of what is happening weekly.

The improvement of patient's quality of life and satisfaction with care being provided for this study specifically will be recorded descriptively by the home health nurses during their visits. The questions that they will be asking are the following: How would you describe your experience with wearing adjustable Velcro compression devices? These responses will be recorded and reported to the project manager.

7. Costs/Benefits

To determine the financial success of the implemented change, it will be determined by examining the comparison between AVCDs and multilayer compression wrap systems. To determine the financial savings from the implementation of the AVCDs the total cost of nursing visits and total cost of the AVCDs will be added together along with any additional wound care supplies and divided by total number of AVCD patients to obtain a mean total cost per patient. Then the total cost of nursing visits and wound care supplies spent on the patient while they were inelastic bandage wrap system will be determined for the same length of time. If it is determined that the cost per patient using AVCDs is less than patients using multilayer compression wraps, the implement change project will be determined to be financially successful. Additional costs that are one-time investments regarding implementing the EBP change will not be determined in

this comparison as they are costs that will not be ongoing. The provided chart is an example of cost savings based off conservative numbers and products that can be currently purchased off Amazon. Once the change is implemented, the cost savings would be expected to be even greater especially because the purchase of the ACVDs is a one-time purchase and the multilayer compression wraps are an ongoing expense.

Supply Costs	
AVCDs	**Multilayer Compression Wraps**
Circaid Juxtalite - $80/set x 2 = $160	$16/set x 2 = $32 x 3 = $96/week
	$96 x 12 weeks = $192
	$96 x 52 weeks (year) = $4,992

Approximate Nursing Visit Cost for 3 months (12 weeks)	
AVCDs	**Multilayer Compression Wraps**
1 week x 3 visit for initial set up	12 weeks x 3 visits per week = 36 visits
11 weeks x 1 visit per week = 14 visits	36 visits x $40-60 per visit = $1440-2160
14 visits x $40-60 per visit = $560-840	Yearly cost for 3 visits per week = $6,240 - $9,360
Yearly cost for weekly visits: $2,160-$3,240	

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Total Yearly Cost: $2,320 - $3,400	**Total Yearly Cost: $11,232 - $14,352**

8. Discussion of Evaluation

The evaluation phase is used to determine if the change was successful in being carried out and if the change made a positive change. A positive change amongst the patient will also be considered a financially positive change due to value-based purchasing reimbursement with Medicare.

After collecting all the data from patient's using both AVCDs and MCWs the data will be examined and compared using descriptive statistics. The descriptive statistics that will be applicable for this change project are the range and mean. The range is important to see how

small to how large the wounds are being assessed in the study as well as the range of edema that was being included. It is also important to take each category at every weekly interval and have a mean of each category for both edema and wound size. This will provide an easy side by side comparison of what is happening weekly.

At the end of week 11, to evaluate the financial success of the project an average cost per patient will be determined per the example provided by determining the nursing visit cost and supply cost for the patients during the 7 weeks of implementation. A 7-week cost analysis will also be determined for each individual patient in the 7 weeks prior to the implementation of AVCDs that includes the supply cost and nursing visit cost.

To determine AVCDs effectiveness for patient edema and venous ulcer therapy, the wound data that Swift collected and analyzes will be reviewed and examined. If patients have documented improvement of both edema and wounds, the project will be considered successful. Other statistical analysis that may be used to provide further documentation of the improved change would be a t-test. This hypothesis testing will further provide evidence that the data collected was not just be chance but can be used to infer what will occur in future patients even though the sample size will most likely be small and less than 30.

The process used to implement the change also needs to be evaluated. A survey using a Likert scale will be used to gain information regarding patient compliance and comfort. An additional survey will also be sent out to clinicians to determine if they have moved their qualifying patients over to AVCDs and how frequently they are having to make a nursing visit to patients that are compliant. The field nurses will also be asked about factors that have impacted the change and if the implementation process was effective.

By concluding in-depth evaluation of the physical, financial and process of change for implementing AVCDs it will be able to be determined if AVCDs improve patient care and decrease financial and time burden to the home health care agency. Due to the cost savings of implementing AVCDs any greater effectiveness in wound healing compared to MCW will be considered successful.

Conclusions/Recommendations

Moving forward, after this project is implemented, it is recommended that Memorial Hermann Home Health Care consider supplying the patients with the AVCDs if their insurance does not approve providing it. One hundred and fifty dollars could be a barrier for a patient to obtain them if their insurance company did not approve it and the cost savings far outweighs the cost of the device if Memorial Hermann Home Health would be willing to make sure that every patient had an AVCD to use if ordered by the physician. Memorial Hermann Home Health could also keep a stocked supply of them in their warehouse that are issues to the patients. This would eliminate the wait time for the AVCD to be delivered and would eliminate the complexity for the home health nurse in ordering it.

It is also recommended that a patient receiving compression therapy be switched over to AVCDs as soon as possible upon admission. Another potential barrier that was discovered is the dependence that patients can acquire on home health nurses three times weekly visits and by providing treatment that is more effective and does not require that level of involvement and visits may be discouraging to the patient, especially the home bound patient who has no other visitors. If they are initially placed into AVCDs and never experience frequent nursing visits, will not be seen as a loss to them.

Regarding staff and the future, it will be important for everyone to work together in helping physicians see the needs and benefits of such devices to continue to have those conversations with physicians early. It would also be beneficial for social workers and case managers in the hospital to be aware of the outpatient goals. If case managers and social workers are aware that AVCDs should be used upon discharge instead of compression wraps, they can help obtain the supplies and possibly even see if the AVCDs can be ordered and obtained before discharge in the same way that oxygen, walkers and other DME is provided before discharge. In conclusion, there is a need for improved care regarding patients with chronic edema and venous ulcers due to a patient's poor quality of life and the financial strain and time burden that the current standard of treatment places on home health care companies. Adjustable Velcro compression devices are a proven effective treatment that not only is more effective in reducing edema and promotes increased wound healing, but it also decreases the licensed nursing staff burden and decreases cost for the home health care company.

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