Program Evaluation on Hospital in Home Model of Care for Veterans with Chronic Spinal Cord Injury

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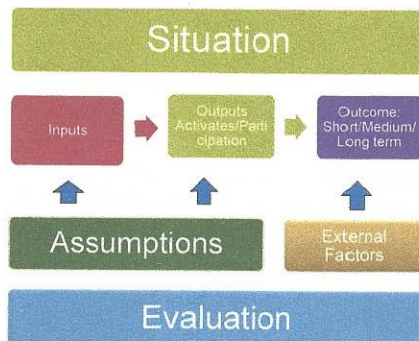
Purpose

- The purpose of this evaluation is to explore evidence and discern if HiH care model is effective in optimizing health outcomes, reducing cost of care and maintaining patient's satisfaction compared to patients treated with inpatient care.

Background

- Spinal cord injury (SCI) is a condition which may results in complete or incomplete loss of motor functions, sensory functions, and autonomic function (Singh, Tetreault, Kalsi-Ryan, Nouri, and Fehlings, 2014). SCI impacts patient's physical, psychological, and social well-being and places substantial financial burden on health care systems.

- The economic impact of SCI is largely due to long-term complications, including pressure ulcers, bladder and bowel dysfunction, neuropathic pain, and respiratory problems (Singh et al. 2014).

- Transitioning of SCI patients to intermediate care facilities has been challenging, leading to prolonged hospitalizations, increased risk of hospital acquired infections, worsening pressure ulcers, increase healthcare cost and increased inpatient bed shortage.

- A regional VA Hospital's strategic solution to these problems was the implementation of "Hospital in Home" (HiH) program. HiH is a medical service that allows for the provision of active treatment by healthcare professions for conditions that otherwise would require acute hospital in-patient care in a community setting or patient home (Shepperd and Iliffe, 2005).

Theoretical Framework

The CDC logic model was used to organize the evaluation process and depict the relationship between HiH inputs, activities outputs and intended outcome of interest (CDC 2006).

Situation

Inputs → Outputs Activates/Participation → Outcome: Short/Medium/Long term

Assumptions | External Factors

Evaluation

Methods

Project Design: A program evaluation with a quasi-experimental design comparing the outcome variables between the "Hospital in Home" (HiH) group and inpatient group without any form of randomization.

Intervention:
1. Inpatient group completed all medical treatment with inpatient care.
2. HiH group received initial treatment as inpatient and was discharged home to complete medical treatment with daily RN visits and daily physician oversight with follow-up physician visits as needed.

Setting: SCI center at a regional VA Hospital

Target Population: Veterans with chronic SCI admitted for Urinary tract Infection (UTI), Pressure ulcer/osteomyelitis, or pneumonia

Outcome measures:
1. Health outcome (Readmission rate and Mortality rate)
2. Cost reduction (length of stay)
3. Patient satisfaction (patient satisfaction survey at two weeks and at discharge)

Results: Sample Characteristics.

Variables	Inpatient Group (n=127)	HiH Group (n=15)	P Value	Model Statistic
Age (years)	60.4(12.15)	52.1(8.62)	0.110	t = 2.368
Gender			0.73	X² =0.119
Male (%)	126 (99.2)	15 (100.0)		
Race: Number (%)			0.595	X²=1.039
White	100 (78.7)	11 (7.3)		
Black	23 (18.1)	4 (26.7)		
Asian	4 (3.1)	0(0.0)		
Education Level (%)			0.519	X²=1.311
≤ High school	77 (60.6)	11(7.3)		
Some College	34 (26.3)	2 (13.3)		
≥College	16 (12.6)	2 (13.3)		
Patient level of Injury				
Quadriplegia	80 (63.0)	6 (40.0)	0.099	X² =2.969
Paraplegia	47 (37.0)	9 (60.0)	0.085	X² =2.969
Comorbidities (SD)	18.13 (6.25)	18.87 (3.98)	0.655	t = -0.448
Medications (SD)	17.02 (6.99)	16.13 (4.16)	0.630	t = 0.483
Admitting Diagnosis: Number (%)				
UTI	64 (50.4)	9 (60.0)	0.589	X² = 0.496
Pressure ulcer/ Osteomyelitis	40 (31.5)	6 (40.0)	0.564	X² = 0.443
Pneumonia	23 (18.1)	0 (0.00)	0.060	X² = 3.242

Results:

1. Health Outcome: Readmission & Mortality rate
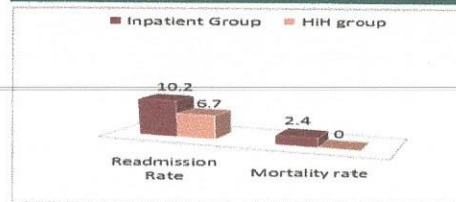
Readmission Rate: Chi-square = 0.192, p-value = 0.661. Results are not significant as p > 0.05
Mortality Rate: Chi-square = 0.362, p-value = 0.547. Results are not significant as p > 0.05

2. Healthcare cost/Length of Stay

Mean length of Stay and Cost of care by Program

By Program	Inpatient Group (n=127)	HiH Group (n=15)	CI of difference	T-test Result	P-value
Length of stay (SD)	34.24 (73.75)	35.73 (27.86)	-21.10 to 18.11	-0.154	0.876
Cost of care (SD)	$251,411 ($533,541)	$15,977 ($12454)	$141,534 to $328,334	4.961	0.000

Mean length of stay and cost of care for patients admitted with UTI

Patients admitted with UTI	Inpatient Group (n =64)	HiH Group (n =9)	T-test Result	P-value
Length of stay in days (SD)	17.64 (24.64)	23.56 (22.23)	-0.737	0.476
Cost of care in dollars (SD)	$129,479 ($180,139)	$10,531 ($9,939)	5.226	0.000

Mean Length of stay and cost of care for patients admitted for pressure ulcer/osteomyelitis

Pressure Ulcer/Osteomyelitis	Inpatient Group (n =40)	HiH Group (n = 6)	T-test Result	P-value
Length of Stay in days (SD)	72.46 (119.13)	54.00 (26.74)	0.849	0.709
Cost of care in dollars (SD)	$531,823 ($858,961)	$24,144 ($11,954)	3.736	0.001

3. Satisfaction

Discussion

1. Results for **health outcome**, readmission rate and mortality rate were greater with inpatient group when compared with HiH group,. However the difference was not statistically significant due to the large difference in sample size between the groups.
2. **Cost & LOS:**
   a. **Average LOS** between the two groups varied based on the program used and the admitting diagnosis. The difference was not statistically significant.
   b. There was a **cost saving** in favor of HiH when analyzed by program and admitting diagnosis, which were statistically significant. However, due to the large difference in sample size between the two groups, generalization of this result should be used with caution.
3. **Satisfaction:** Patients in HiH group were satisfied with the care they received and preferred the HiH program more than inpatient hospital care, likely influenced by less disruptions to family life.
4. **Recommendations:** Increase the number of admitting diagnoses into the program; identify better strategies to create greater awareness of the program to other areas of the hospital and increasing physician involvement in patient care to include at least one or two compulsory home visits per week, this may be crucial in improving patient acceptance of the program.

Limitations

- Patients in both group were not randomly assigned, but they had remarkably similar characteristics, in terms of level of injury and admitting diagnosis.
- The sample size for the HiH group was relatively small compared to the inpatient group. This could have skewed the results.
- The cost analysis was only based on the average cost per bed-day and average cost per day visit, and this does not reflect the total cost of managing these conditions.

Acknowledgements

References

- Center for Disease Control and Prevention (CDC) Division for Heart Disease and Stroke Prevention, State heart Disease and Stroke Prevention Program (2006). Evaluation guide: Developing and using a logic model. Center for Disease Control and Prevention. Atlanta, GA: Retrieved from www.cdc.gov/dhdsp/programs/spha/evaluation_guides/docs/logic_model.pdf
- Shepperd, S., and Iliffe, S. (2005). Hospital at home versus in-patient hospital care. The Cochrane Library (3): CD000356. doi: 10.1002/14651858.CD000356.pub2.
- Singh, A., Tetreault, L., Kalsi-Ryan, S., Nouri, A., & Fehlings, M. G. (2014). Global prevalence and incidence of traumatic spinal cord injury. Clinical Epidemiology. 23(6), 309-331. doi: 10.2147/CLEP.S68889. eCollection 2014.

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