

Patients' Perception of Environmental Control Units: A Pilot Study on Experiences of Patients with Cervical Spine Injuries

¹Dr. Hetal Jagdishkumar Tripathi

¹Ph.D., Lecturer & Occupational Therapist, Gujarat University, Government Occupational Therapy College, Ahmedabad, Gujarat, India

²Dr. Titiksh Vijeshkumar Varma

²M.B.A., B.O.T., Lecturer & Occupational Therapist, Gujarat University, Government Occupational Therapy College, Ahmedabad, Gujarat, India

Abstract:- Environmental control unit (ECU) permits remote control of electronic devices for the individuals' surroundings such as their home temperature and entertainment systems. This allows a person to turn on or off lights, a radio or television, and use a phone and or unlock a door from a remote or other room location. Any part of the person's environment can be controlled depending upon the system's complexity. It enables independence for physically and functionally disabled clients, and reduces burden and frequency of demands on care-givers.

Aim:

To assess the perception of patients with cervical spine injuries at Government Spine Institute after using environmental control units.

Methods:

Twenty (20) patients with cervical spine injuries were approached for the study. 12 of 20 patients were selected for the study on the basis of inclusion and exclusion criteria. A brief questionnaire was given to the patients when they just got admitted to the hospital. Occupational therapists gave ECUs training to them on daily basis in occupational therapy department for 1month. The same questionnaire was filled up again when they got discharge. Data were analysed using descriptive statistics.

Results:

The majority of respondents reported using ECUs in hospital-based treatment with the patients with cervical spinal cord injuries. However, a few respondents only recommended ECUs for home use. High cost and the lack of support from government or third-party reimbursement were the primary reasons that deterred respondents from recommending ECUs for home use. Fifty-five percent of the respondents reported a need for basic training and more in-depth education and training in environmental control technologies.

Discussion & Conclusion:

ECUs were well accepted by the patients with cervical spinal cord injuries in the inpatient setting, and increased patients' perceptions of independence. To maximise usability and satisfaction, facilities should ensure that comprehensive training on ECU use and features

available is offered to all patients, and resources are available for timely troubleshooting and maintenance. The future study can be done with a larger sample size to increase the effectiveness of the study. Outcomes data are needed to support the use of ECUs and to educate government and third-party payers about the benefits of ECUs for clients with quadriplegia in order to increase rates of reimbursement.

Keywords:- Environmental Control Unit, Cervical Spine Injuries, Quadriplegia.

I. INTRODUCTION

Environmental control unit (ECU) permits remote control of electronic devices for the individuals' surroundings such as their home temperature and entertainment systems. This allows a person to turn on or off lights, a radio or television, and use a phone and or unlock a door from a remote or other room location. Any part of the person's environment can be controlled depending upon the system's complexity. It enables independence for physically and functionally disabled clients, and reduces burden and frequency of demands on care-givers.

➤ E-Mukt in Occupational Therapy Department:

- E-Mukt is an indigenous developed ECU which was installed in the occupational therapy department.
- It consists of Environment control device and an android based tablet.
- It is connected with electronic equipments through the environmental control device which can be controlled by the tablet through a wireless connections and APP.

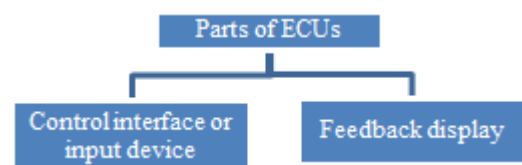


Chart-1 Parts of ECUs

➤ Aims of the study:

- To assess the perception of patients with cervical spine injuries after using environmental control units

- Objectives of the study:
 - To observe the impact of ECU on the quality of life of patients with cervical injuries
 - To understand the pre and post level of competence, adaptability and self-esteem of patients with cervical injuries
- Significance of the study:
 - If the quality of life of patients with cervical injuries is being improved with the help of ECU, it can be a good assistance/support to enhance functional independence and well-being by increasing competence, adaptability and self-esteem.

II. METHODS

- *Study design:* Randomized controlled Trials
- *Study setting:* Occupational Therapy Department, Government Spine Institute
- *Target Population:* The patients with cervical injuries
- *Sample size:* 12 (6 Male+ 6 Female)
- *Study duration:* 6 months
- *Study tool:* Psychosocial Impact Of Assistive Devices (PIADS)



Photograph- 1 Control interface or input device



Photograph-2 Feedback display

- *Sampling method:* Random sampling
- *Codes of ethics:*
 - Permission was taken before filling up the form and written consent was taken in the form.
 - Any personal information of the patients will not be disclosed during or after the study.
- *Inclusion Criteria:*
 - Basic mobile user
 - Age within the specific range of 18 years-45 years
 - The patients with cervical cord injuries with level- below C5
 - The patients who have undergone 1 month ECU training
 - The patients who are admitted in the hospital
- *Exclusion Criteria:*
 - The patients who could not complete 1 month ECU training
 - Patients with any other medical/physical/psychological condition
- *Procedure:*

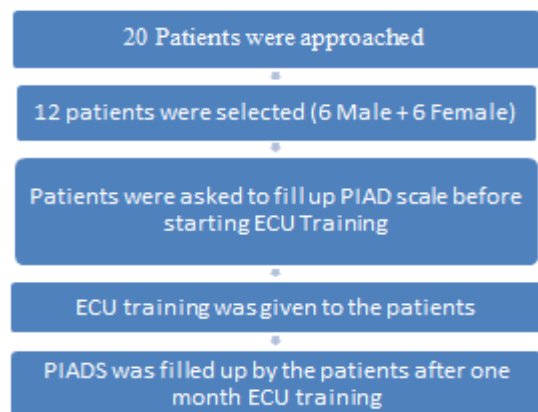


Chart-2 Procedure of data collection and ECU training

- Twenty (20) patients with cervical spine injuries were approached for the study. 12 of 20 patients were selected for the study on the basis of inclusion and exclusion criteria.
- The patients were asked to fill PIADS before starting E-Mukt Training
- The patients were taking medical treatment along with rehabilitation in the hospital.
- As a part of rehabilitation treatment, the patients were taking occupational therapy along with physiotherapy on a daily basis. Occupational therapists gave ECUs training to them in occupational therapy department for 1 month everyday.
- The PIADS was filled up again after a month. The data was analysed by using SPSS-24 and Microsoft Excel.



Photograph- 3 Patient using ECU

III. RESULTS

Table-1 Pre and post training data of the patients on PIADS

Subclasses	Score	No. of Patients	Pre Training	Score	No. of Patients	Post Training
Competence	-3	6	50%	+3	5	41.67%
	-2	3	25%	+2	4	33.30%
	-1	3	25%	+1	3	25%
	0	0	0%	0	0	0%
Adaptability	-3	5	41.67%	+3	4	33.30%
	-2	4	33.30%	+2	4	33.30%
	-1	3	25%	+1	4	33.30%
	0	0	0%	0	0	0%
Self-esteem	-3	7	58.30%	+3	5	41.67%
	-2	3	25%	+2	3	25%
	-1	2	16.67%	+1	4	33.30%
	0	0	0%	0	0	0%

Table-2 Mean Score of pre and post training data of the patients

Mean score	Pre Training	Post Training
Competence	- 2.25	+2.16
Adaptability	- 2.16	+2.00
Self- esteem	- 2.41	+2.08

IV. DISCUSSION

- The post training mean score of PIADS is very high in compare to pre ECU training.
- It has been come to observation that female patients noted less self-esteemed in compare to male patients
- The average value of competence was very low before the training and gradually increased after ECU training. It shows that the patients felt more competent and self-esteemed.
- The post ECU training adaptation level of the patients was also noted with high mean score.
- None of the patients reported no impact- (0) on PIADS after ECU training
- ECUs were well accepted by the patients with cervical spinal cord injuries in the inpatient setting, and increased patients’ perceptions of independence.

- To maximise usability and satisfaction, facilities should ensure that comprehensive ECU training on ECU use and features available is offered to all patients, and resources are available for timely troubleshooting and maintenance.
- The future study can be done with a larger sample size to increase the effectiveness of the study.
- Outcomes data are needed to support the use of ECUs and to educate government and third-party payers about the benefits of ECUs for clients with cervical injuries in order to increase rates of reimbursement.

V. CONCLUSION

- The majority of respondents reported using ECUs in hospital-based treatment with the patients with cervical spinal cord injuries. However, a few respondents only recommended ECUs for home use.

- High cost and the lack of support from government or third-party reimbursement were the primary reasons that deterred respondents from recommending ECUs for home use.
- Fifty-five percent of the respondents reported a need for basic ECU training and more in-depth education and training in environmental control technologies.

ACKNOWLEDGEMENTS

Thanks to Government Spine Institute & physiotherapy college, Asarwa, Ahmedabad for allowing me to conduct this research.

REFERENCES

- [1]. Backus, K. (Ed.). Medical and health information directory (6th ed., vol. 3). Detroit, MI: Gale Research, 1992
- [2]. Bloch, R. F., & Basbaum, M. (Eds.). Management of spinal cord injuries. Baltimore; Williams & Wilkins, 1986
- [3]. Cook, A. M., & Hussey, S. M. Assistive technologies: Principles and practice. St. Louis, MO: Mosby, 1995
- [4]. Dickey, R., & Shealey, S. H. Using technology to control the environment. American Journal of Occupational Therapy, 1987, 41, 717-721.
- [5]. Dillman, D. A. Mail and telephone surveys. New York: Wiley, 1978
- [6]. Efthimiou, J., Gordon, W. A., Sell, G. H., & Stratford, C. Electronic assistive devices; Their impact on the quality of life of high level quadriplegic persons. Archives of Physical Medicine and Rehabilitation, 1981, 62, 131-134.
- [7]. Garrison, J. Emergency signaling for a person with quadriplegia and extra ordinary respirarory risk. Archives of Physical Medicine and Rehabilitation, 1982, 63, 180-181.
- [8]. Gross, K. Controlling the environment. Team Rehab Report, 14-16.
- [9]. Jenkins, R. POSSOM; New communication aid. Special Education, 1967, 56(1), 9-11.
- [10]. Kanny, E., & Anson, D. Technology training in occupational therapy curricula: Changes from 1989 to 1994. Manuscripr in preparation, 1996
- [11]. Kanny, E., Anson, D., & Smith, R. A survey of technology education in entry-level curricula: Quantity, qualiry, and barriers. Occupational Therapy journal of Research, n, 1991, 311-319
- [12]. Mann, W. C. Use of environmental control devices by elderly nursing home patients. Assistive Technology, 1992, 4(2), 60-65.
- [13]. McDonald, D. W., Boyle, M. A., & Schumann, T. L. Environmental control unit utilization by high-level spinal cord injured patients. Archives of Physical Medicine and Rehabilitation, 1989, 70, 621-623.
- [14]. Somerville, N. J., Wilson, D. J., Shanfield, K. J., & Mack, W. A survey of the assistive technology training needs of occupational therapists. Assistive Technology, 1990, 2(2), 41-49.

- [15]. Snait, M. P., & Fridie, S. E. Environmental control units: Are they really luxury devices? Proceedings of the International Conference on Rehabilitation Technology, 1988, 176-177.
- [16]. Symington, D. C, Lywood, D. W., Lawson, J. S., & Maclean, J. Environmental control systems in chronic care hospitals and nursing homes. Archives of Physical Medicine and Rehabilitation, 1986, 67, 322-325.
- [17]. Trefler, E. Narionally Speaking-Technology applications in occupational therapy. American Journal of Occupational Therapy, 1987, 41, 697-700.
- [18]. Vanderheiden, G. Computers can play a dual role for disabled individuals. BYTE, 1982, 7(9), 136-162.