

Effectiveness of an educational booklet in performing self-exercise program for incomplete paraplegic patient following spinal cord injury.

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Abstract

Purpose of the study: the ultimate purpose of the study is to find out the effectiveness of an educational booklet in performing self-exercise program for incomplete paraplegic program following spinal cord injury. **Objectives:** to test the effectiveness of an educational booklet in self-exercise program of incomplete paraplegic patient, to find out the functional progress of incomplete paraplegic patient by following this booklet, to focus a useful and effective way of performing self-exercise program by following an educational booklet, so that can be used in the spinal cord injury rehabilitation program. **Methodology:** A quantitative quasi experimental research design was adopted in this study. 16 incomplete paraplegic spinal cord injury patients were purposively allocated into two groups. 8 patients were in experimental group (with educational booklet) and 8 patients were in control group. **Measurement tools:** Data was collected by FIM scale and data was analyzed by unrelated 't' test. **Result:** educational booklet was found an effective material with physiotherapy for improving the performance of self-exercise program of incomplete paraplegic following SCI. out of six, five traits of different exercise program were effective, and p value was, self-stretching exercise ($p < 0.025$), strengthening exercise ($p < 0.05$), Sit to stand practice ($p < 0.005$), balance practice ($p < 0.05$), Walking practice ($p < 0.025$). **Conclusion:** The research finding shows that an educational booklet is effective in performing self-exercise program for incomplete paraplegic patient following spinal cord injury.

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Introduction:

The World health Organization (WHO) states that, ten percent of total populations are disabled in Bangladesh, and most of those are physically disabled. With such a large number of disabled people, achieving national development is difficult. But it's the real phenomenon of our society that disabled people are very often deprived of social opportunities and their rights (Ahmed 2006). Disability is contentious issue throughout the world. The twentieth century saw a remarkable change in the understanding of disability, from charity and welfare to right based approach (Momin 2003). Spinal cord injury is a devastating condition often affecting young and healthy individuals around the world. This debilitating condition not only creates enormous physical and emotional cost to individuals but also is a significant financial burden to society at large (Ackery et al. 2004, p.1355). During the First World War, those with spinal cord injuries seldom survived because medical technology was not available to provide medical treatment. However after the Second World War many people with spinal cord injury in the high resource countries lived longer due to the development of medical technology (Driedger, cited by Momin 2003). In USA 250,000 Americans are spinal cord injured. 52% of spinal cord injured individuals are considered paraplegic and 47% quadriplegic (Devivo 1997, p.809). The annual incidence of SCI of Japan was 39.4 per million (Shingu et al. 1990). The incidence of SCI in Ireland is 13.1 per million populations (O'Connor & Murray 2001). Spinal cord injury are a major public health problem in Bangladesh, The incidence of people with SCI in Bangladesh Six person per million. The high incidence of SCI as a result from falls from a height, and from falling when carrying a heavy weight on the head, can be explained by the mainly agricultural based economy of Bangladesh. The most common age group (10-40 years) of patient reflects the socio-economic conditions of

Bangladesh. The male: female ratio (7.5: 1.0) of patients with a spinal cord injury is due to the socio-economic status and to the traditional culture of the society. (Haque et al. 1999, p857-60).

Spinal cord injury & Educational booklet:

Spinal cord injury:

A spinal cord injury is usually a result of trauma to the spine. This trauma causes a complete or incomplete tear of the spinal cord leading to loss of sensation and muscle power below the level of injury. Spinal cord damage can also be due to other causes such as tumors and spina bifida (Manchester neuro physio 2008). Spinal cord damage as a consequence of either trauma or diseases may result in tetraplegia or paraplegia depending upon the level at which the damage has occurred. The epidemiological study shows that 60% of traumatic SCI in Bangladesh resulted in paraplegia and 40% in tetraplegia. Among the non-traumatic SCI 84% resulted in paraplegia and 16% resulted in tetraplegia. (Haque et al. 1999). A SCI is a deeply distressing condition that may cause a dramatic alteration in the victim's life. Consequence of SCI depends on the severity, nature, and exact location of the injury. However the impact SCI spreads beyond the individual and their family to the community and society at large (Atrice et al. 2001). SCI usually happens to active people who at one moment are in control of their lives and in the next moment are paralysed, with loss of sensation and loss of bodily functions and thus become dependent on others for their most basic needs (Haque et al. 1999).

If spinal cord injury is suspected the individual is examined by a physician and X-ray of the spine is taken to determine extent of the damage. Physiotherapy assessment was done by the help of Standard Neurological classification of spinal cord injury. Here

assess the sensory key point of whole body & key muscle power of upper and lower extremities. Diagnosis confirmed by ASIA IMPAIRMENT SCALE (American Spinal Injury Association, 1996-2008).

ASIA IMPAIRMENT SCALE

A= Complete: no motor or sensory function is preserved in the sacral segments S4-S5.

B= incomplete: sensory but no motor function is preserved below the neurological and include the sacral segments S4-S5.

C= incomplete: motor function is preserved below the neurological level, and more than half of key muscles below the neurological level have a muscle grade less than 3.

D= Incomplete: motor function is preserved below the neurological level, and more than half of key muscles below the neurological level have a muscle grade of 3 or more.

E= Normal: motor or sensory function is normal. (Young 2002-08).

Spinal injury patient need to be treated from first day as per the altered biophysiology. Treating only the complications is like fighting a lost battle in the enemy's territory. It needs to develop a protocol for the treatment of tetraplegia & paraplegia patient (Sinha 2002). Physiotherapy for patients with spinal cord injuries can include- exercise and stretches, joint care, pain control, anticipating & minimizing secondary complications, provision of equipment, orthoses and wheelchairs, advice on handling techniques, teaching about how to use specialized exercise equipment, teach transfer, teaching W/C skills, hydrotherapy treatment, breathing exercises and chest clearance techniques, referral to appropriate health professionals(Manchester neuro physio 2008). The effects of physiotherapy can be- increased quality of life, increased independence, increased muscle strength, increased energy levels, reduced pain and muscle spasms, reduced stiffness, reduced risk of chest infections (Manchester neuro physio 2008). SCI rehabilitation procedure divided into four stages: Acute stage, Stabilization stage, Rehabilitation stage & Re-integration stage. At the end of the rehabilitation process patient education about self-exercise is an important part. After giving the education of self-exercise the physiotherapist closely monitor the patient in the re-integration stage that the patients able perform it or not. Most of the time patient forgot the exercise protocol and it is very much time consuming to teach the patient again. The researcher is interested to know if the patient will use an educational booklet containing instruction of exercise and related picture then it could be helpful for the patient to perform self-exercise program correctly and confidently & patient can easily perform it at home. It also reduced stress from the carer. If the study will show positive result then a physiotherapist can use this

booklet at the time of prescribing self-exercise. The booklet include following exercise program:

1. Self-stretching exercise
2. Strengthening exercise
3. Transferring practice
4. Sit to stand practice
5. Balance practice
6. Walking practice

Every exercise will be clearly defined in Bengali with related picture. The booklet will be used by the patient for one week.

Methodology:

Study design: the study has been conducted by using quantitative-quasi experimental study design. The hypothesis was one directional. It has a control trial using two different subject groups where physiotherapy has been applied in both the experimental and the control group and an educational booklet was given to only the experimental group.

Sampling procedure: researcher chooses the study sample by purposive sampling. Purposive sampling is different from convenience sampling is that the researchers does not simply study whoever is available, but uses their judgement to select that they believe, based on prior information, will provide the data they need (Framkel & Waller 2000,p.114). To carry out the research project Sixteen patient with incomplete C & D spinal cord injury indoor unit. The patient was simply allocated to experimental(eight) & control(eight) group. The study was carried out in two setting- Neurology outdoor and Re-integration hostel of SCI unit.

Materials:

For preparing the booklet: researcher used some material to prepare the educational booklet that are- digital camera, bed, elbow crutch, walking frame, back slab, dumble, sand bag.

For data collection: functional activities will be measured by FIM scale. The FIM is a generic calculation of disability applicable to many different patient populations and is the most widely adopted functional status measure. The researcher used FIM scale as a data collection material to assess the effectiveness of booklet.

Functional Independence Measure (FIM) Scale:

- 7= complete independent (Timely & safely)
- 6= modified independent (device)
- 5= dependent modified requires supervision
- 4= modified requires minimal assistance
- 3= modified requires moderate assistance
- 2= requires maximal assistance
- 1= complete assistance (Busch 1993, p.73).

Data collection procedure:

The researcher measure functional independency before giving the intervention. This FIM score states as pre test score. Both control and experimental group are measured objectively. Then they had been given some instruction to follow which help the researcher to control confounding variable. The participants were followed the given conventional therapy in control and the instruction of the booklet for experimental group. The control group follow the given physiotherapy and advice but not any educational booklet instead of they were advised to do these exercises at home. The experimental group follows the physiotherapy treatment and follows the instruction of the booklet. Regular monitoring was performed over both groups whether they were following the given instructions. After seven days again the participant function were measured by FIM scale and this scores states post test score. Functional independency level was measured objectively by using FIM scale and the difference was calculated for pre & post test changes for both groups. Within six week data were collected carefully.

Data analysis:

Unrelated t test was used to analyze data inferentially as it was an experimental study with two groups of different subjects and each group was tested under one different condition. At the time of calculating the unrelated t test, the t value presents a significant difference between the results from both experimental and control group.

Significant level:

In order to find out the significance of the study, the researcher calculated the p value. According to Hicks (1999, p.87)'the p value is an experiment is called the significant level.' The p values refer the probability of the results for the experimental study. A p value of <0.05 was accepted as significant result for health service research (Bowling 1997, p.150). If the p value is equal or smaller than the significant levels, the result is said to be significant.

Results:

Variable in the study showing statistically significant or not significant at the following level of significance:

n o	variables	Observed t value	Observed p value	significant	Not significant
1	Self-stretching exercise	2.260	<0.025	significant	
2	Strengthening exercise	2.017	<0.05	significant	
3	Transferring practice	1.711	>0.10		Not significant
4	Sit to stand practice	3.100	<0.005	significant	
5	Balance practice	2.017	<0.05	significant	
6	Walking practice	2.25	<0.025	significant	

Following the treatment the educational booklet group showed in statistically improvement of level of independency in five traits among the six exercises than the only physiotherapy group and mean improvement of FIM score was greater in educational booklet group than the only physiotherapy group. So null hypothesis was rejected & hypothesis was proved. This means an educational booklet is more effective than only physiotherapy for performing the self-exercise program for incomplete paraplegic patient following spinal cord injury.

Discussion:

In case of spinal cord injury patient there is no other option without maintain the physiotherapy treatment. An incomplete paraplegic patient needs proper rehabilitation for maintain a healthy lifestyle and for survival a patient should maintain the home exercise (Bromley 1981). An educational booklet can be one of the treatment options for the patient to do self-treatment. Tetraplegia and paraplegia this book has always been to act as a manual for physiotherapist faced with the challenge of treating patients with tetraplegia and paraplegia. The effects of physiotherapy can be- increased quality of life, increased independence, increased muscle strength, increased energy level, reduced pain and muscle spasms, reduced stiffness, reduced risk of chest infections in case of spinal cord injury patient.

There were some limitation and barriers of this research project. The sample was might not be the representative of the population. That may affect the accuracy of the study. It is recommended that if possible someone would overcome the existing limitations for further study. Although this study shows the tentative results as it is limited by the small sample, following analysis of the data it is possible to make some recommendation for wider studies and way of improving the rehabilitation of spinal cord injury patient. This study suggests that an educational booklet is effective in performing self-exercise program for incomplete paraplegic patient following spinal cord injury. Finally the researcher emphasizing on larger population and randomization from a wider area and if another researcher feel interest to do further study on the same topic & it also recommended that, it will be more valuable if the study will be done in other areas of physiotherapy.

Conclusions:

Bangladesh is a developing country among the third world. The rate of education is very poor, besides government and non-government activities in health sector are not sufficient, so most people are suffering from lack of proper treatment. The results of this study have identified the effectiveness of an educational booklet in performing self-exercise program for incomplete paraplegic patient following spinal cord injury. With further well controlled double blinded study could include in assessing effects and efficacy of this

booklet which consist of physiotherapy exercise program. Spinal cord injury is a condition which is the cause of functional impairment, then disability and at last handicap. So it is necessary to provide proper rehabilitation program. Because of the above mentioned limits, the study lacks generalizability. This study should be replicated and expanded to confirm the validity of the findings.

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