

ORIGINAL ARTICLE

Vocational reintegration of individuals admitted to the medical rehabilitation center into their previous occupations

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ABSTRACT

Background: Retirement of individuals with disabilities has a potential impact on workers. Vocational rehabilitation (VR) programs are designed to rehabilitate subjects with physical disabilities to adapt to their new conditions to return or find employment following a disabling injury.

Aim: To identify the reintegration of patients with disabilities to their previous occupation following a VR program.

Methods: This was a retrospective case series that was conducted at-----between the period from-----to------. The study was conducted on individuals admitted to the medical rehabilitation center and who completed their rehabilitation program. The data of the patients were collected using a pre-designed data collection sheet.

Results: A total of 12 cases were recruited; males were 66.7% of the total sample. Cerebral palsy was the main primary diagnosis of patients (33.3%). There was a significant difference between functional independence measure score at admission and discharge ($P = 0.002$). There were 66.7% reintegrated to their previous occupation.

Conclusion: The VR program was helpful in improving functional independence scores and reintegration of individuals with disabilities.

Keywords: VR program, outcomes, reintegration, employment.

Introduction

The prevalence and longevity of disabilities among the population are increasing due to population aging, growth, and medical improvements that protect and increase longevity [1]. Rehabilitation services support patients with disabilities to be independent and participate in activities in their society, which in turn helps them improve their quality of life (QOL) and become employed [2].

Vocational rehabilitation (VR) provides patients with all types of disabilities with better opportunities for employment [3]. Such programs are designed to rehabilitate subjects with physical disabilities to adapt to their new conditions [4]. The goal of VR is to help disabled patients return to or find employment following a disabling injury [3]. The advantages of receiving a VR program include job satisfaction,

improved income, enhanced employment mobility, increased employment opportunities, and optimized skills [5].

Employment, particularly for those with disabilities, acts as a means of livelihood and enhances the QOL of the patients and personal dignity by fostering a stable lifestyle. Also, employment promotes social integration by narrowing the economic, social, and psychological gaps between those with and without disabilities [6]. In Saudi Arabia, the Ministry of Human Resources

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Vocational reintegration of individuals admitted to the medical rehabilitation center into their previous occupations

and Social Development is the entity organizing and supporting VR programs in the Kingdom [4]. However, there is a lack in Saudi literature reporting reintegration of patients with disabilities to their previous work following a VR program. Therefore, we conducted this case series to identify the reintegration of patients with disabilities to their previous occupation following a VR program.

Subjects and Methods

Design and subjects

This was a retrospective case series that was conducted at-----between the period from-----to------. The study was conducted on individuals admitted to the medical rehabilitation center and who completed their rehabilitation program. The inclusion criteria for patients were both genders and employees, including students considering studying as a job can be affected by injury, whereas those who were not employees were excluded from the study.

Data collection and analysis

The patients' data were collected using a pre-designed data collection sheet. The collected data included demographic characteristics such as age and gender; clinical characteristics such as primary diagnosis and length of stay (LOS); and occupational characteristics. Data were analyzed using **SPSS version 26**. Quantitative variables were presented as mean $\pm$ standard deviation (SD) for normally distributed data or median (range) for non-normally distributed data, while categorical variables were presented as frequencies and percentages. The 7-point ordinal scoring scale was used to assess functional independence measure (FIM) with assessment of mean $\pm$ SD and range of FIM scores. The **Wilcoxon signed-rank test** was used to compare FIM scores before and after rehabilitation, while the **McNemar test** was used to compare paired employment status before admission and at follow-

up. Comparisons between reintegrated and non-reintegrated participants were performed using the **independent-samples t-test** for normally distributed quantitative variables and the **Mann-Whitney U test** for non-normally distributed variables. For categorical variables, the **Chi-square test** was used when expected cell frequencies were adequate, whereas **Fisher's exact test** was used when expected frequencies were small because of the limited sample size. Effect sizes were reported in addition to p-values to assess the magnitude of observed differences. **Cohen's d** was used for comparisons of means, **Cramer's V (or Phi for 2 $\times$ 2 tables)** for categorical variables, and $r = |Z|/\sqrt{N}$ for both the Mann-Whitney U and Wilcoxon signed-rank tests. For the McNemar test, the effect size was expressed using an appropriate measure based on the discordant pairs. Effect sizes were interpreted as small, moderate, or large according to conventional thresholds. A **two-tailed p-value ≤ 0.05** was considered statistically significant.

Results

A total of 12 cases were included; males were more predominant compared to females, 8 (66.7%) vs. 4 (33.3%), respectively. The age range was 8–53 years, with a mean $\pm$ SD of 24 ± 13 years. The major pre-admission occupation was student (8, 66.7%), and pre-admission employment status was reported by 9 (75%), whereas 3 (25%) were temporary unemployed due to injury before VR (Table 1).

The maximum LOS of all the cases was 42 days. Regarding the primary diagnosis of patients, cerebral palsy was the main diagnosis for 4 (33.3%) cases, followed by genetic mutation in 2 (16.7%) cases and traumatic brain injury in 2 (16.7%) cases (Table 2).

The range of FIM score at admission was 2–6, and it 4–7 at discharge. The comparison between FIM at admission and discharge revealed a significant

Table 1. Demographic characteristics of the study participants (N= 12).

Variable	Category	n (%)	Mean $\pm$ SD	Median	Range
Gender	Female	4 (33.3)	–	–	–
	Male	8 (66.7)	–	–	–
Age (years)	–	–	24.0 ± 13.0	20.0	8–53
Pre-admission occupation	Student	8 (66.7)	–	–	–
	Marketing	1 (8.3)	–	–	–
	Mechanic	1 (8.3)	–	–	–
	Technician	1 (8.3)	–	–	–
	Tourism	1 (8.3)	–	–	–
Pre-admission employment status	Employed	9 (75.0)	–	–	–
	Not employed	3 (25.0)	–	–	–



Vocational reintegration of individuals admitted to the medical rehabilitation center into their previous occupations

difference ($p = 0.002$). The mean score at discharge revealed significant improvement compared to admission (Table 3). However, the mean $\pm$ SD score at discharge was 5.50 ± 1 , indicating that the patients still need help.

The data on VR revealed that all patients received rehabilitation, whereas 8 (66.7%) successfully reintegrated to their previous occupation, including the jobs for workers and studying for students. Additionally, all patients had disability, and it was the major barrier to return their employment before VR, table 4.

Table 5 shows that non-reintegrated participants were older than reintegrated participants (36.0 ± 16.0 vs. 18.0 ± 6.0 years; $p = 0.016$), with a very large effect size (Cohen's $d = 1.80$). Gender showed a negligible effect (Cramér's $V = 0.125$; $p = 0.99$), while pre-admission employment showed a moderate effect ($V = 0.408$; $p = 0.49$). FIM scores were similar at admission ($p = 0.57$), while the reintegrated group had a slightly higher discharge score (6 vs. 5; $p = 0.34$). Given the small sample size ($N = 12$), findings should be interpreted cautiously, with emphasis on effect sizes and observed differences.

The comparison between reintegrated and non-reintegrated patients regarding diagnosis revealed that those who were not involved in reintegration had traumatic brain injury 2 (100%), spinal cord injury 1 (100%), and cerebrovascular accident 1 (100%). On the other hand, one-half of those who were reintegrated had cerebral palsy, and there were four cases (Table 6).

Table 2. Distribution of participants according to primary diagnosis ($N = 12$).

Primary diagnosis	n	%
Cerebral palsy (CP)	4	33.3
Genetic mutation	2	16.7
Traumatic brain injury (TBI)	2	16.7
Cerebellar ataxia	1	8.3
Cerebrovascular accident (CVA)	1	8.3
Knee amputation	1	8.3
Spinal cord injury (SCI)	1	8.3
Total	12	100.0

Discussion

Workers with disabilities retire despite their younger age, and this potentially reduces the overall effective age of retirement. Additionally, early retirement has a potential influence on the workers themselves, as work is a relevant source of psychological and material well-being [7]. The VR programs aim to help individuals with disabilities return to or find employment following a disabling injury [3]. This case series was established to identify the reintegration of patients with disabilities to their previous occupation following a VR program.

VR programs provide patients with all types of disabilities with better opportunities for employment [3]. In the current series, VR was provided to patients with seven different disabilities. Additionally, the mean FIM score significantly improved at discharge after completing VR in comparison to the FIM mean score at admission.

Previous studies revealed that VR qualifications considerably expanded the opportunities of those with disability to retain their employment positions and obtain employment in other areas [8,9]. In the current series, the reintegration rate to previous work was high (66.7%), where eight out of nine patients who were already employed were reintegrated to their previous occupation.

It was stated that generally, more than one-half of subjects with disabilities who completed the VR program found employment [10]. This rate was much higher than our findings, where the employment rate at follow-up was only 8.3%.

After completing a VR program, the probability of employment elevates due to overcoming perceived obstacles associated with disabilities [10]. However, in our series, disability was the main barrier to resume employment before VR. This indicates that VR helped patients to reintegrate to their employment despite their disabilities before receiving VR. Additionally, we found that reintegration was significantly higher for younger patients, indicating the incorporation of personal factors and possibly other factors in the reintegration process, and not only the VR program.

It was stated that individuals with disabilities face constraints in their occupational choices due to their mental and physical limitations [11]. This may explain

Table 3. Comparison of functional independence measure (FIM) scores at admission and discharge ($N = 12$).

Variable	Mean $\pm$ SD	Median (IQR)	Range	Mean difference	p value
FIM score at admission	3.33 ± 1.37	3.00 (2.00–4.75)	2–6	2.2 ± 0.72	0.002
FIM score at discharge	5.50 ± 1.00	5.50 (5.00–6.00)	4–7		

a. Wilcoxon Signed Ranks Test.

Comparison of functional independence measure (FIM) scores at admission and discharge (a).



Vocational reintegration of individuals admitted to the medical rehabilitation center into their previous occupations

Table 4. Vocational rehabilitation and employment outcomes of the study participants (N = 12).

Variable	Category	n (%)
Vocational rehabilitation received	Yes	12 (100.0)
Reintegrated to previous occupation	Yes	8 (66.7)
	No	4 (33.3)
Primary barrier to employment before vocational rehabilitations	Disability	12 (100.0)

Table 5. Comparison of participant characteristics according to reintegration to previous occupation (N = 12).

Variable	Not reintegrated (n = 4)	Reintegrated (n = 8)	Effect size	p-value
Age (years) mean $\pm$ SD	36.0 $\pm$ 16.0	18.0 $\pm$ 6.0	Cohen's d = 1.80	0.016
Gender n(%)			Cramér's V = 0.125	0.99
Female	1 (25.0%)	3 (75.0%)		
Male	3 (75.0%)	5 (62.5%)		
Pre-admission employment status n(%)			Cramér's V = 0.41	0.49
Employed	4 (44.4%)	5 (55.6%)		
Not employed	0 (0.0%)	3 (100.0%)		
FIM score at admission median(range)	3 (2–5)	3 (2–6)	0.204	0.57
FIM score at discharge median(range)	5 (4–6)	6 (5–7)	0.306	0.34

Table 6. Comparison of DIAGNOSIS between participants according to reintegration to previous occupation (N = 12).

Variable	Not reintegrated (n = 4)	Reintegrated (n = 8)
Primary diagnosis		
Cerebellar ataxia	0 (0.0%)	1 (100.0%)
Cerebral palsy (CP)	0 (0.0%)	4 (100.0%)
Cerebrovascular accident (CVA)	1 (100.0%)	0 (0.0%)
Genetic mutation	0 (0.0%)	2 (100.0%)
Knee amputation	0 (0.0%)	1 (100.0%)
Spinal cord injury (SCI)	1 (100.0%)	0 (0.0%)
Traumatic brain injury (TBI)	2 (100.0%)	0 (0.0%)

our findings, and our patients may experience several limitations although they received the VR program.

In a survey, it was found that the employment rates varied with type of disabilities, where the employment rates for those with facial, liver, visual, and physical disabilities were 48.1, 41.3, 38.5, and 36.8%, respectively [12]. Such findings indicate that the disability type may affect the rate of employment. In our series, the reintegration involved eight patients with cerebral palsy,

genetic mutation, and knee amputation; however, only one was successfully employed. This may indicate that the success of employment may be dependent on factors other than the rehabilitation program.

A previous trial included 158 young and middle-aged patients with coronary heart disease to assess a designed VR program. The patients were categorized into 79 subjects in the intervention group and 79 subjects who received usual care. It was found that after a three-month intervention, the VR program significantly improved the rates of return to work compared to usual care ($p < 0.001$) [13]. However, the previous study included a larger sample size in comparison to our series.

A previous observational study included 1757 subjects aged 20 years and older with physical disabilities and revealed that the results for employment of the recruited patients displayed no difference when comparing those with rehabilitation services and the without rehabilitation services group [11]. Such findings refer to the non-significant effect of VR in helping patients reintegrate to their work. Another study revealed that integrated intervention did not hasten the return to work, but it resulted in better outcomes regarding the proportion in work compared to service as usual [14].

A previous study found that employment reintegration was significantly affected by several factors, including mobility level, environmental accessibility, and social factors such as recurrent illness and stigma [15]. In our study, only the age of patients affected the reintegration



Vocational reintegration of individuals admitted to the medical rehabilitation center into their previous occupations

process, but we couldn't find any other factor. Even the FIM score revealed no significant impact on reintegration.

Conclusion

The VR program was helpful in reintegrating individuals with disabilities to their previous occupation, and it significantly improved the functional independence score. However, the rate of successful employment of patients was very low, and this can be attributed to other factors such as personal factors, work factors, and other factors related to the disability. Additionally, the effectiveness of the program should be assessed using larger sample size of the patients.

List of Abbreviations

FIM	Functional independence measure
LOS	Length of stay
QOL	Quality of life
VR	Vocational rehabilitation

Conflict of interest

None.

Funding

None.

Consent to participate

Participants who admitted to the medical rehabilitation center provided consent before participation.

Ethical approval

The study was approved by the IRB committee in Care Medical Hospital. All data were fully anonymized.

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References

1. Al-Eisa E, Rao G, Alsobayel H. Rehabilitation services in Saudi Arabia: an overview of its current structure and future challenges. *J Gen Practi*. 2014;2(06).
2. Verhoef JA, Roebroek ME, van Schaardenburgh N, Floothuis MC, Miedema HS. Improved occupational performance of young adults with a physical disability after a vocational rehabilitation intervention. *J Occup Rehabil*. 2014;24(1):42–51. <https://doi.org/10.1007/s10926-013-9446-9>
3. Holmes, J. Vocational rehabilitation; Wiley-Blackwell: Hoboken NJ. USA, 2007.
4. Country Profile on Disability: Kingdom of Saudi Arabia. Available online: <https://ecommons.cornell.edu/handle/1813/76489>. Accessed 4 August 2026.
5. Hoeckel K. Costs and benefits in vocational education and training. Paris: Organ Econ Coop Dev. 2008;8:1–7.
6. Lee HY. A study about the influence on the job maintenance period of individual characteristic, job training, job satisfaction by disability type employment workers. *Soc Welf Policy*. 2008;32(109):36–42. <https://doi.org/10.15855/swp.2008..32.109>
7. Canhete Pereira RM, Monteiro I. Vocational rehabilitation and return to work: integrative review. *Rev Bras Med Trab*. 2020;17(3):441–55.
8. Mustapha RB, Ali MM, Bari S, Amat S. Supportive and suppressive factors in the improvement of vocational special needs education: a case study of Malaysia. Washington, DC, USA: ERIC Institute of Education Sciences; 2001.
9. Polidano C, Mavromaras K. Participation in and completion of vocational education and training for people with a disability. *Aust Econ Rev*. 2011;44(2):137–52. <https://doi.org/10.1111/j.1467-8462.2011.00632.x>
10. Dutta A, Gervery R, Chan F, Chou CC, Ditchman N. Vocational rehabilitation services and employment outcomes for people with disabilities: a United States study. *J Occup Rehabil*. 2008;18(4):326–34. <https://doi.org/10.1007/s10926-008-9154-z>
11. Park HN, Lee SJ, Yoon JY. Impact of rehabilitation services on employment outcomes for individuals with physical disabilities: a propensity score matching analysis. *BMC Public Health*. 2024;24(1):1534. <https://doi.org/10.1186/s12889-024-19015-6>
12. Ministry of Health and Welfare. National survey on persons with disabilities [policy report]. Sejong-si: Ministry of Health and Welfare; 2020. Report No. 11-1352000-000568-12.
13. Hu Y, Zhang Q, Zhou T, Yang Y, Feng X, Ji X, et al. Evaluating a designed vocational rehabilitation program based on society ecosystems theory for young and middle-aged patients with coronary heart disease: a randomized controlled trial. *Front Public Health*. 2026;14:1674523. <https://doi.org/10.3389/fpubh.2026.1674523>
14. Hoff A, Poulsen RM, Fisker J, Hjorthøj C, Rosenberg N, Nordentoft M, et al. Integrating vocational rehabilitation and mental healthcare to improve the return-to-work process for people on sick leave with depression or anxiety: results from a three-arm, parallel randomised trial. *Occup Environ Med*. 2022;79(2):134–42. <https://doi.org/10.1136/oemed-2021-107894>
15. Pan H, Ding M, Yang Y, Zhang J, Zhu L, Wei Q. Rehabilitation priorities and employment reintegration among individuals with spinal cord injury receiving home-based care: a national cross-sectional survey of functional and social determinants. *Patient Prefer Adherence*. 2025;19:3125–44. <https://doi.org/10.2147/PPA.S535765>

