

LATE EFFECTS OF POLIOMYELITIS:  
IMPLICATIONS FOR VOCATIONAL ASSESSMENT AND REHABILITATION

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Abstract

In the United States there are 250,000 survivors of paralytic polio. Twenty-five percent of this group may be experiencing new health problems related to earlier infection with polio. Individuals initially contracted polio, were able to regain much of their function and maintain neurologic stability. Polio was felt to be a conquered disease by the medical profession, individuals, and society. Approximately 20 years ago existing support organizations and research for polio victims were disbanded. Presently no national organization exists to represent polio survivors and sponsor research to investigate the latent effects. Symptoms are reoccurring approximately 30 years post onset. Many are at the peak of their careers since the mean age of individuals with reoccurring symptoms is 46. Among new health problems fatigue was reported most frequently followed by weakness in previously affected muscles, muscle pain, joint pain, weakness in previously unaffected muscles and difficulties breathing. ADL problems most frequently reported are; new difficulties with walking, climbing stairs, bathing and transfers. These problems have significant vocational and psychosocial implications due to the negative impact on an individual's ability to maintain previous levels of productivity. Vocational assessment must incorporate significant medical and functional issues into an in-depth job analysis to enable the counselor to identify work tolerance and specific work tasks the individual is experiencing difficulty in performing. Accurate assessment will permit relevant collaboration and vocationally relevant evaluation from appropriate therapeutic disciplines, provide pertinent facts to base vocational plans and offer specific recommendations to the individual and employer. Vocational assessment and rehabilitation must be tailored to the specific etiology of the latent effects of poliomyelitis so that individuals currently experiencing these effects may maintain a level of productivity within their tolerance and continue to lead a vocationally rewarding life.

Poliomyelitis is often thought of as a stable chronic disease. Following acute illness and a period of rehabilitation, the individual was thought to have achieved a plateau of neurological and functional recovery which would remain relatively stable for the remainder of their lives.

Based on data from the National Center of Health Statistics, Atlanta, Georgia there are an estimated 200,000 to 250,000 survivors in the United States with paralytic polio. According to a preliminary study from the Mayo Clinic ... approximately 25% of this group may be experiencing new health problems related to their earlier infection with polio ...

Four factors present at onset were strongly associated with developing the late effects of polio many years later. These were (1) hospitalization at onset; (2) contracting polio over the age of 10; (3) ventilator use; and (4) paralysis in four limbs at onset. For persons who had any one of these four risk factors, the median time post-polio to onset of fatigue was under 30 years. Of these four risk factors, the need for hospitalization, ventilator use and paralysis in four limbs, in all likelihood reflected a common underlying variable - namely, severity at onset. Thus, the two most important predictors of whether someone would develop late changes and when were age at onset and severity at onset.

Among the new health problems, fatigue was reported most commonly (87.3%), followed by weakness in previously affected muscles (81.5%), muscle pain (75.5%), joint pain (75.4%), weakness in previously unaffected muscles (71.3%), and new difficulties with breathing (41.9%) ... Among the ADL problems, new difficulties with walking were reported most frequently (82.2%), followed by difficulty in climbing stairs (81.4%), with bathing (61.1%) and with transfers (51.2%).

This information is taken from my co-author, Lauro Halstead and Wlechers (1985), who are pioneers in the research of late effects of poliomyelitis.

Andrea Marhefka (1985) states that one explanation for these changes centers on dying of anterior horn cells.

As part of the normal aging process our bodies experience a decrease in the number of cells in the spinal cord which transmit nerve impulses to the muscles and cause them to move as we want them to. These cells are the ones destroyed or damaged in an acute attack of polio.

According to the theory, the horn cells that are left must take over those that are killed but eventually the strain and overuse becomes too great and the survivors, too, begin to die off. In contrast, persons who have not had polio can lose a considerable number of anterior horn cells as they age without experiencing any serious muscular weakness.

These factors have significant vocational and psychosocial implications for the individual who has fought to overcome the debilitating effects of polio. Victims of paralytic polio have been striving to lead a relatively normal lifestyle, have reached significant levels in their career development, and, once again, are being challenged by latent effects 20 to 40 years post onset. These individuals must now confront the maze of diagnostic evaluations and tests which serve to give credence to the fact that new significant changes in their bodies are occurring. Presently, the long-term outcome is not fully known or understood.

The vocational implications are significant. Presently vocational problems include:

- (1) Fatigue experienced on the job. This is an inability to complete the work day without experiencing mild to extreme fatigue. Described as the "Polio wall phenomenon" by Dr. Halstead (1985) as a "rather sudden onset of one or more symptoms together such as intense fatigue, headache, weakness, hot and cold flashes, sweating or a feeling like hitting a wall".
- (2) Weakness: the individual's inability to perform repetitive tasks. This includes filing, typing, writing, data entry operations, walking, standing, lifting, wheelchair propulsion etc. without experiencing weakness or tiredness in the muscles required to perform those tasks.
- (3) Muscle and joint pain. These symptoms interfere with an individual's ability to concentrate and/or restricts movement which may result in reduced productivity or inability to perform required tasks. This is associated with the post polio syndrome of progressive muscular weakness and muscle atrophy. Frederick Maynard (1985) states, "slowly progressive amyotrophy resulting in a gradual decrease in maximum strength and/or endurance of muscles previously involved by polio puts overuse, strain on

functionally useful muscles, tendons, ligaments and joints, which can be expected to produce a wide variety of musculoskeletal pain and motion problems".

- (4) Difficulties breathing. Difficulty breathing may require a reduction in tasks which require physical exertion, alteration in working or environmental conditions, or the use of assistive respiratory equipment on the job.
- (5) Identification and incorporation of assistive devices previously utilized or newly acquired on the job. To compensate for increased fatigue, muscle and joint pain, equipment such as a cane, braces and crutches, manual/motorized wheelchair or three wheeled scooter, respiratory equipment, adaptive office equipment, etc. may be needed. These adaptations may require modifications to the work place to accommodate their use.

In a January 1986 vocational follow up questionnaire, I surveyed 252 TIRR post polio outpatients. To date I have received 106 responses. From this survey we have learned that 62% of these patients are currently employed. Of these, 45% were employed in professional, technical and managerial positions, 21% were in clerical and sales, 6% were in service, 12% were employed in other occupations, and 16% did not respond to any of the categories.

Eighty percent reported new problems associated with their original polio. As a result of the new problems, 7% changed jobs with the same employer, 4% changed jobs to a new employer and 7% changed careers to accommodate their physical needs. Of those continuing in the same job, 28% required job duty modifications, 30% incorporated assistive devices, 28% reduced the number of working hours, and 31% incorporated rest periods.

The survey also indicates to us why the late effects of poliomyelitis are just now starting to surface. Eighteen percent of those surveyed reported new problems associated with their original polio prior to 1978. Eighty-two percent have only noticed or experienced problems in the last seven years. This finding indicates to us that post-poliomyelitis is a relatively new phenomenon which will be facing us with increasing regularity as the mean age of poliomyelitis survivors increases. We all need to become aware of the phenomenon, its effects, and how we can provide relevant vocational assessment and services.

The vocational assessment interview is a critical factor in effectively addressing the identified vocational problems. An in-depth verbal job analysis will enable the counselor to identify work tolerance and specific work tasks in which the individual is experiencing

difficulty. Use of the 1977 VALPAR Physical Functioning Questionnaire Modified for Use with Polio Survivors (Fairhurst, 1986) will assist in the identification and evaluation process, provide detailed pertinent facts to base vocational plans, and will assist in offering specific recommendations. The vocational counselor can then interface with appropriate therapeutic disciplines to achieve vocationally relevant evaluations.

A multidisciplinary approach in achieving vocationally relevant evaluations can include seven steps. These are:

1. Collaboration with the physician. Such information gives the vocational counselor relevant medical information regarding current medical status, stability, prognosis, and allows us to share information gleaned from the vocational assessment interview so that appropriate recommendations regarding employment are offered to the individual and those involved.
2. Collaboration with the physical therapist. Vocational counselors provide pertinent information to the physical therapist from the interview, specifically from the 1977 Valpar Physical Functioning Questionnaire Modified for Use with the Post Polio Survivors (Fairhurst, 1986), so assessment of identified vocationally relevant problematic physical activities may be incorporated into the therapists' evaluation. This allows the physical therapist to achieve a more specific and detailed vocationally relevant evaluation. The physical therapist can then identify and evaluate specific functional work capabilities, identify those specific work activities which require restriction, and give the exact parameters of those restrictions. It further identifies specific work behaviors, such as poor body mechanics that may place the individual at increased risk of injury or musculoskeletal deterioration and provide intervention and guidelines to minimize their risk. An important component would include the development of an individualized exercise program to strengthen weakened muscles. The physical therapist may also identify assistive devices to conserve energy, reduce strain, muscle fatigue, and pain.
3. Collaboration with the occupational therapist. Occupational therapists can identify energy conservation techniques specific to the individual's employment requirements. This may include adaptive equipment to be utilized on the job, principles of motion economy, prescription of orthotic equipment, manual/motorized wheelchair, or three wheeled scooter to address mobility needs, education on body mechanics while performing work tasks, and work simplification.
4. Collaboration with the social worker. Social workers need to assist in identifying the psychosocial impact of the latent effects of poliomyelitis on the individual and significant others, financial resources for identified equipment needs, assistance in applying for social security or disability retirement if indicated, and assistance in transportation and housing if mobility needs demand.
5. Collaboration with community resources. Many community resources are available to meet vocational and psychosocial needs and can be arranged through collaborative effort.
6. Referral to vocational evaluation. If indicated vocational evaluation can further identify work tolerance, transferable skills, aptitudes, potential for retraining, education, and feasible options for alternate re-employment.
7. Ongoing vocational counseling. Vocational counselors need to incorporate information obtained by the vocational assessment interview and other team members evaluations, assist in the vocational decision making process, identify and evaluate employment/training options, collaboration with the employer to maximize return to work, and enhance job seeking skills such as application, resume and interviewing techniques, and address retirement issues or work reduction if indicated.

Once the recommendations are formalized, communication with the employer is essential to increase awareness of latent effects of poliomyelitis. We need to assist in returning the employee promptly to a maximum feasible level of physical function and gainful employment. This may be achieved by assisting the employer in developing appropriate job duty modifications compatible with the employee-patient's physical capabilities, identify necessary worksite modifications to accommodate physical and/or mobility needs, gain acceptance and utilization of adaptive assistive devices on the job, or possibly considering altering employment status. Other vocational options are to consider part time, flex time, or the need for extended rest or lunch periods so the individual may lie down to rest.

For the individual this approach would increase knowledge and understanding of their current physical status and prognosis, increase their ability to realistically estimate their physical capabilities and limitations on the job, assist in their ability to solve problems, identify alternate methods of accomplishing work tasks, and provide accurate information and practical recommendations regarding needed accommodations on the job.

The latent effects of poliomyelitis, though not thoroughly understood, place new demands on the individual and vocational rehabilitation profession. Vocational assessment must be tailored to the specific etiology of the latent effects of poliomyelitis so that individuals currently experiencing these latent effects and those that follow may maintain a level of productivity within their tolerance and continue to lead a personally fulfilling and rewarding lifestyle.

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