
A Review of Therapeutic Recreation Outcomes in Physical Medicine and Rehabilitation Between 1991-2000

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Abstract

This paper provides a critical review of research studies that demonstrate the outcomes of recreation intervention in physical medicine and rehabilitation. The review of research was systematically organized using the National Center for Medical Rehabilitation and Research model (i.e., patho-physiology, impairment, functional limitations, disability, and social limitation). Literature searches were conducted using PsycINFO, Medline, and the Social Science Citation Index computerized database between 1991-2000. The restricted search for the research between 1991 and 2000 was to avoid redundancy of the previous review article by Berryman, James and Trader (1991). Various outcome studies demonstrated promising efficacy of recreation intervention in rehabilitation that indicates recreation intervention as an effective means to achieve various outcomes outlined in the NCMRR disablement model. However, this review found that existing knowledge base on TR outcomes in rehabilitation falls short of the contemporary requirement for evidence-based practice. Particularly, only a few outcome studies were conducted by the researchers in TR. Considering limited outcome studies, the authors of this paper see the TR profession as skating cautiously on a very thin ice.

Shank, Kinney and Coyle (1993) identified two important needs associated with outcome research for the therapeutic recreation (TR) profession. They include: (a) the need for definitive evidence of the value of TR to outside groups; and (b) the need for a clearly established body of knowledge in TR. Recognizing the importance of these imperative needs, the purpose of this paper is to review research studies that demonstrate the outcomes of recreation intervention in physical medicine and rehabilitation. The paper begins with a brief discussion that brings outcome research close to an evidence-based practice, followed by an introduction of the National Center for Medical Rehabilitation and Research (NCMRR) model, which served as a framework to review and analyze the outcomes. Next, a review of outcome research using leisure and recreation as an intervention is presented based on the NCMRR model. Finally, intervention programs, along with measurement of outcomes follow. This paper ends with discussion of the issues associated with outcome assessment.

Outcome Research and Evidence-Based Practice

Simply speaking, evidence-based practice attempts to integrate outcome research into practice. Evidence-based practice implies that scientific evidence, not tradition or conventional wisdom, should guide the selection of interventions and the delivery of our service. Evidence can be considered as the findings of outcome research that are created through the systematic process of scientific examination. With evidence, the foundation or rationale for our interventions may be more convincingly articulated to outside parties.

TR practice is a pragmatic process grounded in the evolving knowledge base that is derived from the broad range of outcome research. Outcome research is an essential part of clinical decision making. In addition, choice of intervention should preferably be based on outcome studies. Therefore, TR practitioners must be capable of identifying evidence and applying the findings of outcome research in order to solve the problems brought by patients.

In evidence-based practice, a recreational therapist

should know which outcomes are appropriate targets for TR intervention. Advanced theoretical knowledge of TR outcomes with specific populations serves as a foundation. The body of knowledge is constantly evolving as new findings, interpretations, and questions are developed. Therefore, it is imperative for practitioners to become skilled in comprehensive awareness and knowledge of TR outcomes. This paper presents current research evidence that exists in physical medicine and rehabilitation.

A Conceptual Framework

The search for suitable outcome measures stimulated the development of conceptual models in the field of rehabilitation. Nagi (1976) was the first scholar who proposed a model of disability process. He identified four stages in the process of disability: (a) active pathology, (b) impairment, (c) functional limitation, and (d) disability. In 1980 the World Health Organization (WHO) published the International Classification of Impairment, Disability and Handicap (ICIDH), based largely on the works of Philip Wood. The model suggested appropriate definitions of impairment, disability and handicap. The ICIDH has focused on the individual as the source of disability, and postulates a cause and effect relationship among conceptual stages. Since then, the model has offered a conceptual framework examining the consequences of disability/disease that has the potential for helping to understand the impact of different intervention for individuals with disabilities and illness.

For more than 10 years, no effort has been made to challenge the ICIDH model. In 1993, however, the National Center for Medical Rehabilitation and Research (NCMRR) expanded the model by coming up with five stages. They include (a) patho-physiology, (b) impairment, (c) functional limitations, (d) disability, and (e) social limitation (US Department of Health and Human Services, 1993). While the ideas of the first three concepts are very similar to Nagi's initial model, differences exist in the definition of "disability" and "social limitation."

According to the NCMRR (US Department of Health and Human Services, 1993), *pathophysiology* is the interruption or interference with normal physiological and developmental process and structure by cells and tissues to regain a normal state. Examples include neurological, physiological, nutritional deficits or other genetic abnormality. *Impairment* involves organs and organ system levels that result in loss and/or abnormality of mental, emotional, physiological, or anatomical structure or function including secondary losses and pain. Some examples include loss or abnormality in the area of hearing, vision, speech articulation, problem solving,

attention, memory, etc. *Functional limitation* primarily involves performance of action or activity. It was defined as restriction or lack of ability to perform an action or activity in the manner or range considered normal. Examples include restriction associated with organizing, sequencing, judging, attending, sitting, lifting, standing, reaching, reading, writing, etc. *Disability* addresses task performance of a person in physical and social context. NCMRR conceptualized it as an inability or limitation in performing socially defined activities and roles such as worker tasks, leisure activity, education, etc. *Social limitation* is defined as a restriction owing to social policy or barriers (i.e., structural or attitudinal) that limit fulfillment of roles. Social limitation also includes barriers concerning denied access to services or opportunities.

The NCMRR model was selected for use in this paper because it is familiar to those agencies that promote and fund studies on functional outcomes. The model "provides a framework for identifying and unifying disciplines within the rehabilitation sciences and it serves as guide for disability research" (Shank, Coyle, Boyd, & Kinney, 1996, p. 180). Further, one of the important outcomes that the TR profession addresses is community reintegration. This outcome is recognized as a primary component of the social limitation segment of the model.

Methods

Literature searches were conducted using PsycINFO, Medline, and the Social Science Citation Index computerized database between 1991-2000. The restricted search for the research between 1991 and 2000 was to avoid redundancy of the previous review article by Berryman, James and Trader (1991). The authors attempted to identify research studies that demonstrated outcomes of recreation in physical medicine and rehabilitation as identified in the computerized data base. Various relevant articles were selected for review only if they reported work assessing the outcomes of intervention using leisure and recreation in physical medicine and rehabilitation context. The primary free-text terms entered were "outcome and leisure," "benefit and leisure," and "recreation and rehabilitation." Since outcomes related to social limitations were not available through the aforementioned keywords, a number of other words were used (i.e., "attitudes," "inclusion," "barriers," and "accessibility").

A special attempt was made to provide all possible process information related to outcomes of treatment. Process refers to how intervention is delivered – the means to the ends. Definition of outcomes suggested by the Joint Commission on Accreditation of Healthcare Organization

(1993) contains the demand of process: "An outcome represents the cumulative effect of one or more processes on a patient at a defined point in time" (p. 260). The relationship between outcome and process is, therefore, inseparable.

Review of Demonstrated Outcomes

Functional Limitation Level

Injury and illness often give rise to the disruption of normal neurological, physiological, nutritional, mental, and emotional functioning in various body levels (i.e., cells, tissues, organ, organ system) (NCMRR, 1993). No single study exists to investigate the outcomes of recreation intervention addressing path-physiology and impairment levels. Other disciplines such as medicine and pharmacology exert research interest in these areas.

However, some studies investigate the outcomes of recreation intervention as a component of the area of functional limitations. Interestingly enough, most studies treated recreational exercises as intervention tools to deal with functional limitations. A review paper (Shephard, 1990) reported the importance of recreational exercise (also called "leisure time exercise") and documented numerous benefits such as improved cardio-respiratory function, muscular strength, health status, and greater mobility. Some experimental and quasi-experimental studies reported therapeutic recreation outcomes associated with functional limitations.

Recent advancement in technology, combining virtual reality and exercise, offers a powerful means for treating patients with traumatic brain injury (TBI). Grealy, Johnson and Rushton (1999) conducted a study to assess the impact of exercise and virtual reality on the cognitive rehabilitation of persons with TBI. A total of 13 patients (mean age = 32; 8 males and 5 females) from the rehabilitation hospital in Edinburgh, Scotland, were assigned to an experimental group that participated in a four-week intervention. The control group consisted of 12 patients with similar ages and severity of injury. The main outcomes assessed include tests of attention, information processing, learning, and memory. The study found that after the 4-week intervention, patients in the experimental group performed significantly better than the control group on the digit symbol, verbal, and visual learning tasks. However, no improvement was found in the complex figures and logical memory task. The researchers also assessed the impact of a single-bout intervention, a non-immersive virtual reality exercise on the reaction time and movement time of 13 volunteers with TBI. Significant improvement in reaction times, and movement times were gained following a single bout of virtual reality exercise.

Bastien, Korner-Bitenski, LaLonde, LeBrun and Matte (1998) examined the efficacy of an intervention programs utilizing social, leisure and physical activities for people with stroke impairments. The subjects of this study were 24 individuals with strokes who were living at home. Seventeen were males (mean age = 64) and seven were females (mean age = 67). The program consisted of two groups (7 & 7 participants) of one 90-minute class per week (8 sessions) and two groups (6 & 4 participants) of two 60 minute classes per week (12 sessions).

The interventions included: (a) warm-up and flexibility of the body, (b) balance and coordination through activities (i.e., dance, simple Tai-Chi movements), games (ping-pong, soccer), and exercises, (c) strengthening of upper and lower musculature using resistance (elastic bands, bean bags), (d) relaxation techniques (self-massage, stretching, and guided visual imagery), (e) group discussions (report on their activity level at home), and (f) a health promotion and educational component focusing on the benefits of healthy behavior. The results of this study indicated that participants significantly improved mobility. Furthermore, 71% of the participants showed a gain in range of motion greater than ten degrees at one or more of the six joints (e.g., ankle, knee, hip) measured.

Broach, Groff, Dattilo, Yaffe, and Gast (1998) conducted a study with a single subject design to determine the effects of aquatic therapy on physical functioning for three adults with multiple sclerosis. The subjects participated in a 45-minute aquatics therapy program twice a week for 25 weeks. The following five dependent measures were examined: vacuuming, riding a bicycle, climbing stairs, placing cans on a shelf, and buttoning and unbuttoning a shirt. In addition, the research measured levels of physical and mental fatigue. Each participant was tested 5 to 8 times at baseline, 30-40 times at intervention, and 1-4 times at follow-up phase on the dependent measures. Improvements were observed for three of the five dependent measures: vacuuming, riding a bicycle, and climbing stairs. Further, the participants' perceptions of physical and mental fatigue decreased over the course of the aquatics therapy program. In addition, the participants reported a modest increase in the duration of activity participation and the number of community based activities, and a decrease in solitary activities.

Manns and Chad (1999) conducted a study to determine the relationships among fitness, physical activity, subjective quality of life (QOL), and level of "disability" in persons with spinal cord injury (SCI). A total of 38 individuals with SCI (mean age 34; 45% quadriplegia; 55% paraplegia; 74% male and 26% female) participated in a series of tests without any intervention. Diverse test results were

then correlated with other variables to establish a relationship. Findings showed that higher involvement in leisure-time physical activity associated with less disability in clients with quadriplegic and paraplegic. Further, lower levels of leisure time physical activity were associated with higher levels of problems in physical independence, mobility and occupational function for people with quadriplegia.

A number of survey studies were reviewed that demonstrated association of recreation involvement with some outcomes related to the levels of mortality and risk of stroke. Kujala, Kaprio, Sarna, and Koskenvuo (1998) found that leisure-time physical activity was associated with reduced mortality. Andersen, Schnohr, Schroll, and Hein (2000) also reported that leisure time physical activity was inversely associated with all-cause mortality in both men and women in all age groups. Ellekjaer, Holmen, Ellekjaer, and Vatten (2000) found that physical activity was associated with reduced risk of death from stroke in middle-aged and elderly women. Sacco, and his associates (1998) also found that leisure-time activity was significantly protective for stroke. Lee and Paffenbarger (1998) found that a moderate recreational exercise such as walking was associated with significantly lower risk of stroke.

Disability Level

Consequences caused by patho-physiology, impairment and functional limitations often result in disability. Disability according to NCMRR is "a limitation in performing tasks, activities, and roles to levels expected within physical and social contexts" (p. 37). Empirical studies that addressed how individuals with disabilities establish and maintain support networks, change or maintain emotional stability pre and post injury, and attain and maintain or redefine recreational activities, were sought for review.

Using a pretest-post test control group design, Santiago, Coyle and Kinney (1993) examined the effects of aerobic exercise on the fitness level of adults with physical disabilities. Twenty-one individuals participated in a pretest-posttest research design that compared the effects of an aerobic exercise program upon experimental ($n = 8$; 2 males, 6 females) and control subjects ($n = 13$; 5 males, 8 females). The researchers provided aerobic training programs in either a supervised group aerobic class or as an individualized home exercise program (a stationary bicycle or aerobic videotape). The average period of the aerobic exercise was approximately 12 weeks in duration (10–15 weeks) and the mean of treatment frequency was 2.4 times per week (2–4 times/week). Each session lasted between 20 and 40 minutes (mean = 23 minutes) in length. The researchers reported that aerobic exercise significantly

improved physical work capacity by 23.1% and cardio-respiratory fitness (maximum pulmonary ventilation) and maximal oxygen consumption by 16.1% and 23.7%, respectively. In contrast, the control group demonstrated declines in these variables of 10.3%, 8%, and 17.1%, respectively, when post tested approximately 25.5 weeks later. This study confirmed the importance of exercise in promoting fitness and preventing secondary disabilities in adults with physical disabilities.

Coyle and Santiago (1995) tested the effects of aerobic exercise on fitness and psychological health of adults with physical disabilities. Data were collected using nonrandomized control trial with pre-post testing. The aerobic training program was conducted at home or at a community center using a stationary bicycle or an aerobic videotape. A total of 19 participants volunteered for either the exercise group ($n = 7$; 1 male, 6 females, mean age 45) or control group ($n = 12$; 5 males, 7 females; mean age 37). On average, exercise was performed 2.5 times per week (i.e., 2–4 times/week) for 12.6 weeks (i.e., 10–15 weeks). Duration of each session was between 20 and 40 minutes (mean = 23 minutes). The authors found that the experimental group increased the fitness measure by 23% while the control group decreased by 19%. A statistically significant difference existed on the adjusted post test mean scores of fitness measure between the two groups. In addition, the experimental group decreased 59 % in depressive symptoms, whereas the control group reported a 6 % increase. A statistically significant difference was found between the exercise group and control group on the adjusted post-test mean scores. The study concluded that an aerobic exercise program improved aerobic fitness and decreased depressive symptoms in this sample.

Jongbloed and Morgan (1991) examined the effects of leisure intervention using a total of 40 patients with cerebrovascular accident (CVA) who had been discharged from three hospitals in British Columbia, Canada. Of the 40 subjects (mean age = 69; 27 male and 13 female), 17 had incurred a right hemispheric CVA and 23 a left hemispheric CVA. Subjects were randomly assigned to either an intervention group ($n = 20$) or a control group ($n = 20$). The researchers provided the experimental group with individual or social leisure activities (e.g., visiting a stroke club, catching a bus independently, making a vegetable board, etc) based on their leisure interests. The intervention contained five 1-hour leisure visits at the subjects' home over 5 consecutive weeks. No leisure-related intervention was provided to the control group. The major outcomes measured were levels of leisure activity involvement and satisfaction with activity. The results showed no statistically significant differences

between the two groups in leisure activity involvement or satisfaction with activity. The researchers speculated that the limited intervention (i.e., five 1-hour sessions) contributed to the limited effect on leisure activity involvement and satisfaction with activity.

Drummond and Walker (1996) investigated the effectiveness of a leisure rehabilitation program on the functional performance and mood state of patients with stroke. The subjects were randomly assigned to three groups: (a) leisure rehabilitation group, (b) conventional occupational therapy group, and (c) control group. A therapist provided leisure-based treatment to the leisure rehabilitation group ($n = 21$, mean age = 59) for a minimum of 30 minutes per week for the first 3 months, and thereafter, for a minimum of 30 minutes a fortnight for the next 3 months. The leisure-based treatment programs include transfer (e.g., practice of transfers needed for leisure pursuits), positioning (e.g., provision of equipment), advice on obtaining financial assistance and transport, liaison with specialist organizations, and providing physical assistance (e.g., referral to voluntary agencies). The same therapist provided a regular OT treatment (i.e., transfers and dressing activities) to the patients in the conventional OT group ($n = 21$, mean age = 70) for the same amount of time as the subjects in the leisure group. The patients in control group ($n = 23$, mean age = 68) had no additional input except involvement in hospital and social services.

Base-line assessment on functional performance and mood state were assessed on admission to the study, and additional assessment occurred at 3 and 6 months after discharge from hospital. Baseline data showed no significant differences among groups on functional performance and psychological well-being. However, statistically significant differences were found on mobility at both 3 months and 6 months between the leisure group and other groups. A significant difference on energy level was found between the leisure group and other groups, but not between the leisure group and the control group. That is, the subjects in the leisure group perceived that they had more energy at the 3-month and 6-month assessments and were more mobile than the other groups. Significant differences existed between the leisure group and the OT group and between the leisure group and the control group on psychological well-being at both 3 and 6 months. However, there was no significant difference between OT group and control group on the same variable. The overall results suggest that leisure intervention had a significant effect on mobility, energy, and psychological well-being.

Pasek and Schkade (1996) explored the effects of a 6-day skiing trip on 14 adolescents with a variety of limb

deficiency patterns. The subjects consisted of 7 male and 7 female adolescents who had been or were receiving rehabilitation treatment at a children's hospital. Participant observation method utilizing videotapes, interviews, and daily progress notes by ski instructors was used to collect data. A one-month post trip questionnaire was also administered to check the level of the participants' self-esteem and the improvements in efficiency, effectiveness, and satisfaction to self and others. All 13 skiers showed gains in efficiency (i.e., a progression in the quality of the skiers' movement) as the week progressed. All 13 subjects demonstrated increases in effectiveness in ski (i.e., a progression of slope difficulty) and indicated satisfaction to self (i.e., the sense of pleasure to self as noted by non-verbal behaviors as well as verbal comments). All but one ($n = 12$) subject indicated satisfaction with others (family members and friends). The findings supported the positive effect of a skiing trip.

McKenna and Haste (1999) investigated the clinical effectiveness of drama-therapy with 10 patients who were recruited from a neuro-rehabilitation unit. Among the 10 participants (5 males and 5 females; mean age = 34), six were recovering from head injury, one from CVA, two from removal of a cerebral tumor and one from Guillain Barrie syndrome. The treatment provided was various artistic forms of creative expression within an aesthetically pleasing environment to stimulate and release the imaginative and creative ability of clients (e.g., engaging in creating sound recordings, stories, pictures, landscapes, and sculptures). Each participant received one-to-one sessions of therapy over a five-week period (1 hour per week). A semi-constructed interview was carried out with each participant and tape-recorded for analysis. The researchers found that the drama-therapy provided the participants with: (a) a sense of personal space in an otherwise institutional setting; (b) escapism and enjoyment; (c) creativity and a sense of potency, and (d) a metaphor to explore personal issues.

Taylor and McGruder (1995) identified meaningful components of the experience of sea kayaking as described by persons with SCI. Three subjects with SCI (2 males & 1 female) who participated in recreational kayaking participated in a series of interviews, each lasting approximately 45 minutes. One important theme that emerged from the interview data was "perceptions of the self as able in the eyes of others." Participants' verbal descriptions indicated the outcomes of: (a) perception of self as able in the eyes of others, (b) meaningful time use, and (c) the construction of an identity after injury.

Increasing attention has been given to quality of life as a measure in evaluating the effectiveness of intervention as well as a major goal of rehabilitation (Fabian, 1991; Gill &

Feinstein, 1994). Post et al. (1998) surveyed the life satisfaction of people with SCI who reside in the community, and compared their levels of life satisfaction with a sample population without disability. The study found that the people with SCI scored significantly lower in general life satisfaction and satisfaction with self-care ability, leisure situations, vocational situations and sexual life than the general population group. Another study (National Organization on Disability, 1988) reported that 33% of adults with disabilities are very satisfied with life in general, compared to 61% of adults without disabilities.

While people with disabilities showed lower levels of QOL compared to those without disabilities, some researchers have conducted follow-up studies to examine life satisfaction and QOL incorporating identified leisure variables. Kinney and Coyle (1992), for example, examined the contribution of leisure to life satisfaction among adults with physical disabilities. Using a sample of 790 adults, they found that leisure satisfaction was the most significant predictor of life satisfaction ($R^2 = .42$). Vogel, Klaas, Lubicky, and Anderson (1998) conducted a survey to examine the factors that contribute to life satisfaction among adults who had childhood SCI. The study found that satisfaction with social/recreation opportunities was a significant predictor for satisfaction with life. Further, life satisfaction was associated with education, income, satisfaction with employment, and social/recreation opportunities, and was inversely associated with some medical complications. Lee (1998) conducted a study to identify factors that predict QOL of people with SCI using leisure and demographic variables. Study results using a total of 206 individuals with SCI showed that frequency of recreation participation contributed the most variance when explaining QOL, followed by free-time boredom, income, and age (total $R^2 = .51$). This study suggested that frequency of recreation participation and free-time boredom explain more than demographic variables such as income and age.

Social Limitations

People with disabilities often experience challenges in their life due to social and environmental circumstances. Social limitations refer to "restrictions attributable to social policy or barriers (structural or attitudinal) which limit fulfillment of roles or deny access to services and opportunities associated with full participation in society" (U.S. Department of Health and Human Services, 1993, p. 38).

One of the most important goals in rehabilitation is to minimize levels of social limitation by integrating people with disabilities into the community. Studies have documented the efficacy of TR in the community re-integration

process. Using an ex-post facto design, Shank, Coyle, Kinney, and Lay (1994/95) utilized existing data sources to examine the relationship between treatment time in TR and outcomes. Data was collected from 149 clients with SCI or TBI who had attended a rehabilitation hospital. The data sources used in this study were admission and discharge evaluation data on the clients completed by TR staff at the facility. One unique feature of this study was the incorporation of the intensity of TR treatment variable (i.e., less than 15 minutes each day, 16–30 minutes each day, and 31–60 minutes each day). Among eight TR variables (i.e., leisure time management, leisure initiation, community integration, leisure skills, home leisure resources awareness, community leisure resource awareness, and alternative leisure awareness), statistically significant difference existed only within community integration. Post hoc test indicated statistically significant differences in improvements in community integration between individuals receiving 15 minutes of interventions per day and those receiving more than 15 minutes of TR interventions per day. However, there were no significant differences between those individuals receiving from 16-30 minutes and those receiving 31-60 minutes of TR intervention each day.

While no other experimental studies were found, some researchers employed survey methods to examine one of the social limitations (i.e., attitudes toward people with disabilities). Numerous scholars and researchers reported that one important factor inherent in the subtle barrier that people with disabilities often experience is the attitudes of health and rehabilitation professionals, parents, peers and individuals with disabilities themselves (e.g., Beattie, Anderson, & Antonak, 1997; Furnham & Thompson, 1994; Gilbride, 1993; Holaday & Wolfson, 1997). Negative attitudes toward individuals with disabilities often create real constraints to the fulfillment of their social roles and personal goals.

An examination of attitudes toward people with disabilities is not an easy task. Attitudes are multidimensional in nature, reflecting ambivalence rather than pure positive, negative, or neutral responses (Katz, Hass, & Bailey, 1988). Traditional assumption indicates that increased contact with people who have disabilities will result in more positive attitudes about disabilities. However, current literature indicates a somewhat different view. Makas (1993), for example, noted that studies examining the relationship between attitudes and contact with individuals with disabilities revealed wide variations in findings. The following variables mediate the relationship between attitudes and actual contact: length and frequency of contact, relative status between the two people taking part in the interaction, pleasantness of contact, and degree of intimacy. Makas

recommended that researchers examining the attitudes must describe the characteristics of contacts between people with and without disabilities.

While social integration of individuals with disabilities is very challenging, recreation involvement often provides a positive opportunity for socialization. Thus, an important benefit of recreation participation is the opportunity for people with disabilities to develop social contact and support that create sense of respect and belonging. For example, physical forms of recreation involvement have been found to be very conducive toward the development of new friendships and social support network (Shepherd, 1991). In leisure context, Coleman (1993) has examined "leisure based social support" and its impact as a buffer on stress. Coleman noted that leisure may provide a "short term relief" from accumulated stress, and that continued leisure involvement prevents stress. This social benefit in turn enhances quality of life (Fuhrer, Rintala, Hart, Clearman, & Young, 1992; Krause, 1992).

Furthermore, social support has been identified as an important factor that facilitates leisure participation of people with SCI in community settings. Elliott and Shewchuk (1995) reported a positive relationship between social support and leisure activities. The researchers reported that higher levels of depression were significantly predictive of fewer leisure activities. Greater satisfaction with intimate relationships, on the other hand, was significantly associated with higher levels of leisure activity. More time spent in hobbies, conversation, and recreational pursuits undoubtedly enhanced the quality of close relationships with spouses, lovers, and partners.

The factors that affect the ability of persons with wheelchairs to access the goods and services within the community setting are complex (Grady, 1995). Access to public accommodations and services operated by private entities is the focus of the Americans with Disability Act, Title III (U. S. Department of Justice, 1991). Even with clear ADA guidelines and checklists, National Council on Disability (1997) reported that compliance has been an ongoing problem. Noncompliance to ADA causes constraints to individuals who use wheelchairs. For example, some studies (e.g., Ahn, McGovern, Walak, & Edlich, 1994; Cope, Allred, & Morsell, 1991; Figoni et al., 1998) reported that accessibility problems such as parking, entering buildings, and utilizing restrooms do not allow individuals with disabilities to reach public goods and services. When an individual with disability cannot park or get into a building or when that same person cannot access the restroom facilities, he/she is clearly excluded from the goods and services housed in that building. These studies underscore the problem of inaccessible

public and private facilities, which often preclude the full participation of persons with disabilities in social, educational, vocational, and recreational environments.

Of course, many positive actions have occurred to improve the inclusiveness of persons with disabilities into their communities since a decade of the ADA's mandates has passed. However, many ADA monitoring, reporting, and enforcement issues continue to be challenged. When barriers associated with accessibility exist, they not only discriminate against individuals with mobility limitations, but they also create social limitations. When a community constructs barriers to a person who uses a wheelchair due to non-compliance to the public law, this community creates a public health concern. Recreational therapists working in rehabilitation must place emphasis on addressing the environmental needs (e.g., accessibility, social inclusion) of people with disabling conditions. Environmental strategies can be effective in helping people function independently and not be limited in their social participation, leisure activities or social interaction as a spouse, parents, or co-workers.

Intervention/Treatment Programs to Achieve Outcomes

Client outcomes are direct consequences of the therapeutic intervention. Therefore, it is very important to identify information concerning the specific programs and interventions that lead to outcomes. Effective rehabilitation services require that therapists comprehend the intensity, frequency, and duration of services to maximize the improvement. Therefore, every intervention program should be specifically outlined concerning amount, duration and types of intervention included within the treatment program (Pollock, Freemantle, Sheldon, Song, & Mason, 1993).

One predominant intervention program identified in this review was therapeutic exercise. An exercise program was used in conjunction with virtual reality (Grealy et al., 1999). This technologically advanced exercise program has the advantage of increasing stimulating interaction, and, therefore, offers a powerful tool to integrate cognitive and physical function. Aerobic exercise was another type of exercise program utilized to improve fitness and decrease depressive symptoms (Santiago et al., 1993; Coyle & Santiago, 1995). Still other types of exercise programs included regular exercise regimen along with relaxation techniques, group discussion and educational sessions on healthy behavior (Bastien et al., 1998). An aquatics program (Broach, 1997/98) was utilized to improve physical functioning. Some occupational therapists (Drummond & Walker, 1996) provided leisure-based treatment containing

transfer activity needed for leisure pursuits, positioning, advice on obtaining financial assistance and transport, liaison with specialist organizations, and providing physical assistance. Unidentified leisure intervention was further employed by occupational therapists. The intervention contained involvement in individual or social leisure activities such as "visiting a stroke club" and "making a vegetable board" (Jongbloed & Morgan, 1991). Further, outdoor activities such as ski trip and sea kayaking were also implemented as intervention programs.

The length of intervention for the programs ranged from a minimum of 4 weeks to maximum of 24 months. Exercise programs using a nonimmersive virtual reality exercise bicycle were used three times a week for 4 weeks and each bout lasted approximately 25 minutes (Grealy et al., 1999). An exercise program combining lifestyle component occurred once a week for an hour for 16 weeks, and every other week thereafter until 24th month (Bastien et al., 1998). Other type of exercise program lasted 90 minutes per week for 8 weeks or 60 minutes per week for 12 weeks. A regular aerobic exercise was also provided at least 23 minutes duration per session every 2-3 times a week for 12 weeks. A therapist provided leisure-based treatment for a minimum of 30 minutes a week for the first 3 months, and thereafter, for a minimum of 30 minutes a fortnight for the next 3 months. Another leisure activity intervention lasted for 30 minutes per week for the first 3 months. Although most studies with aforementioned lengths and duration resulted in statistically significant improvement, an intervention containing five 60 minutes leisure visits for 5 weeks did not show significant improvement.

Assessment/Measurement of Therapeutic Recreation Outcomes

Various assessment and evaluation instruments exist to measure outcomes related five domains of the NCMRR model. All instruments are designed for different measurement purposes depending on the nature of population and settings. Due to the fact that no outcome research was found in the area of patho-physiology and impairment, the discussion of assessment and measurement in these areas will be excluded

Table 1 summarizes the various assessment and measurement instruments related to three domains in the NCMRR model. While many instruments introduced in the Table 1 were identified in the reviewed studies, the authors of this paper added other assessment tools that are most commonly used in the physical medicine and rehabilitation settings. Some of the assessment tools in functional

limitations (NIH Stroke Scale, the Canadian Stroke Scale) are directly related to medical science, and may not be used by recreational therapists. However, other instruments listed in functional limitation may be adaptable to measure functional outcomes.

One of the most common instruments is the Functional Independence Measure (FIM) (Granger et al., 1986). The FIM measures basic activities of daily living, social cognition, and functional communication. Although the FIM is placed in the functional limitation section, it can be used to measure disability-related outcomes. Another popular instrument identified in the studies was Craig Handicap Assessment and Reporting Technique (CHART, Whiteneck et al. 1992). The CHART can be used to measure disability (e.g., physical independence, mobility, orientation), as well as community integration (e.g., social integration, economic self-sufficiency). While no single study used the Leisure Competence Measure (LCM) (Kloseck, & Crilly, 1997), the LCM has potential to be used to measure TR-related outcomes in disability (e.g., leisure skills, group interaction skills) as well as social limitations (i.e., community participation). Of particular relevance is that the LCM was specifically designed "to be consistent with the Functional Independence Measure... to afford therapeutic recreation professional, employed in rehabilitation facilities" an outcome-based instrument (Kloseck, Crilly, Ellis, & Lammers, 1996, p. 14). While the emergence of LCM is promising, part of the lack of outcome studies in TR may be due to the lack of instruments that are valid and reliable to assess TR outcomes.

Summary and Conclusion

A review of literature was presented that demonstrated promising efficacy results for recreation intervention in physical medicine and rehabilitation. It is evident that recreation is an effective means to achieve various outcomes outlined in the NCMRR model. However, the existing knowledge base on TR outcomes in physical medicine and rehabilitation falls short of the contemporary requirement for evidence-based practice. Particularly, there exists only a few outcome studies conducted by the researchers in TR. Researchers in occupational therapy, kinesiology, and rehabilitation sciences produced many of the studies reviewed within this paper.

More than 10 years ago, Iso-Ahola (1988) stated that TR research was beginning to address important research questions and improved the quality of research associated with the field. However, Compton and Dieser (1997) were unable to see the follow-up results after approximately 10

Table 1
A Review of Measurement Tools Available in Physical Medicine and Rehabilitation

Functional Limitation	Disability	Social Limitations
<ul style="list-style-type: none"> • National Institute of Health Stroke Scale (Brott & Reed, 1989) • Canadian Stroke Scale (Cote, Battista, Wolfson, & Hachinski, 1989) • Functional Independence Measure* (Granger and his associates, 1986) • Edinburgh Rehabilitation Scale (Affleck et al., 1988) • Functional Life Scale (Sarno, Sarno, & Levita, 1973) • Disability Rating Scale* (DRS, Gourvier, Blanton, LaPorte, & Nepomuceno, 1987) • The Mini-Mental Status Examination* (Folstein, Folstein, & McHugh, 1975) • Borg Scale* (Borg & Linderholm, 1967) • Instrumental Activities of Daily Living Scale (IADL, Lawton, 1971) 	<ul style="list-style-type: none"> • Functional Independence Measure* (Granger and his associates, 1986) • Leisure Competence Measure (Kloseck, & Crilly, 1997) • Katz Index of ADL* (Katz et al., 1963) • Functional Assessment Inventory (Crewe & Athelstan, 1980) • Craig Handicap Assessment and Reporting Technique* (Whiteneck et al., 1992) • Satisfaction with Life Scale* (Diener, Emmons, Larsen, & Griffin, 1985) • The Nottingham Health Profile* (NHP; Hunt, McEwan, & McKenna, 1986) • Center for Epidemiological Studies Depression Scale* (CES-D, Radloff, 1977) • Rosenberg's Self-esteem Scale* (Rosenberg, 1965) 	<ul style="list-style-type: none"> • Community Integration Questionnaire (Willer et al., 1994) • Craig Handicap Assessment and Reporting Technique* (Whiteneck et al., 1992) • Impact on Participation and Autonomy (Cardol et al., 1999) • Leisure Competence Measure (Kloseck, & Crilly, 1997)

* indicates measurement tools that were identified in the review of outcome studies.

years. Compton concludes that researchers in TR "have not produced the research base necessary to make significant claims as to therapeutic recreation's efficacy" (p. 301). Considering this trend, it can be summarized that the TR profession is skating cautiously on a very thin ice. Unless the TR profession is able to substantiate its claim of contributing to important patient outcomes, the professional may very well be left behind by the broader rehabilitation community.

It is recommended that researchers continue to conduct outcome research in TR to demonstrate the relationship between important details in treatment (i.e., intensity, frequency, and duration of intervention) and expected outcomes. Outcome research should concentrate on the process that leads to outcomes. There is a need to analyze

the intervention components that help determine which specific aspects of the program format are actually producing outcomes. Future outcome studies in TR should address the following questions: (a) What specific program components cause TR intervention outcomes? (b) Are frequency and duration of intervention significant components?; (c) Is sequence of intervention efficacious? and (d) Is the facilitation style of recreational therapist an important component to achieving outcomes? Researchers need to investigate the complex relationship between process and outcomes associated with TR intervention.

Whiteneck and her colleagues (1992) state that rehabilitation services in general focus more on their effectiveness in reducing disability than the social implication of disability (i.e., handicapism). The tendency to concentrate

more on disability than the social limitation area was found to be true in this review paper in that there were few studies that investigated outcomes related to social limitations. Examination of the various instruments measuring outcomes associated with community integration revealed that recreation is an essential component in facilitating community integration (c.f., Dijkers, 1999). In conclusion, considering the national goal mandated by the ADA (PL 101-336), researchers and practitioners in TR should begin to address the reduction of social limitations and develop predictable methods to promote community re-integration through TR services in rehabilitation.

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