A Study of the Recreational Athlete and Sport-injury Rehabilitation Adherence: Implications for the High School Athlete

J. Jordan Hamson, MS, ATC, ETT
Director of Fitness Management
PhD Candidate Psychology
Instructor
DePaul University, Chicago

J. Jordan Hamson
2320 North Kenmore Avenue
Chicago, Illinois 60614-3250
773-325-4341

Abstract

The purpose of this study was to determine the relationship between the effects of the environment and the rehabilitation adherence of recreational athletes measured by the items on the Rehabilitation Adherence Questionnaire (RAQ). The RAQ contains six variables that might influence rehabilitation adherence: scheduling, pain tolerance, environment, social support, self-motivation and perceived exertion. These six subject-specific variables and one clinic-specific variable, patient volume, were examined. Subjects were recruited from five Chicagoland sports medicine clinics (n = 132) who were rehabilitating a sport-related injury. Adherence to the rehabilitation program was evaluated by attendance at the scheduled sessions with the treating therapist. A logistic regression equation was formulated to predict non-adherent behavior using all seven variables. A stepwise procedure showed that, among the predictors, scheduling and patient volume were selected as significant predictors of rehabilitation non-adherence in the recreational athlete population. Implications for the recreational high school athlete were discussed.

Key words: rehabilitation adherence, non-adherence, sport-injury, recreational athlete, high school athlete

Rehabilitation adherence is an important research issue across populations within sports medicine. Investigation is needed to identify useful predictors of compliance, ultimately aiding sports medicine professionals in their rehabilitation of injury. It has been recognized by past research that personal factors or traits of an individual determine their adherence or compliance to a rehabilitation program (Brewer, 1998; Byerly et al., 1994; Duda et al., 1989; Fields et al., 1995; Fisher et al., 1988; Udry, 1997). Non-adherent behavior can be defined as missing scheduled appointments, not following prescribed exercise plans or dropping out of the rehabilitation process (Meichenbaum, 1987). Considerable research in the area of sport-injury rehabilitation has determined a set of personal components that will predict non-adherent behavior. A few of these predictors include self-motivation, pain tolerance, perceived exertion, and social support (Duda et al, 1989; Fields et al, 1995; Fisher et al., 1988). However, prior studies have failed to thoroughly investigate the effects of the environment, or situational factors. Early investigation by Balint, dating back to 1968, reported the effects of the treating therapist as a salient influence on adherent behavior. Balint's research parallels the theory that the effect of the treating therapist's attitude is so powerful that the therapist him/herself should be considered a drug or catalyst to rehabilitation adherence. This has implications for those who are acting in the environment where the patient is being treated. Consider the high school training room setting. This setting requires one athletic trainer, sometimes two, to treat nearly fifty to over one hundred athletes a day; the time allowed each patient and the pace at which the treatment is given may not be observed by the athlete as quality care. Research by Moos (1987) suggested that there is something

such as the "social climate" or the "personality" of a setting that can lead to non-compliant behavior. The high school athletic training room setting is vulnerable to develop a negative "social climate" for the athlete seeking individualized care. On the clinical side, the overpopulated clinic, with the treating therapist seeing an overload of patients per hour, it may also be difficult for the patient to feel as if quality care is being offered. DiMatteo and DiNicola (1982a) reported that stress and organizational demands on physicians could have a significant affect on adherence rates. The clinical setting offers more problems feeding into non-adherent behavior. Scheduling appointments at times that are not convenient, being seen by more than one therapist, and the lack of availability of the therapist to provide one-on-one care are a few documented elements leading to non-adherence (Meichenbaum, 1987). Adhering to a rehabilitation program is a well-documented problem that affects many patients in their return to full health following an athletic injury.

In a review of the literature on compliance, Kyngas et al. (2000) reported that compliance is not as straightforward as a single number or percent of attendance at scheduled appointments. Rather, it is a behavioral concept; adherence involves multiple actions, intentions, emotions and events that may not be directly observable. Masek (1982) suggested that non-adherence was defined in literature as a low of 4% to a high of 92%; different treatment modes have varying rates but the most typical range being 30-60%. Due to the difficulty of defining the separation of adherent behavior and non-adherent behavior, for this study, adherent behavior will be defined as attending 100% of the scheduled appointments and anything less than that will be defined as non-adherent behavior.

Many studies supported scheduling and environment as predictors of non-adherent behavior but the research was limited by only one environment being sampled (Duda et al, 1989; Fields et al, 1995; Fisher et al., 1988). It should be noted here, that examining the situational effect across clinics by sampling patients and their adherence rates from multiple centers has not yet been done within this body of research. This style of research will evaluate the environmental effects by comparing 5 clinics and the patient's adherence rates at those clinics. Thus, this research attempts to elucidate the powerful effects of the environment on non-adherent behavior.

The focus of this article is to bring attention to the problem of rehabilitation adherence in the recreational athlete population. The data collected are used to highlight the significant predictors of adherent behavior, as to avoid or improve these elements for future injured athletes. The article will explain the problem of adherence in relation to injury rehabilitation and dissect the specific roadblocks that cause the majority of the non-adherent behavior. The article will also discuss the role of the coach, parent and teammate in the rehabilitation process of the high school athlete and how to avoid adherence problems that ultimately interfere in timely return to sport.

Methods

Subjects in this study were recruited from 5 Chicagoland sports medicine clinics (n = 132). To be included in the study, participants were identified as having a "sport-related" injury. The age range of the subjects was from 18-66 years old (mean = 29.82). There were 54 females and 78 males in this sample. To measure adherence, the treating therapist (athletic trainer (ATC) or physical therapist (PT)) recorded total number of

visits (at least 6) and total number of missed visits (due to any reason except scheduling error). Adherence was defined as meeting 100% of the scheduled appointment times; missing one or more appointments was defined as non-adherent behavior. There were 50 adherents and 82 non-adherents in this sample. Information such as age and gender of the patient and the joint injured by participation in sport were also recorded. Injuries included in this study involved the ankle, knee, shoulder, hip, and back.

The patient was asked to participate upon completion of all rehabilitation sessions; the primary investigator collected the informed consent and all survey material. If the patients entered the study, they filled out the Rehabilitation Adherence Questionnaire (RAQ); the RAQ contains questions addressing rehabilitation adherence. A sample question might be, "My appointments were scheduled at times that were convenient to me" and would require the patient to circle a number on a 5-point scale.

Two specific types of variables were investigated; six patient-specific variables and one clinic-specific variable. The patient-specific variables were measured by the RAQ and include self-motivation, pain tolerance, social support, perceived exertion, scheduling and the environment. The clinic-specific variable was patient volume per month at the clinic; this variable allows for the environmental effect to be studied across multiple clinics. The main hypothesis is that the patients who are rehabilitating a sport-injury at a clinic with a high patient volume, will experience a negative “social climate” that will adversely affect their adherence rate. Furthermore, the second hypothesis is that the subject-specific factors of self-motivation, pain tolerance, perceived exertion and social support will have no effect on rehabilitation adherence.

Results

Logistic regression analysis was employed to predict the probability that a participant would display non-adherent behavior within the rehabilitation program of the recreational athlete. The predictor variables were six subject-specific and one clinic-specific variable. A test of a full model including all 7 variables versus a model with intercept only was statistically significant (C= .777). The area under the receiver operating characteristic curve (or C-statistic) is a measure commonly used to evaluate the goodness-of-fit of a logistic regression model, whereas an increase in the C-statistic has been observed indicating an improved fit (Cash, 1979). To further examine the predictors, a stepwise procedure (with tolerance level = .05 for entry into the model) was used to select the most powerful predictors. The reduced model included scheduling ($p < .0001$) and patient volume ($p = .0028$). The reduced model was as powerful in predicting non-adherent behavior as the full model; the reduced model is the model of choice ($c = .76$). *[or Since the C-statistic for the reduced model meets that of the full model, the selected model will only have two terms.]*

Discussion

This research focused on the recreational athlete, or the "weekend warrior" type. The largest percent of people involved in sport activity today are recreational athletes. The United States Census (1997) reported 21,283 physical fitness/club facilities and 332,103 employees at those facilities. Hence, it is important to sample this population to ultimately aid in the largest percent return to participation. It is especially important to the recreational population because they are not as invested in the playing of sport (not a

livelihood or scholarship voucher). In order to keep this individual active in sport, roadblocks must be removed that would otherwise limit their adherence to rehabilitating an injury (return to activity). The environmental effect was identified as significant by this research; it is hoped that the data collected from a recreational sport athlete population will shed light on what is predictive of a positive, rehabilitation process that brings the athlete back to the sport and continued healthy lifestyle.

It is noteworthy that the two significant predictors were both environmental factors, thus supporting that the patients who were rehabilitating a sport-injury at a clinic with a high patient volume, would experience a negative "social climate" that would adversely affect their adherence rate. Furthermore, the second hypothesis was also validated; the subject-specific factors of self-motivation, pain tolerance, perceived exertion and social support will had no effect on rehabilitation adherence. Moreover, the clinic-specific variable, patient volume, has implications for the clinical setting; a clinic that has a high patient volume will be at risk for non-adherent behavior. The environment that the athlete is undergoing rehabilitation in, is the most important element related to adherence. This is especially important because it is something that can be readily manipulated, as compared to pain tolerance and self-motivation. The clinic, or training room must have a positive "social climate" and employ staff that value offering a positive, caring, personally interactive environment. The power of a therapist or ATC working with the injured athlete is not to be underestimated. The recreational population, as a whole, may not be as motivated to continue participation post-injury and the effect of a positive patient-therapist interaction is essential to ensure adherence and healthy lifestyle continuance.

Many parallels have been drawn from previous research in this field; samples on a specific injury or a specific team or training room have been used to extrapolate to the general public. It is our view that the general public, the recreational athlete, would be the best sample to examine and match to the general population. It is important to look to the recreational population to provide a sturdy baseline for comparison, as the largest percent participating today are recreational athletes (United States Census, 1997).

Implications for the High School Athlete

A special recreational athlete under watchful concern is the high school athlete. Being a teenager is a difficult task and imaging a devastating change to their social interaction as a result from being injured is cause for concern. High school seniors who were 18 at the time were included in this investigation. Most high school sports were represented, from volleyball, track, soccer to football and baseball. Environmental effects are salient in this population; this is the area that coaches, parents, teammates can have the biggest positive impact on the rehabilitation process.

Incurring an injury involves loss of time participating in the sport. This takes the individual away from a very important environment, being with their team. It has been proven that the rehabilitation process goes more smoothly with better results toward full recovery when the athlete reports having a positive social support climate (Fisher et al., 1993; Grove et al., 1990; Udry, 1997). This support can come from various individuals including parents, coaches, teammates and athletic trainers. These individuals all play a vital role in fostering a supportive environment by building the social support infrastructure. Members of the team are very important; teammates signify a connection

to the sport. It is important not to isolate the injured athlete during the recovery process. Encourage the injured athlete to carry on with social interactions with the team and not to focus on the limitations set on their participation. Previous research documents that "starters" and "bench warmers" have a different reactions to injury; starters return faster to participation than bench players (Petrie, 1993). This phenomenon has been attributed to self-motivation, ego orientation, and social support possibly offered by the status found on the team.

In the case of the high school athlete, the coach can aid the injured athlete immensely by keeping them involved with the team environment. This can be done by suggesting that they still attend practices (complete their rehabilitation outside of training times) and engage them in a different way with the team, such as critiquing certain plays and other minor coaching details. The coach is also a valuable part of the rehabilitation process when he/she communicates with the athlete, showing concern about their well being. In the actual rehabilitation of the athlete, the coach can also be a part of the goal setting plan, helping with sport specific drills that the athlete can progress through. Simple communication can make all the difference in the world for the high school athlete; the coach should maintain contact with the injured player and show investment in their rehabilitation process and continue to make them feel a part of the team.

Parents also play an instrumental role in the injury rehabilitation process. The parent commonly plays a support role, often transportation to and from practices and games and providing feedback on participation. The parent of an injured athlete will help most if they continue to provide a supportive environment for involvement in that sport; attend the games with the athlete, even though they are not currently participating.

Parents are often involved in the scheduling of the appointments if the athlete is treated outside of the high school training room. Providing transport to the rehabilitation sessions and being present to learn and ask questions about the process can also be a function of the parent figure. Parents can also show their support by communicating with the athletic trainer and coaches, as well as discussing the rehabilitation process with their athlete. Although the connection to the team itself is very important, parents play a key role in the infrastructure of social support and ultimately, a positive rehabilitation experience.

Finally, the treating ATC or PT also plays a vital role in the adherence of the athlete to the rehabilitation process. Beyond the personal factors examined by the RAQ, scheduling of appointments and setting the "social climate" are of vast importance and under the control of the therapist. To address scheduling of the rehabilitation appointments, if they are easy to get to in the way of time and location the athlete will be more likely to attend the rehabilitation session. This has implications for the treating ATC. Findings from prior research suggest that the speed of recovery can be augmented by convenient therapy, providing a comfortable, stable, consistent and coherent environment (Grove, 1990). The ATC has a primary responsibility over coaches, parents and teammates, to educate the athlete about the injury and form attainable, realistic goals for the rehabilitation process. The coach and the parent need to communicate with the ATC so that the same information is communicated with the athlete. All too often, the athlete is pulled in many directions by conflicting information. This miscommunication impedes progress and limits adherence to the rehabilitation program. The ATC is also

206 important as a support structure; the ATC has the experience of bringing many athletes
207 successfully through this process.
208

References

Brewer, B. W. (1998). Adherence to sport injury rehabilitation programs. *Journal of Applied Sport Psychology*, 10, 70-82.

Byerly, P.N., Worrell, T., Gahimer, J., and Domholdt, E. (1994). Rehabilitation compliance in an athletic training environment. *Journal of Athletic Training*, 29, 352-355.

Cash,W. (1979). Parameter estimation in Astronomy through Application of the likelihood ratio. *Astrophysical Journal*, 228, 939-947.

Duda, J.L., Smart, A.E., Tappe, M.K. (1989). Predictors of adherence in the rehabilitation of athletic injuries: An application of the personal investment theory. *Journal of Sport and Exercise Psychology*, 11, 367-381.

Fields, J., Murphey, M., Horodyski, M., and Stopka, C. (1995). Factors associated with adherence to sport injury rehabilitation in college-age recreational athletes. *Journal of Sport Rehabilitation*, 4, 172-180.

Fisher, C.A., Domm, M.A., and Wuest, D.A. (1988). Adherence to sports-injury rehabilitation programs. *The Physician and Sportsmedicine*, 16(7), 47-52.

Fisher, C.A. (1990). Adherence to Sports Injury Rehabilitation Programs. *Sports Medicine, 9 (3),* 151-158.

Fisher, Craig, Hoisington, Linda L. (1993). Injured Athletes' Attitudes and Judgments Toward Rehabilitation Adherence. *Journal of Athletic Training, 28 (1),* 48-53.

Grove, R. J., Hanrahan, S., Stewart, R.L. (1990). Attributions for Rapid or Slow Recovery from Sports Injuries. *Canadian Journal of Sport Science, 15 (2),* 107-114.

Kyngas, Helvi, Duffy, Mary E., Kroll, Thilo. (2000). Conceptual analysis of compliance. *Journal of Clinical Nursing, 9,* 5-12.

Masek, BJ. (1982). Compliance and Medicine. In D. M. Doleys, R. L. Meredith, and A. R. Ciminero (Eds.), *Behavioral Medicine: Assessment and Treatment Strategies.* New York: Plenum Press.

Meichenbaum. D., Turk, D. (1987) *Facilitating Treatment Adherence: A Practitioner's Guidebook. Plenum Press, New York.*

Moos, RH. The Social Climate Scales: A User's Guide. Palo Alto: Consulting Psychologists Press, Inc, 1987.

Petrie, Trent. (1993). The Moderating Effects of Social Support and Playing Status on the Life Stress-Injury Relationship. *Journal of Applied Sport Psychology*, 5, 1-16.

Udry, Eileen. (1997). Coping and Social Support Among Injured Athletes Following Surgery. *Journal of Sport and Exercise Psychology, 19*, 71-90.

United States Census. (1997). http://www.census.gov/epcd/ec97/US_71.HTM.