Factors Influencing Return to Work Following Hospitalization forTraumatic Injury

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Abstract: This paper describes the employment experience of 266 individuals one year after traumatic injury severe enough to require hospitalization. Of those working full-time prior to their injury, 56 per cent were employed full-time at one year; an additional 5 per cent were working part-time. Those sustaining a severe head or spinal cord injury were at highest risk of not returning to work (only 43 per cent and 21 per cent, respectively, had returned within the year). Low one-year employment rates (58 per cent) were also noted for individuals whose most severe injury was to one or more extremities. The extent and rate of return to work was examined in relation to selected socioeconomic and personal characteristics. Findings indicate that after controlling for type and severity of injury, personal income, and educational level of the injured person, as well as the identification of a strong social network as defined by the presence of one or more confidants, were important correlates of post-injury employment status. (*Am J Public Health* 1987; 77:329–334.)

Introduction

The impact of injury in terms of threat to life is well recognized. Injury is the leading cause of death among children and young adults ages 1–44. Among causes of death for the entire United States population, trauma is exceeded only by heart disease, cancer, and stroke.[1] National initiatives to improve trauma care and promote injury control over the past 10–20 years have focused principally on reducing overall case fatality rates.[2,3] As more trauma fatalities are prevented, however, an increase can be expected in the already large number of survivors with impairments that affect their return to pre-trauma functional status and major usual activity. There is little information available on the characteristics and duration of disabilities resulting from trauma serious enough to require hospitalization and the factors that influence the extent and rate of recovery.

Return to work is often used as a measure of overall recovery from injury or illness. It is a particularly relevant measure when examining individual and societal burden of injury as the majority of those inflicted are young. The ability to return to work following illness or injury, however, is influenced not only by one's physical and emotional well being but by several non-health related factors as well. Several studies have addressed the factors influencing return to work following stroke,[4,5] myocardial infarction,[6,7] and a variety of other conditions.[8–11] These studies have found that—after controlling for the severity of the condition—age, education, and prior work experiences significantly influence whether and when an individual returns to work.

Although estimates have been reported of the per cent returning to work following traumatic injury,[12–23] the factors associated with the extent and rate of return to work have been systematically examined in only a few studies; most of these studies have been restricted to recovery from closed head and spinal cord injuries. Those which have examined the correlates of return to work have found that age, socioeconomic status, and prior job experience of the patient as well as presence of other injuries and pre-morbid personality traits are associated with whether and when a person returns to work.[12,16,18] The literature further indicates that support from close friends and family is important in recovery from traumatic injury,[13,24,25] although no study has formally examined the influence of this support after controlling for injury severity and socioeconomic characteristics of the injured person.

The present study examines the correlates of employment status post-trauma for a broad group of individuals, including those who sustained extremity, thoracic, and abdominal injuries, as well as head and spinal cord injuries. In addition to investigating the relationship between return to work within one year and type and severity of injury, the influence of selected socioeconomic and personal characteristics, including the presence of an informal social support network, is examined.

Methods

Source of Study Population

The analysis focuses on 266 individuals who were working full-time prior to injury. They were participants in a larger prospective survey of 597 trauma patients, ages 16–45 inclusive, who were admitted to either the Johns Hopkins Hospital (JHH) or the Maryland Institute for Emergency Medical Services System (MIEMSS) Shock Trauma Unit.[26] Excluded from the survey were minor injuries that did not result in hospital admission, poisonings, and injuries secondary to other illnesses such as stroke. Also excluded from study were trauma patients with previously diagnosed psychiatric conditions and those who did not live in Maryland, Virginia, West Virginia, Washington, DC, Delaware, or Pennsylvania.

Patients were asked to participate in the study shortly before their discharge from the hospital. Of those judged eligible for inclusion in the study, 597 (79 per cent) were enrolled. Forty-eight (6 per cent) refused to participate, 34 (4 per cent) were transferred to another acute care facility nearer their homes, and 75 (10 per cent) were discharged before the study coordinators could contact them for a baseline interview. This latter group consisted for the most part of patients who stayed in the hospital for only one or two nights. An attempt was made to contact these individuals by phone, and, if no contact was made within one week

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following discharge, the case was posted as lost. Each person who agreed to participate was contacted for an interview at three time periods: 1) in the hospital 48 hours prior to discharge; 2) over the telephone at six months post-discharge; and 3) in person one year following discharge. The interviews covered a broad range of items with an emphasis placed on identifying change in life circumstances and disability. As part of the interview at discharge, participants were queried as to their functional status and major usual activity prior to the injury. Selected information from the medical chart was also obtained and the severity of their injuries rated using the Abbreviated Injury Scale (AIS).[27]

Of the 597 patients recruited into the larger study, 486 (81 per cent) were followed for a full year subsequent to discharge from acute care. Those for whom no follow-up interview was obtained at 12 months post-discharge differ in some respects from respondents (e.g., less severe injuries), but they are too few to affect the results, particularly when the analysis controls for injury severity.

Participants in the study were predominantly males aged 18–35 years and the majority (79 per cent) were in the labor force before their injury. Of the 486 for whom complete 12-month information was obtained, 98 (20 per cent) were not in the labor force, 31 (6 per cent) reported part-time work, 91 (19 per cent) were laid off or looking for work, and 266 (55 per cent) were working full-time prior to their injury. Those working full-time prior to injury differ in some respects from the entire study sample. Specifically, they are somewhat older (mean age of 28 years for those working vs age 25 for the entire sample), more likely to be White (75 per cent working vs 64 per cent entire sample), and more likely to have completed high school (73 per cent working vs 61 per cent, entire sample).

Injury severity was quantified using the AIS,[27] a numerical scale ranging from 1 (minor injury) to 6 (maximum injury—virtually unsurvivable). Scores are subjective assessments of severity assigned by experts in the field and are implicitly based on four criteria—threat to life, permanent impairment, treatment period, and energy dissipation.

The Injury Severity Score (ISS)[28] defined as the sum of squares of the highest AIS score in each of the three most severely injured body regions, has generally been used to assess the combined effect of multiple injuries. More recent work, however, has shown that when predicting levels of disability among injury survivors as opposed to case fatality, the ISS is not an adequate measure of severity.[26,29] Rather, the body region of the most severe injury sustained must be taken into account. Furthermore, injuries to the head, extremities, and spine have been shown to be the most important predictors of disability; abdominal and thoracic injuries, if survivable, are associated with little functional disability. For this reason, results are presented in this paper by the AIS score of the most severe injury sustained within body regions: head/neck, spine, extremities, and abdomen/thorax. For purpose of classification, if an individual sustained two injuries with the same AIS, the head injury took precedence over the spine injury and the spine injury over an extremity injury.

Of the 266 individuals working full-time prior to injury, 41 per cent sustained their most severe injury to the head or neck, 11 per cent to the spine, 26 per cent to one or more extremities, and 22 per cent to the thorax or abdomen. The distribution by type is similar for the subsample and entire study sample, which includes those not working full-time prior to injury. Approximately 63 per cent of the injuries in the study groups were motor vehicle-related, 21 per cent resulted from assault, and the remaining 16 per cent were primarily due to falls. These figures are slightly different for the entire study sample; for the larger group only 54 per cent were motor vehicle-related, and 30 per cent were due to assaults.

Correlates of Return to Work

In addition to type and severity of the injury, factors that were examined for their influence on return to work were selected among those likely to influence response to therapy, access to health and human services, and general well-being. These include socioeconomic characteristics (age, race, sex, education, marital status, and status as head of household prior to injury), type of job (blue collar vs white collar) and income prior to injury, and the identification of a strong social support network as defined by the presence of one or more confidants. The presence of a confidant was identified by asking the respondent to name up to three individuals (family or friends) with whom he/she could discuss a very personal or serious problem. For each person named, five questions were asked to determine the frequency and ease of contact and the reciprocity of the relationship. A "confidant" was thus operationally defined as any person with whom the respondent could discuss a serious and personal problem, expect the other significant person to reciprocate if the need arose, find it very easy or easy to contact, and is in contact with at least twice a month.[30,31] These factors were examined for their influence on full-time employment status at 6- and 12-months post-injury on both the bivariate level using chi-square statistics and in a multivariate model using logistic regression techniques.[32]

Results

Of the 266 individuals who were working full-time prior to the injury, 44 per cent were employed full-time at 6-months post-injury and 56 per cent at 12-months. Of the 116 individuals who were not working full-time at 12-months post-injury, 4 per cent were institutionalized, 10 per cent were retired due to a disability, and 32 per cent indicated they were unable to work because of their poor health. An additional 11 per cent were working part-time, 18 per cent were looking for work, and 25 per cent were keeping house, going to school, or doing something else not specified. Thirteen individuals reported having returned to full-time work post-injury but were not employed full-time at 12-months post-injury. Of these 13, five were working part-time at 12 months, three were laid-off or looking for work, one had enrolled in school and one indicated he was unable to work due to poor health.

Employment Status by Type and Severity of Injury

The percentage employed at 6 and 12 months varied by type and severity of injury (Table 1). Overall, only 56 per cent of the group had returned to full-time employment a year after hospital discharge. By body region, the percentages were 63 per cent for abdomen/thorax, 58 per cent for extremities, 56 per cent for head/neck, and 45 per cent for spine. Within each body region except abdomen/thorax the least severe injuries returned to work soonest. This relation was most striking for spinal injuries, 75 per cent having returned to work after minor injuries (AIS 1–2), 46 per cent after moderate injuries (AIS 3), and 14 per cent after severe injuries (AIS 4–5). For extremities, there was relatively little difference in return to work (minor, 65 per cent; moderate, 54 per cent). Head/neck injury return to work percentages by AIS score fell between these two extremes.

TABLE 1—Per Cent Working Full-time at 6 and 12 Months Post-injury by Body Region and Severity of Most Severe Injury (for those working full-time prior to injury)

Body Region and Severity of Most Severe Injury	No. of Cases	Per Cent Working at 6 Months	Per Cent Working at 12 Months
Head/Neck			
Total	108	43.5	55.6
1–2	26	76.9	76.9
3	28	42.9	57.1
4	30	40.0	56.7
5	24	12.5	29.2
Spine—(including spinal cord & vertebrae)			
Total	29	31.0	44.8
1–2	8	62.5	75.0
3	13	30.8	46.2
4–5	8	0.0	12.5
Extremities			
Total	69	33.3	58.0
1–2	23	43.5	65.2
3–4	46	28.3	54.3
Abdomen or Thorax			
Total	59	64.4	62.7
1–2	23	69.6	65.2
3	8	75.0	62.5
4–5	28	57.1	60.7
All Injuries			
Total	266	44.0	56.4

The rate of return to work for three subgroups of the study population (i.e., individuals whose most severe injury was: 1) spinal cord injury; 2) severe (AIS = 4 or 5) head/neck injury; or 3) moderate or severe (AIS = 3 or 4) extremity injury was examined in more detail. These subgroups were chosen as representing individuals at particularly high risk of not returning to work post-injury. The cumulative percentage distribution of time between injury and full-time employment for these three subgroups as compared to all other study patients is displayed in Figure 1.

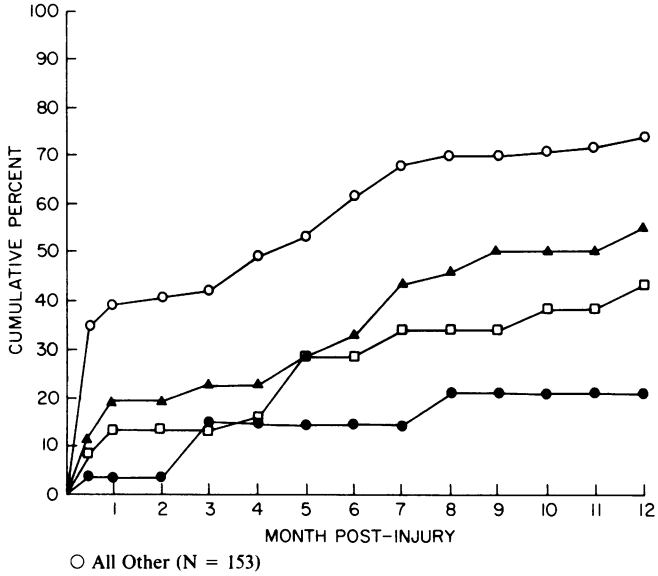

FIGURE 1—Cumulative Per Cent Return to Work by Selected Injury Groups

Within the first month post-injury, only 19 per cent of those with moderate/severe extremity injuries, 13 per cent of those with severe head/neck injuries, and 7 per cent of those with a spinal cord injury had returned to work, whereas nearly 40 per cent of the individuals without these injuries were employed at one month. At four months, those working among the three high-risk injury subgroups is less than 25 per cent. Nearly twice as many individuals in the residual category were working within four months. After the first four months, return to work accelerated considerably for all patients except those with spinal cord injuries.

Limitations at Work

Among those who were working at 12 months post-injury, 49 per cent identified some limitation that interfered with their ability to work: 40 per cent had a problem with physical activity (compared to 5 per cent pre-injury); 14 per cent had a problem seeing, hearing, or speaking (compared to 4 per cent before); 16 per cent had difficulty dealing with work pressure (6 per cent before); and 4 per cent had some trouble traveling to and from work (1 per cent before). In general, within all injury type groups except abdomen/thorax, the percentage with difficulties increased with higher AIS scores, although the numbers on which percentages for specific injury type and severity groups are small. The majority (80 per cent) who returned to work indicated that they were doing the same kind of work as they had done prior to the injury.

Correlates of Return to Work

We next examined the contribution to returning to work of factors other than body region and severity of injury in univariate analyses. The specific relation of the 10 factors available to us are displayed in Table 2. Age, race, sex, and marital status seem unimportant while education, income, head of household status, type of prior work, and social supports appear related to return to work status.

We performed a logistic regression to determine the individual contribution of these factors to returning to work. As shown in Table 3, income, education, and social support make greater independent contributions to returning to work than type of work or head of household.

Overall, the odds of working full-time at 12 months are approximately twice as great if one or more confidants are identified, and three times as great if the respondent's income is greater than $10,000. In Table 4, the unadjusted and adjusted rates of employment at 6 and 12 months are displayed by prior income level and presence of one or more confidants. Those with low income levels and no source of social support are at highest risk of not returning to full-time employment; at 12 months only 24 per cent (29 per cent adjusted) of these individuals were working. At the other extreme, those with higher incomes prior to injury and a source of social support are most likely to be working, with approximately 74 per cent (72 per cent adjusted) employed at 12 months. It is important to note that even among those with higher incomes, the presence of one or more confidants increases the likelihood of working. The positive effect of social support appears to be somewhat stronger among those with smaller incomes.

Discussion

The results of this study, while limited in generalizability due to the relatively small number of participants, emphasize the public health importance of injuries, not just as a leading cause of death, but as a cause of significant disability among those who survive. The findings further point to subgroups of

TABLE 2—Per Cent Working Full-time at 6 and 12 Months Post-injury by Patient Characteristics (for those working full-time prior to injury)

Characteristics	Number of Individuals	Per Cent Working at 6 Months	Per Cent Working at 12 Months
Age (years)			
16–25	118	39.8	54.2
26–35	102	44.1	54.9
36–45	46	54.3	65.2
Race			
White	201	45.3	59.2
Non-white	65	40.0	47.7
Sex			
Male	217	42.9	55.3
Female	49	49.0	61.2
Marital Status Prior to Injury			
Married	85	41.2	61.2
Div/Sep/Wid	43	53.5	58.1
Never Married	138	42.8	52.9
Respondent Head of Household			
Yes	128	52.3	64.8
No	138	36.2	48.6
Education			
Less than High School	72	30.6	38.9
High School Graduate	128	45.3	59.4
Some College	66	56.1	69.7
Type of Work Prior[+]			
White collar	86	59.3	72.1
Blue collar	173	37.6	50.3
Respondent Income Prior[++]			
< $5,000	47	19.2	36.2
$5,000–9,999	42	38.1	40.1
$10,000–19,999	99	55.6	67.7
≥ $20,000	49	65.3	77.6
Number of Confidants at 6 Months			
0	60	23.3	Not Applicable
1	87	48.3	
2	58	50.0	
3	61	52.5	
Number of Confidants at 12 Months			
0	50	Not Applicable	38.0
1	84		65.6
2	67		53.7
3	65		61.5

[+] N = 7 missing values.
[++] N = 29 missing values.

the injured population for whom special attention should be directed in future research and program development.

Of 266 young adults who were working full-time prior to an injury severe enough to require hospitalization, only 56 per cent reported full-time employment at one year; an additional 5 per cent were working part-time. As expected from other reports,[12–14,24,25] those sustaining a severe head or spinal cord injury were at particularly high risk of not returning to work. What has not been previously documented, however, is the relatively low one-year employment rates (58 per cent) for individuals with moderate or severe injuries to the extremities. Levels of post-trauma employment for extremity injuries are not as low as for those with severe head or spinal cord injuries, but given their relatively high incidence in the population, the total social and economic impact of extremity injuries is significant.

The results of this study further point to the importance of both economic and personal resources in returning to work post-trauma. Low income and education are indicators of limited resources being available to the individual and, in addition, are correlated with type of occupation. These individuals are expected to be more likely to have to change employers due to long absences from the job or may have to permanently leave occupations that are physically demanding. Personal resources, on the other hand, are likely to be important in coordinating care needs and providing emotional support.

There are clearly other factors which, although not considered in the present analysis, may directly influence employment status post-injury. These include the quantity and quality of vocational rehabilitation as well as pre-injury personality traits and behavior. Financial disincentives that may be created through receipt of disability payments may also affect the extent and rate of return to work post-injury, although to date there is no consistent evidence that claimants report more symptoms than non-claimants or return to work in fewer numbers.[15,33–56]

Results of the study argue for the need to include the family or significant other in early discussions post-trauma to ensure that effective communication is initiated and maintained between the injured person and his/her social network. Recognition and utilization of this extended resource base by health care providers may be an effective supplemental tool to therapeutic intervention. Individual or group counseling could serve as an effective substitute for this source of support for those who cannot identify a close friend or

TABLE 3—Logistic Regression Results: Work Status at 6 and 12 Months by Respondent Characteristics, Adjusted for Type and Severity of Injury

Characteristics	Adjusted Odds Ratio (95% Confidence Interval)	
	6 Months	12 Months
Age (years)		
16–25	1.08 (0.39, 2.98)	1.59 (0.59, 4.32)
26–35	0.65 (0.26, 1.60)	0.73 (0.30, 1.75)
36–45	Reference	Reference
Race		
White	1.13 (0.53, 2.40)	1.08 (0.54, 2.17)
Non-white	Reference	Reference
Sex		
Male	1.01 (0.45, 2.28)	1.05 (0.47, 2.34)
Female	Reference	Reference
Marital Status		
Never Married	2.10 (0.92, 4.78)	1.09 (0.51, 2.35)
Wid/Sep/Div	2.10 (0.80, 5.50)	1.29 (0.52, 3.18)
Married	Reference	Reference
Head of Household		
Head or Lives Alone	2.07 (0.97, 4.38)	1.78 (0.88, 3.60)
Not head	Reference	Reference
Education		
Some College	1.87 (0.70, 5.02)	2.56 (1.00, 6.52)
HS College	1.53 (0.70, 3.34)	1.83 (0.91, 3.70)
Less than HS	Reference	Reference
Type of Work Prior		
White Collar	1.46 (0.70, 3.02)	1.66 (0.80, 3.44)
Blue Collar	Reference	Reference
Income		
≥ $10,000	3.47 (1.67, 7.20)	3.00 (1.53, 5.83)
Unknown	0.96 (0.28, 3.32)	1.11 (0.40, 3.04)
< 10,000	Reference	Reference
Social Support		
≥ 1 Confidant	2.90 (1.31, 6.41)	2.10 (1.00, 4.39)
No Confidants	Reference	Reference

TABLE 4—Unadjusted and Adjusted[+] Employment Rates at 6 and 12 Months Post-Injury by Prior Income of Respondent and Presence of Social Support

Income Prior to Injury and Presence of Social Support	6 Months		12 Months	
	Unadjusted	Adjusted	Unadjusted	Adjusted
Income ≤ $10,000				
No Confidants	15.8	13.4	23.5	29.0
≥ 1 Confidant	31.4	31.0	41.7	46.1
Income ≥ $10,000				
No Confidants	50.0	35.0	56.5	54.9
≥ 1 Confidant	60.3	60.9	73.6	72.0

[+]Adjusted using logistic regression.

relative. In planning rehabilitation services, it is important that careful consideration be given to the economic, social, and personal factors which, in addition to the extent of physical damage caused by the injury, play an important role in the recovery process.

ACKNOWLEDGMENTS

This research was supported in part by grants from the Robert Wood Johnson Foundation and the Insurance Institute for Highway Safety. The opinions, findings and conclusions expressed in this publication are those of the authors and do not necessarily reflect the views of the Insurance Institute for Highway Safety or the Robert Wood Johnson Foundation.

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Funding Continued for Community Health Care Programs

The Hospital Research and Educational Trust (Trust), the research and development affiliate of the American Hospital Association, has recently received a $253,140 grant from the Robert Wood Johnson Foundation to continue administering Community Programs for Affordable Health Care (CPAHC). A project promoting the development of community-based, health care cost-containment programs, CPAHC is overseen by a national advisory committee chaired by Professor John T. Dunlop of Harvard University.

Since its inception in 1982, the $15.2 million project, funded by RWJF and cosponsored by the American Hospital Association and the Blue Cross and Blue Shield Associations, has provided matching grants of as much as $100,000 to 16 communities to plan comprehensive, multi-year, community-wide programs aimed at restraining local health care expenditures. Now in its second stage, 11 communities nationwide have been awarded grants of up to $1.5 million to implement these plans. Project work over the next year will focus on reviewing communities' progress in implementing programs, supporting CPAHC national advisory committee review and recommendation to RWJF of communities appropriate for continued funding, and disseminating information on successful programs to other communities.

The major objective of CPAHC is to foster cooperative interaction among purchasers, payers, and providers. To receive funding, a community must be able to mobilize its hospitals, third-party payers, major employers, and unions to participate in program planning and implementation.

Under the grant, the Trust offers technical assistance not only for communities receiving development or implementation grants, but also for other communities interested in developing similar programs. Some of the CPAHC programs include:

- A community-rated benefit plan in Tulsa, OK, in which a local HMO and preferred provider organization charge small and large employers the same rate to provide employees with coverage, thereby subsidizing indigent care more cost effectively;
- a locally developed pre-admission review program, including a substance abuse and mental health component and a comprehensive program of care for the elderly in Mecklenburg, NC;
- a project in Topeka, KS to establish a small urban/rural physician and hospital financing and delivery network;
- projects in Iowa to reduce variations in physician practice patterns, establish rural alternative delivery systems, and implement a capitated comprehensive workers compensation program;
- a project in Worcester, MA to develop competitive health plans which compete according to rules established by the community.

For further information, contact the Hospital Research and Educational Trust, American Hospital Association, 840 N. Lake Shore Drive, Chicago, IL 60611. Tel: 312/280–6620.