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## Veterans of Operation Enduring Freedom and Operation Iraqi Freedom: Employment Status Following Traumatic Amputation

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### Abstract

**Purpose:** The population of veterans experiencing traumatic amputation grows at a rate disproportionate to the general population. This study explores the current employment experience of veterans living with traumatic amputation and the relationship among demographic, health and amputation related characteristics, employment status and service utilization, and perceived barriers to employment.

**Methods:** Survey data from veterans of Operation Enduring Freedom and Operation Iraqi Freedom (OEF/OIF) were gathered on health and amputation, employment, service utilization, and perceived barriers to employment. Pearson chi-square tests, Fisher's exact tests, and one-way analysis of variance were used to compare these measures between the employment categories.

**Results:** Education level, annual household income, and disability benefit income were significantly related to employment status. Pain was found to significantly, negatively relate to employment status. Level of amputation and prosthesis use did not relate to employment status.

**Conclusions:** Given the role of employment and the impact of an amputation on functional and psychosocial well-being, comprehensive supports to include pain management, exploration of one's sense of meaning and achievement, including how veterans may contribute to their community, educational or skill-based opportunities, greater education on Veteran disability

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benefits, support utilization, and employment options including workplace accommodations should be considered and offered to veterans in a customized manner.

### Keywords

employment; unemployment; veterans; traumatic amputation

Combat operations in Afghanistan and Iraq have resulted in almost 2,000 U.S. service members acquiring a trauma-related amputation since 2002 (Fischer, 2015). The majority of these injuries involves lower extremity amputations, but also include upper extremity, as well as multiple limb amputations at rates greater than the civilian population (Krueger et al., 2012). Over 90% of these injuries have been due to intermittent explosive devices, resulting in polytraumatic injuries (injuries involving multiple parts of the body and mind), which further complicate transition to civilian life.

The physical recovery from combat-related amputation is ongoing. Injuries often require extensive rehabilitation, multiple surgeries, and prosthetics (Largo & Rosenman, 2013). An amputation requires both physical and psychological adjustment and can be one of the most debilitating outcomes for a patient (Ramchand et al., 2015; Reiber et al., 2010). These injuries may also be more severe in military populations impeding their response to treatment (Ramchand et al., 2015). Physical limitations along with impaired coping skills from co-occurring traumatic brain injury, posttraumatic stress disorder, and/or substance use disorder, can further hinder recovery. As the majority of these service members are young, male, and in the early stage of their work life, these traumatic wounds can have a significant impact on their future employment trajectory (Hurley et al., 2015).

A service member's military prospects following an amputation are limited. While advances in prosthetics have made redeployment for some service members an option (Nichels, 2018), return to military duty after amputation is rare (Belisle et al., 2013; Hurley et al., 2015). The majority of service members with limb injuries (64%) are declared unfit for active duty (Masini et al., 2009), and battlefield extremity injuries such as amputation account for the majority of veteran long-term disability claims (Cross et al., 2011). Hurley et al. (2015) found that only 13% of service members returned to active duty, of which 2% were able to return to their original occupation. While reports on the long-term vocational outcomes of veterans with amputations are few, a 1982 report indicated that the unemployment rate for soldiers sustaining limb amputation in the Vietnam conflict was twice that of noninjured Vietnam veterans (Dillingham, 1998). For veterans with an amputation who did return to work (RTW), they earned less money, held more blue-collar jobs, and obtained fewer college degrees.

However, little is known about the employment outcome of more recent Operation Enduring Freedom (OEF)/Operation Iraqi Freedom (OIF) veterans following an amputation. The purpose of this study is to explore the employment experience of OEF/OIF veterans with amputation, particularly as it relates to individual demographic and amputation characteristics. The following research questions addressed in this study are:

1. What is the employment experience of OEF/OIF veterans with amputation?

2. What factors and individual characteristics are related to employment following an amputation?

## METHODOLOGY

This study was part of a larger examination of the postamputation experience of OEF/OIF veterans (Darter et al., 2021). It was conducted in accordance with approved protocol by institutional review boards at the Central Virginia Veterans Healthcare System and the researchers' affiliated university. All U.S. service members between the ages of 18 and 55, who sustained one or more major limb amputations as identified by ICD-9 diagnostic codes, and who had participated in OEF/OIF service, were queried through the VA Corporate Data Warehouse. A major limb amputation is defined as an amputation that occurs proximal to a wrist or ankle (Ajibade et al., 2013). The records search yielded a total of 870 veterans who met study inclusion criteria, of which 716 had valid mailing addresses.

### Sampling and Measures

All eligible veterans or service members with a major traumatic limb amputation were contacted through mailings to participate in the study. Two rounds of follow-up reminder postcards were sent approximately 2 weeks apart. Individuals had the option to take an electronic version of the questionnaire through a password protected website, or complete a provided paper copy. Web-based surveys often have low response rates, typically 11% less than mail or phone surveys (Archer, 2008). The questionnaire collected information on participant demographics and military involvement, general health and amputation specific items, and employment experience and perceptions. The primary outcome variable was RTW status. The veteran was categorized into the following groups based on their current self-reporting: Employed, Unemployed, and Retired.

**Demographic and Military Variables.**—The questionnaire's demographic variables were veteran age, gender, race, education level, relationship status, and earnings. Military variables included service branch, length of service, final military rank, and if the amputation was service related.

**Health and Amputation Related Variables.**—Participants provided information on time since amputation, and level of amputation(s), and health comorbidities. The researchers used a modified version of the Questionnaire for Persons with Transfemoral Amputation (Q-TFA) for the study (Hagberg et al., 2004). The Q-TFA has shown good criterion validity (range 0.89–0.97) and internal consistency ( $\alpha = .70$ ) (Hagberg et al., 2004). Veterans reported on their prosthesis usage, fit and average hourly wear per day. They were also asked to rate (No trouble, Slight trouble, Moderate trouble, Considerable trouble, Great deal of trouble), their overall situation as an individual with limb loss, their functional ability, and the severity of problems experienced with prosthesis use. An aggregate of these three areas were also calculated into a global score (Hagberg et al., 2004).

**Employment and Support Services Experience.**—Separate items were used to assess employment and service utilization indicators. Employment related variables were: vocation prior to amputation (to include military service for active duty service members),

physical demands of work prior to amputation (Not demanding, Somewhat demanding, Neutral, Demanding, Extremely demanding), if the participant had returned to same job after the amputation, and current employment status. The reason for not returning to the same job, and the industry the participant is currently working in was included for those appropriate participants. Participants were also asked to provide information on their use (yes/no) and need of vocational rehabilitation and satisfaction level with vocational rehabilitation services (Very dissatisfied, Dissatisfied, Neutral, Satisfied, Highly satisfied).

**Barriers to Employment.**—Information on participant perceived barriers to employment were collected. Individuals could select from options provided (e.g., accessibility, skills, adequate pay, etc.), or provide their own experiences. Responses were then collapsed into related categories of workplace, disability, career, social support, and financial barriers.

Statistical analyses were performed using SAS version 9.4. Means and standard deviations were reported for each of the demographic, health and amputation, and employment items. Separate summaries of each of the demographic and health and amputation measures were calculated separately by RTW level (employed, unemployed, retired). Pearson chi-square tests, Fisher's exact tests, and one-way analysis of variance were used to compare these measures between the employment categories.

## RESULTS

A total of 164 veterans with traumatic amputations participated in the study (23% response rate), of which 75% were between the ages of 26 and 40 years of age (35% 31–35; 20% 26–30; 20% 36–40). The majority were married or in a serious relationship (67%), and had children (70%). Almost all (98%), participants were male and most were White (81%). They had also completed a college degree (78%). The Army (57%) and the Marine Corp (32%) were the dominant military branches veterans served in. As for type of amputation, 84% ( $N = 162$ ), had a lower extremity amputation, 16% ( $N = 26$ ) had an upper extremity amputation. Concerning perceived barriers to employment, 80% of the veterans believed their disability was an impediment to work (Table 1).

Regarding employment status, 38% of veterans were employed following their amputation, 36% were unemployed, and 26% were retired. There were no significant differences between groups in age or time since injury. The majority of veterans had participated in vocational rehabilitation services (86%), through the Veterans Administration (VA), of which 68% were reportedly satisfied with the services received, compared to 18% who were dissatisfied. Veterans who were currently employed were more likely to rate their overall experience as a person with an amputation as good (50%), compared to those who were unemployed (30%) and retired (20%) ( $p = .002$ ). See Table 2.

Education level, annual household income, and disability benefit income were related to employment status. Veterans who had a college education were more likely to be employed (58%) versus retired (8%), whereas individuals with a high school diploma or some technical training were more likely to be retired (42%) than employed (21%) ( $p < .001$ ). The majority of veterans who were in households earning less than 45k per year (77%) and

those earning between 45 and 75k (47%) were more likely to be in the unemployed category. Conversely, the majority of veterans in households earning over 75k were more likely to be employed (60%) ( $p < .001$ ). However, the amount of annual disability benefits received was negatively associated with employment. For individuals receiving less than 45k per year in annual VA disability benefits, the majority (56%) were employed; for those receiving between 45 and 75k the majority (50%) were unemployed; and for those veterans receiving more than 75k, the majority were retired (69%) ( $p < .001$ ). See Table 3.

No relationship between the type of amputation or prosthetic use on employment status was observed. However, over three-fourths (76%) of veterans reported that the experience of pain in their residual limb moderately to greatly impacted their ability to work. Veterans who reported that pain in the residual limb greatly impacted employment were more likely to be unemployed (40%) or retired (57%), versus employed (26%) ( $p < .01$ ). Additionally, 80% of Veterans reported that pain in other areas of the body also moderately to greatly impacted work. Similar to findings on limb pain, the majority of veterans who reported that “other” pain greatly impacted work were unemployed (48%) and retired (38%), versus employed (21%). See Table 4.

Overall, 92% ( $N = 150$ ) of veterans did not return to their preinjury job (i.e., military service) following their amputation. When asked why, 80% ( $N = 117$ ), reported they could not due to their disability. For individuals who were currently employed, the largest industry sector veterans were working in was Government 33% ( $N = 20$ ). The majority of employed veterans are working full time (82%). However more than half (58%), believe they are less productive employees than prior to their amputation. Regarding work satisfaction, 69% of employed veterans reportedly like their job and plan on staying in it for the next several years, despite just under half (45%) wanting to ultimately change their job or career (see Table 5).

## DISCUSSION

Our study assessed OEF/OIF veterans' RTW experience following a traumatic amputation, and factors associated with it. The majority (98%) of respondents were male and White (81%), which is consistent with other studies of wounded service members (Cross et al., 2011; Hurley et al., 2015). Almost 80% of these veterans were 40 years of age or younger, and similar mean ages were found across the employment categories of employed, unemployed, and retired. As these veterans with a traumatic amputation are younger, having an amputation can have a significant impact on the ability to obtain, and maintain employment and their future earning potential. Of the findings, education level, household income, disability benefit income, and the experience of pain were significantly associated with employment status

Similar to other research findings (Dajpratham et al., 2008; Postema et al., 2016; Schoppen et al., 2001), education level is related to RTW. Veterans with college degrees were significantly more likely to be employed than those without. Dajpratham et al. (2008) found that amputees with a higher educational level had more job opportunities, employment, and flexibility in their work schedule. MacKenzie et al. (2006) hypothesized that having a degree

may also influence an individual's expectations for recovery and their ability to adapt to change.

As for the relationship between income and employment, not surprisingly, veterans residing in households with lower annual incomes were more likely to be unemployed. Veterans residing in higher income households tended to be employed. Of particular note, veterans' disability benefit income level was related to RTW. Individuals with higher disability amounts were more likely to be retired. Conversely, veterans receiving lower benefit payments were more likely to be employed. This is in line with previous research that found higher veteran disability rates were associated with the lowest likelihood of employment (Gerber et al., 2016). Veteran disability benefits are calculated at time of discharge through a single index standardized rating scheme (Gerber et al., 2016). It is based on a medical examination assessing limitations due to the loss of a body part or function and clinical measures of illness/injury related to the individual's service. The severity of each condition is assigned a number from a scale of 0–100, combining the score of multiple disabilities in a nonadditive manner. This scale is also used to approximate the loss of earning capacity or lack of future employment. Compensation in the form of cash, medical benefits, and other benefits are based on this combined index. A higher disability rating corresponds to higher monthly compensation payment amounts (U.S. Department of Veteran Affairs, 2020). While a greater disability rating may indicate increased disability severity that can correspond to an inability to work, research has shown that the correlations between disability rating severity and work-related disability are not strong (Crewe & Athelstan, 1981; Crewe et al., 1975). For instance, findings show that 20% of veteran disability beneficiaries with a 100% disability rating are working (Gerber et al., 2016). Although receiving disability benefits should not be a disincentive to employment, as veterans do not lose them when they RTW, many veterans state they are reluctant to work for fear of losing their benefits or that they will fail at work (Resnik & Allen, 2007).

A fear of failure in acquiring or sustaining employment may also prohibit veterans from pursuing work. Self-efficacy was found to be one of the strongest predictors of employment in a longitudinal study of civilian amputees (MacKenzie et al., 2006). Often employment enhances one's positive identity, meaning, and achievement, which are elements of well-being, yet this may be overshadowed by anxiety that one will not be successful in the first place. Further research addressing self-efficacy, self-esteem, and a sense of meaning or purpose is warranted. Coaching or supporting Veterans to build their self-efficacy in the pursuit of employment may be an active strategy to enhance employment acquisition and retention.

The majority of veterans in this study are experiencing pain in their residual limb and other areas that moderately to greatly impact their ability to work. This perception of pain severity was also related to one's employment category. Veterans who reported that their pain greatly impacted work were more likely to be unemployed and retired. The research on the relationship between RTW and pain is inconsistent. MacKenzie et al. (2006) found individuals who experienced greater pain early in their recovery were less likely to RTW. However other research has not shown a relationship between pain and RTW (Dajpratham et al., 2008; Ide et al., 2002; Whyte & Carroll, 2002).



In a secondary analysis we explored the work experience of veterans who were currently employed. The vast majority of these individuals did not return to their previous occupation and the majority of these veterans attributed it to their disability. Of those who were working, more than half believed their amputation was a barrier to employment and that they were less productive employees now than prior to their injury. Over a quarter indicated that they might be experiencing underemployment. Underemployment is more common for people with disabilities and can have a detrimental impact on their well-being (Milner et al., 2017). Studies of individuals with amputations suggest that the majority of amputees believe they have limitations performing their job, and that maintaining long-term employment may also be a challenge without workplace intervention (MacKenzie et al., 2006). The scientific literature demonstrates that work accommodations can make the difference between job loss and a successful employment experience (Vornholt et al., 2018). Schoppen et al. (2001) found that 34% of individuals with an amputation who had dropped out of the workforce stated they would have worked longer if workplace accommodations had been made, while 30% of individuals currently working desired additional workplace modifications, making ongoing workplace accommodation evaluations necessary for job tenure. Work accommodations have also been linked to greater job satisfaction (Schoppen et al., 2002).

It is interesting to note that for those veterans who were employed, the industry sector the majority of veterans were working in was Government. Federal agencies and their contractors are required to adhere to specific laws that help promote opportunities for inclusion and employment participation for veterans with disabilities. The Rehabilitation Act of 1973 (Section 503 of the Rehabilitation Act and Other Federal Initiatives: The CWICs Role in Supporting Beneficiaries, 2019) provided the first civil rights protections for individuals with disabilities and Section 501 of the Act prohibits employment discrimination by the federal government and their contractors and requires affirmative action in the recruitment and hiring of persons with disabilities. Much like the Rehab Act, the Vietnam Era Veterans' Readjustment Assistance Act (VEVRAA) also prohibits federal contractors and subcontractors from employment discrimination towards protected veterans (i.e., veterans with disabilities who served in active duty and are entitled to disability compensation, or veterans released from active duty because of a service-connected disability), and requires affirmative action to recruit, hire, promote, and retain veterans. These Acts were designed to improve employment opportunities for veterans (Section 503 of the Rehabilitation Act and Other Federal Initiatives: The CWICs Role in Supporting Beneficiaries, 2019).

A potential limitation of this study is that the results are specific to OEF/OIF veterans and may not generalize to veterans who did not sustain a combat injury or to the overall civilian population with limb loss. Also the data is reliant upon self-reporting and may be subject to bias. Additionally, we do not know the employment status of veterans with traumatic amputations who did not respond. It is conceivable that service members who responded may be functioning at a higher level than those who did not.

## CONCLUSION

Employment has been shown to increase the health and wellness in disability populations (Saunders & Nedelec, 2014; Vornholt et al., 2018). Given the role of employment and the impact of an amputation on functional and psychosocial well-being, comprehensive supports should be considered and offered to veterans in a customized manner. These supports could include pain management, exploration of one's sense of meaning and achievement (e.g., how veterans may contribute to their community), greater education on veteran disability benefits, support utilization, educational or skill-based opportunities, employment options, and workplace accommodations. Community integration of veterans must be optimized so that all veterans have options to enrich their respective well-being and potential contributions to society. Exploration of quality of life of OEF/OIF and their experiences over the course of time also warrants further consideration.

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## REFERENCES

- Ajibade A, Akinniyi OT, & Okoye CS (2013). Indications and complications of major limb amputations in Kano, Nigeria. *Ghana Medical Journal*, 47, 185–188. [PubMed: 24669024]
- Archer TM (2008). Response rates to expect from web-based surveys and what to do about it. *Journal of Extension*, 46(3). <https://joe.org/joe/2008june/rb3.php>
- Belisle JG, Wenke JC, & Krueger CA (2013). Return-to-duty rates among US military combat-related amputees in the global war on terror: Job description matters. *Journal of Trauma and Acute Care Surgery*, 75(2), 279–286. 10.1097/TA.0b013e31829bb777 [PubMed: 23887560]
- Crewe NM, & Athelstan GT (1981). Functional assessment in vocational rehabilitation: A systematic approach to diagnosis and goal setting. *Archives Physical Medicine Rehabilitation*, 62(7), 299–305.
- Crewe NM, Athelstan GT, & Meadows GK (1975). Vocational diagnosis through assessment of functional limitations. *Archives Physical Medicine Rehabilitation*, 56(12), 513–516.
- Cross JD, Ficke JR, Hsu JR, Masini BD, & Wenke JC (2011). Battlefield Orthopaedic injuries cause the majority of long-term disabilities. *Journal of the American Academy of Orthopaedic Surgeons*, 19, 1–7. 10.5435/00124635-201102001-00002 [PubMed: 21205762]
- Dajpratham P, Tantiriramai S, Lukkapichonchut P, & Kaewnaree S (2008). Factors associated with vocational reintegration among the Thai lower limb amputees. *Journal of the Medical Association of Thailand*, 91(2), 234–239. [PubMed: 18389989]
- Darter B, Hawley CE., & Armstrong AJ., (2021). Current life experiences in veterans with limb loss: A description of survey methods and summary results. *Journal of Rehabilitation*. Under Review
- Dillingham TR, (1998). Rehabilitation of the upper limb amputee. In Zajtcuk GR. (Ed.), *Text book of military medicine, Part IV, surgical combat casualty care, rehabilitation of the injured combatant* (Vol. 1). Published by the Office of the Surgeon General, Department of the Army, United States of America.
- Fischer HA (2015). Guide to US military casualty statistics. Operation freedom's sentinel, operation inherent resolve, operation new dawn, operation Iraqi freedom, and operation enduring freedom. Congressional Research Service.
- Gerber LH, Weinstein AA, Frankenfeld CL, & Huynh M (2016). Disability among veterans: Analysis of the national survey of veterans (1997–2001). *Military Medicine*, 181(3), 219–226. 10.7205/milmed-d-14-00694 [PubMed: 26926746]



- Hagberg K, Brånemark R, & Hägg O (2004). Questionnaire for persons with a transfemoral amputation (Q-TFA): Initial validity and reliability of a new outcome measure. *Journal of Rehabilitation Research & Development*, 41(5), 695–706. 10.1682/JRRD.2003.11.0167 [PubMed: 15558399]
- Hurley RK, Rivera JC, Wenke JC, & Krueger CA (2015). Identifying obstacles to return to duty in severely injured combat-related service members with amputation. *Journal of Rehabilitation Research & Development*, 52(1), 53–61. 10.1682/JRRD.2014.04.0094 [PubMed: 26230831]
- Ide M, Obayashi T, & Toyonaga T (2002). Association of pain with employment status and satisfaction among amputees in Japan. *Archives of Physical Medicine & Rehabilitation*, 83(10), 1394–1398. 10.1053/apmr.2002.35095 [PubMed: 12370875]
- Krueger CA, Wenke JC, & Ficke JR (2012). Ten years at war: Comprehensive analysis of amputation trends. *Journal of Trauma and Acute Care Surgery*, 73, 438–444. 10.1097/TA.0b013e318275469c
- Largo TW, & Rosenman KD (2013). Michigan work-related amputations, 2008. *Journal of Occupational and Environmental Medicine*, 55, 280–285. 10.1097/JOM.0b013e31827945be [PubMed: 23439271]
- MacKenzie EJ, Bose MJ, Kellam JF, Pollak AN, Webb LX, & Swiontkowski MF (2006). Early predictors of long-term work disability after major limb trauma. *Journal of Trauma*, 61(3), 688–694. 10.1097/01.ta.0000195985.56153.68 [PubMed: 16967009]
- Masini BD, Waterman SM, Wenke JC, Owens BD, Hsu JR, & Ficke JR (2009). Resource utilization and disability outcome assessment of combat casualties from operation Iraqi freedom and operation enduring freedom. *Journal of Orthopedic Trauma*, 23(4), 261–66. 10.1097/BOT.0b013e31819dfa04
- Milner A, King TL, LaMontagne AD, Aitken Z, Petrie D, & Kavanagh A (2017). Underemployment and its impacts on mental health among those with disabilities: Evidence from the HILDA cohort. *Journal of Epidemiology & Community Health*, 71(12), 1198–1202. 10.1136/jech-2017-209800 [PubMed: 28970195]
- Nichels WD (2018). Soldier amputees have more options than ever for redeployment. *Warrior Care and Transition*. [https://www.army.mil/article/209083/soldier\\_amputees\\_have\\_more\\_options\\_than\\_ever\\_for\\_redeployment](https://www.army.mil/article/209083/soldier_amputees_have_more_options_than_ever_for_redeployment)
- Postema SG, Bongers RM, Brouwers MA, Burger H, Norling-Hermansson LM, & Reneman MF (2016). Upper limb absence: Predictors of work participation and work productivity. *Archives of Physical Medicine & Rehabilitation*, 97(6), 892–899. 10.1016/j.apmr.2015.12.022 [PubMed: 26792618]
- Ramchand R, Rudavsky R, Grant S, Tanielian T, & Jaycox L (2015). Prevalence of, risk factors for, and consequences of posttraumatic stress disorder and other mental health problems in military populations deployed to Iraq and Afghanistan. *Current Psychiatry Reports*, 17(5), 37. 10.1007/s11920-015-0575-z [PubMed: 25876141]
- Reiber GE, McFarland LV, Hubbard S, Maynard C, Blough DK, Gambel JM, & Smith DG (2010). Servicemembers and veterans with major traumatic limb loss from Vietnam war and OIF/OEF conflicts: Survey methods, participants, and summary findings. *Journal of Rehabilitation Research & Development*, 47(4), 275–97. 10.1682/jrrd.2010.01.0009 [PubMed: 20803399]
- Resnik LJ, & Allen SM (2007). Using international classification of functioning, disability and health to understand challenges in community reintegration of injured Veterans. *Journal of Rehabilitation Research & Development*, 44(7), 991–1006. 10.1682/jrrd.2007.05.0071 [PubMed: 18075956]
- Saunders SL, & Nedelec B (2014). What work means to people with work disability: A scoping review. *Journal of Occupational Rehabilitation*, 24, 100–110. 10.1007/s10926-013-9436-y [PubMed: 23519737]
- Schoppen T, Boonstra A, Groothoff JW, Vries J.De, Goeken LN., & Eisma WH. (2002). Job satisfaction and health experience of people with a lower-limb amputation in comparison with healthy colleagues. *Archives of Physical Medicine & Rehabilitation*, 83(5), 628–634. 10.1053/apmr.2002.32473 [PubMed: 11994801]
- Schoppen T, Boonstra A, Groothoff JW, Sonderen E.van, Goeken LN., & Eisma WH. (2001). Factors related to successful job reintegration of people with a lower limb amputation. *Archives of Physical Medicine & Rehabilitation*, 82(10), 1425–1431. 10.1053/apmr.2001.26074 [PubMed: 11588749]

- Section 503 of the Rehabilitation Act and Other Federal Initiatives: The CWICs Role in Supporting Beneficiaries. (2019). VCU, work incentives planning and assistance, national training and data center. [https://vcu-ntdc.org/resources/WIPA\\_OtherResources/Section503andFedInitiative2020\\_mm\\_7\\_7\\_20.pdf](https://vcu-ntdc.org/resources/WIPA_OtherResources/Section503andFedInitiative2020_mm_7_7_20.pdf)
- U.S. Department of Veteran Affairs. (2020, November). Past rates: 2020 Veterans disability compensation rates. <https://www.va.gov/disability/compensation-rates/veteran-rates/past-rates-2020/>
- Vornholt K, Villotti P, Muschalla B, Bauer J, Colella A, Zijlstra F, Ruitenbeek G. Van, Uitdewilligen S., & Corbière M. (2018). Disability and employment – overview and highlights. *European Journal of Work and Organizational Psychology*, 27(1), 40–55. 10.1080/1359432X.2017.1387536
- Whyte AS, & Carroll LJ (2002). A preliminary examination of the relationship between employment, pain and disability in an amputee population. *Disability & Rehabilitation*, 24(9), 462–470. 10.1080/09638280110105213 [PubMed: 12097215]

**TABLE 1.**

## Perceived Barriers to Employment

<b>Barriers</b>	<b>Level</b>	<b>N (%)</b>
Workplace	Yes	70 (43%)
	No	94 (57%)
Disability Related	Yes	131 (80%)
	No	33 (20%)
Career	Yes	87 (53%)
	No	77 (47%)
Social Support	Yes	21 (13%)
	No	143 (87%)
Financial	Yes	44 (27%)
	No	120 (73%)

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**TABLE 2.**

Summary Demographics by Employment Status

Characteristic	Levels	N (%)	Employed	Unemployed	Retired	P-value <sup>a</sup>
Age	18–30 years	39 (24%)	11 (28%)	15 (38%)	13 (34%)	.334
	31–35 years	57 (35%)	24 (43%)	23 (41%)	9 (16%)	(.468)
	36–45 years	48(30%)	20 (42%)	14 (30%)	13 (28%)	
	46 + years	19 (11%)	7 (37%)	5 (26%)	7 (37%)	
Race	White	129 (81%)	55 (43%)	42 (33%)	31 (24%)	.109
	Non-White	30 (19%)	7 (23%)	15 (50%)	8 (27%)	(.047)
Amputation Group	Bilateral	52 (16%)	16 (31%)	21 (40%)	15 (29%)	.640
	Above Knee	30 (9%)	11 (37%)	10 (33%)	9 (30%)	(.267)
	Below Knee	54 (17%)	21 (39%)	20 (37%)	13 (24%)	
	Other	26 (8%)	14 (54%)	7 (27%)	5 (19%)	
Amputation Group (Altered)	Lower Extremity	136 (42%)	48 (35%)	51 (38%)	37 (27%)	.204
	Other	26 (8%)	14 (54%)	7 (27%)	5 (19%)	(.075)
Time From Injury	(Mean Years)		6.9 (2.0)	6.5 (2.3)	6.7 (2.2)	.695 (.423)
Education	College degree	78 (48%)	44 (58%)	26 (34%)	6 (8%)	<.001 *
	High school / Technical training	85 (52%)	18 (21%)	31 (37%)	36 (42%)	(<.001)
Relationship Status	Married / Partnered	110 (67%)	44 (40%)	37 (34%)	28 (26%)	.946
	Single	28 (17%)	9 (33%)	10 (37%)	8 (30%)	(.767)
	Widowed / Divorced / Separated	25 (16%)	9 (36%)	10 (40%)	6 (24%)	
Summary of Overall Situation	Poor	36 (23%)	10 (28%)	17 (47%)	9 (25%)	.120
	Average	67 (42%)	23 (34%)	22 (33%)	22 (33%)	(.002)
	Good	56 (35%)	28 (50%)	17 (30%)	11 (20%)	
Average Hours per Day Wearing Prosthesis	Greater or equal to 7 hours	108 (68%)	47 (44%)	38 (35%)	23 (21%)	.083
	Less than 7 hours	50 (32%)	14 (28%)	18 (36%)	18 (36%)	(.062)
Annual Household Income	<\$44,999	22 (18%)	4 (18%)	17 (77%)	1 (5%)	<.001 <sup>a*</sup>
	\$45,000–\$74,999	51 (41%)	14 (27%)	24 (47%)	13 (26%)	(<.001)
	>\$75,000	52 (41%)	31 (60%)	7 (13%)	14 (27%)	
Annual Disability Benefit Income	<\$44,999	66 (52%)	37 (56%)	26 (39%)	3 (5%)	<.001 <sup>a*</sup>
	\$45,000–\$74,999	44 (35%)	8 (18%)	22 (50%)	14 (32%)	(<.001)
	>\$75,000	16 (13%)	4 (25%)	1 (6%)	11 (69%)	

<sup>a</sup>Fisher’s Exact test.

\*  $p < 0.001$ .

**TABLE 3.**

Amputation Variables by Employment Category

Summary of Overall Section A Questions by Employment					
Question 2 – Have you experienced other pain (back shoulder, other leg)?					
Variable	Responses	No to slight	Moderate	Considerable to great	P-value
Employment Category <sup>1</sup>	Employed	13 (21%)	25 (41%)	23 (38%)	.263
	Unemployed	11 (19%)	15 (26%)	32 (55%)	(.431)
	Retired	8 (19%)	18 (43%)	16 (38%)	
Question 3 – Have you had pain in your residual limb (stump) during activities?					
Variable	Responses	No to slight	Moderate	Considerable to great	P-value
Employment Category <sup>3</sup>	Employed	14 (23%)	22 (35%)	26 (42%)	.817
	Unemployed	15 (26%)	22 (38%)	21 (36%)	(.939)
	Retired	10 (24%)	12 (28%)	20 (48%)	
Question 4 – Have you been troubled by the appearance of your residual limb?					
Variable	Responses	No to slight	Moderate	Considerable to great	P-value
Employment Category <sup>4</sup>	Employed	45 (72%)	6 (10%)	11 (18%)	.665
	Unemployed	36 (64%)	9 (16%)	11 (20%)	(.351)
	Retired	25 (59%)	7 (16%)	10 (25%)	
Question 5 – Have you had difficulty with transportation?					
Variable	Responses	No to slight	Moderate	Considerable to great	P-value
Employment Category <sup>5</sup>	Employed	45 (73%)	12 (19%)	5 (8%)	.206
	Unemployed	32 (58%)	13 (24%)	10 (18%)	(.062)
	Retired	22 (52%)	11 (27%)	9 (21%)	
Question 6 – Has the prosthesis given rise to chafing, sores, or skin irritation?					
Variable	Responses	No to slight	Moderate	Considerable to great	P-value
Employment Category <sup>6</sup>	Employed	13 (23%)	14 (25%)	30 (52%)	.668
	Unemployed	17 (30%)	9 (16%)	30 (54%)	(.465)
	Retired	13 (33%)	9 (23%)	18 (45%)	
Question 7 – Have you had difficulty participating in social and community activities?					
Variable	Responses	No to slight	Moderate	Considerable to great	P-value
Employment Category <sup>4</sup>	Employed	37 (60%)	14 (23%)	11 (17%)	.281
	Unemployed	25 (44%)	15 (27%)	16 (29%)	(.149)
	Retired	18 (43%)	15 (36%)	9 (21%)	

Note.

<sup>1.</sup>  $N=161$

<sup>2.</sup>  $N=163$

<sup>3.</sup>  $N=162$

<sup>4.</sup>  $N=160$

<sup>5.</sup>  $N=159$

<sup>6.</sup>  $N=153$

<sup>7.</sup>  $N=155$

<sup>a.</sup> Fisher's Exact test (chi-square test otherwise).

\*  $P<0.05$ .

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**TABLE 4.**

Amputation Variables by Employment Category

Amputation Variables by Employment Category					
Question 2a – Has this other pain (back, shoulder, other leg) affected your ability to work?					
Variable	Responses	No to slight	Moderate	Considerable to great	P-value
Employment Category <sup>1</sup>	Employed	30 (49%)	18 (30%)	13 (21%)	.019*
	Unemployed	18 (31%)	12 (21%)	28 (48%)	(.003)
	Retired	15 (35%)	7 (17%)	20 (38%)	
Question 3a – Has the pain in your residual limb affected your ability to work?					
Variable	Responses	No to slight	Moderate	Considerable to great	P-value
Employment Category <sup>1</sup>	Employed	30 (49%)	15 (25%)	16 (26%)	.034*
	Unemployed	21 (36%)	14 (24%)	23 (40%)	(.029)
	Retired	12 (29%)	6 (14%)	24 (57%)	
Question 4a – Has the appearance of your residual limb affected your ability to work?					
Variable	Responses	No to slight	Moderate	Considerable to great	P-value
Employment Category <sup>3</sup>	Employed	52 (84%)	5 (8%)	5 (8%)	.400
	Unemployed	44 (78%)	6 (11%)	6 (11%)	(.343)
	Retired	28 (68%)	5 (12%)	8 (20%)	
Question 5a – Has difficulty with transportation affected your ability to work?					
Variable	Responses	No to slight	Moderate	Considerable to great	P-value
Employment Category <sup>4</sup>	Employed	51 (82%)	5 (8%)	6 (10%)	.127
	Unemployed	38 (69%)	8 (15%)	9 (16%)	(.071)
	Retired	25 (61%)	5 (12%)	11 (27%)	
Question 6a – Has chafing, sores, or skin irritation affected your ability to work?					
Variable	Responses	No to slight	Moderate	Considerable to great	P-value
Employment Category <sup>5</sup>	Employed	26 (44%)	15 (25%)	18 (31%)	.296
	Unemployed	24 (43%)	8 (14%)	24 (43%)	(.092)
	Retired	17 (41%)	5 (13%)	19 (46%)	
Question 7a – Has difficulty participating in social and community activities affected your ability to work?					
Variable	Responses	No to slight	Moderate	Considerable to great	P-value
Employment Category <sup>6</sup>	Employed	46 (75%)	10 (16%)	5 (9%)	.257
	Unemployed	36 (65%)	9 (16%)	10 (19%)	(.125)
	Retired	23 (56%)	10 (24%)	8 (20%)	

Note.

<sup>1.</sup>  $N=161$

<sup>2.</sup>  $N=163$

<sup>3.</sup>  $N=159$

<sup>4.</sup>  $N=158$

<sup>5.</sup>  $N=156$

<sup>6.</sup>  $N=157$ .

<sup>a.</sup> Fisher's Exact test (Chi-Square test otherwise)

\*  $P<0.05$

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**TABLE 5.**

## Summary of Section C Survey Questions for Only Employed Individuals

Question	Levels	N (%)
How many hours on average do you work weekly?	Less than 15 hours	6 (10%)
	15–30 hours	5 (8%)
	30 + (full time)	51 (82%)
How physically demanding is your current job?	Little to not demanding	29 (48%)
	Neutral	16 (26%)
	Moderate to extremely demanding	16 (26%)
Does your job involve formal supervision of other employees?	Yes	26 (42%)
	No	36 (58%)
Do you think your work productivity is as good as before amputation?	Yes	26 (42%)
	No	36 (58%)
I am employed in a job I...	Dislike/Really dislike	8 (13%)
	Neither like or dislike	11 (18%)
	Like/Really like	43 (69%)
The job I currently have allows me to use my skills, strengths, and training.	Yes	44 (72%)
	No	17 (28%)
I plan on staying in this job for the next several years.	Yes	42 (69%)
	No	19 (31%)
I would like to change my job or career.	Yes	28 (45%)
	No	34 (55%)