Assessment of work limitations and disability in systemic vasculitis

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ABSTRACT

Objective. *Despite advances in the management of systemic vasculitis (SV), direct consequences of the disease, leading to impairments in physical and mental function can cause disability. The objective of this study was to assess work limitations in SV.*

Methods. *SV patients were recruited from a tertiary care clinic. Work disabled (WD) was defined as not working, early retirement, or reduced hours at work. Participants who were working at the time of enrolment completed the Work Limitations Questionnaire (WLQ). Other work-related measures were self-reported by questionnaire. Disease outcome measures (Vasculitis Damage Index (VDI), Health Assessment Questionnaire-Disability Index (HAQ) and pain visual analogue score (VAS)) were obtained at time of WLQ.*

Results. *103 participants were enrolled with mean age 58 (SD17), 60% females, 48% with anti-neutrophilic cytoplasmic antibody-associated vasculitis (AAV), 26% with large-vessel vasculitis (LVV) and 26% with other types of SV. 22 (21%) were WD secondary to SV, 29 (28%) were working and 52 (51%) subjects were not working for reasons other than SV. SV-related WD subjects were more likely to have a lower level of education (p=0.003) than non-WD subjects. The VDI was higher in SV-related WD vs. non-WD subjects: 1.9 (SD 2.7) vs. 2.9 (SD 1.4); p=0.015. 38 subjects were working in some capacity and completed the WLQ; their productivity loss was 8.2% and this was highly correlated with HAQ and pain VAS (rho=0.585 and rho=0.458, respectively).*

Conclusion. *SV-related work disability occurred in 21% and was associated with lower levels of education, higher disease severity and worse functional outcomes.*

Systemic vasculitis (SV) is a group of autoimmune disorders classified by the size of the involved blood vessel: large-vessel vasculitis (LVV) (giant cell arteritis and Takayasu's arteritis), medium-vessel vasculitis (polyarteritis nodosa and Kawasaki disease), small-vessel vasculitis, such as anti-neutrophilic cytoplasmic antibody-associated vasculitis (AAV), cryoglobulinaemic and IgA-mediated vasculitis, and variable vessel vasculitis (Behçet's syndrome) (1). Since SV can affect patients during their working years and multiple organ systems with possible vision loss, chronic dyspnea, end-stage renal disease, neuropathic pain, arthritis and cognitive impairment, assessment of work disability is an important disease outcome.

Work disability is the state in which the individual has had to leave their job, or forced to work fewer hours (2). Methods for assessing WD differ between studies. Many studies examine absenteeism (days or hours missed at work); however, this does not account for unproductive work time, nor does it assess working at reduced capacity (2, 3). Presenteeism evaluates decreased performance at work, including time spent on a task, quality of task completion, quantity of work, and mental-interpersonal factors (2, 4). The Work Limitations Questionnaire (WLQ) is a subjective assessment tool to evaluate work productivity and presenteeism (3). It is advantageous because it has been previously validated in other conditions (3, 5). There is a paucity of studies investigating the effect of SV on work limitations (6-9). Given the progress in the treatment of SV, including prolonged survival rates, evaluating work limitations in patients with SV is an unmet need (10). This study evaluates the aspects of presenteeism and work disability amongst individuals with SV.

Methods

Study population

Subjects ≥18 years of age with a diagnosis of SV confirmed by a rheumatologist in a tertiary care academic centre (St. Joseph's Health Care, London, Canada) were sequentially recruited into the study. In this centre, patients with SV are commonly co-managed by multiple specialties. However, patients with renal-limited disease are sometimes only managed by nephrology and not referred to rheumatology. Given that some types of SV are more likely to have renal-limited disease, they may be under-represented in this study. Between October 2012 and December 2014, 105 patients seen at this centre had a diagnosis of SV and 103 agreed to participate in the study.

This study was approved by the Western University Human Research Ethics Board.

Variable and outcome measures

Work disabled (WD) was defined as not working, early retirement, or reduced hours at work due to SV (self-reported). Level of education (secondary school or less, college or university) was also self-reported. Study subjects were asked to provide a percentage estimate of the change in income since diagnosis of SV. Patients who were working within two weeks prior to study enrolment were eligible to complete the WLQ (3). A weighted aggregate of four categories in the WLQ (physical, mental-interpersonal, time-management, and output demand) provides an estimate of the productivity loss due to health (3, 5). At the same visit, participants also completed the Health Assessment Questionnaire Functional Disability Index (HAQ) (11) and a visual analogue scale (VAS) for pain (0 is no pain and 10 is maximum pain). Disease activity and damage due to disease was determined using the validated, Birmingham Vasculitis Activity Score (BVAS) and Vasculitis Damage Index (VDI), respectively (completed by physicians at time of WLQ) (12, 13). Physicians were blind to the participants' responses to the WLQ and self-reported work-related measures.

Table I. Characteristics of SV subjects with and without work disability.

Characteristic	Non-WD (n=29)	WD (n=22)	*p*-value
Age, mean (SD)	46.2 (16.3)	47.3 (13)	0.42
Female	62	50	0.16
Caucasian	27 (93)	15 (73)	0.056
Disease duration, mean years (SD)	3.9 (3.4)	3.1 (4.4)	0.09
Type of SV:			
AAV	15 (52)	15 (68)	0.254
LVV	1 (3)	1 (5)	
Other	12 (41)	4 (18)	
Smoking status:			
Non-smoker	15 (52)	8 (36)	0.261
Former smoker	12 (41)	5 (23)	
Current smoker	1 (4)	6 (27)	
Education level:			
≤Secondary school	4 (14)	10 (46)	0.003
College	17 (59)	3 (14)	
University degree	7 (24)	8 (38)	
Self-reported income:			
<$20 000	3 (10)	7 (32)	0.124
$20 001 – 40 000	4 (14)	3 (14)	
$40 001 – 80 000	9 (31)	2 (9)	
>$80 000	1 (3)	1 (5)	
Mean reduction in income (%)	3	46	0.0006
Mean HAQ score (SD)	0.14 (0.2)	0.86 (0.7)	<0.0001
Pain VAS, mean (SD)	2.2 (2.1)	4.2 (2.7)	0.001
VDI, mean (SD)	1.9 (2.7)	2.9 (1.4)	0.015
BVAS, mean (SD)	1.6 (1.9)	2.4 (1.2)	0.02

Values are number (%), unless otherwise indicated.
SV: systemic vasculitis; WD: work disabled; AAV: anti-neutrophilic cytoplasmic antibody-associated vasculitis; LVV: large-vessel vasculitis; HAQ: Health Assessment Questionnaire Disability Index; VAS: visual analogue scale; VDI: Vasculitis Damage Index; BVAS: Birmingham Vasculitis Activity Score.

Statistical analysis

Differences between WD and non-WD participants were tested using the Mann-Whitney U and Fisher's exact tests. Correlations between WLQ and and outcome measures (HAQ, pain VAS, BVAS, VDI) were reported using Spearman's rho coefficient. $p<0.05$ was considered statistically significant. Analyses were performed using SPSS™ .

Results

A total of 103 participants were included. The mean age was 58 (SD 17) years, 60% were female and 89% were Caucasian. The majority of patients had AAV: granulomatosis with polyangiitis (n=32), eosinophilic granulomatosis with polyangiitis (n=12) and microscopic polyangiitis (n=5)). 26 subjects had LVV (giant cell arteritis (n=24) and Takayasu's arteritis (n=2)). The remaining 28 subjects had another type of SV: IgA vasculitis (n=7), polyarteritis nodosa (n=6), Behçet's disease (n=4), cryoglobulinaemic vasculitis (n=3), hypocomplementemic urticarial vasculitis (n=2), secondary to systemic lupus erythematosus (n=1), and 5 unclassifiable. The average disease duration was 4 (SD 4) years and 22% were in complete disease remission defined as a BVAS=0. Disease severity at enrollment was mild to moderate with mean BVAS was 1.8 (SD 1.6) and VDI was 2.2 (SD 2.2). Physical function was clinically significant with a mean HAQ score of 0.54 (SD 1.20). The mean pain VAS was 2.9 (SD 3.0).

Twenty-two (21%) subjects reported that they were work disabled secondary to SV (13 were not working, 3 had early retirement, and 6 reported reduced hours at work); 29 (28%) did not report any work disability. The remaining 52 subjects (51%) were retired or not working for reasons other than SV (excluded from further analysis). Characteristics for the subjects are shown in

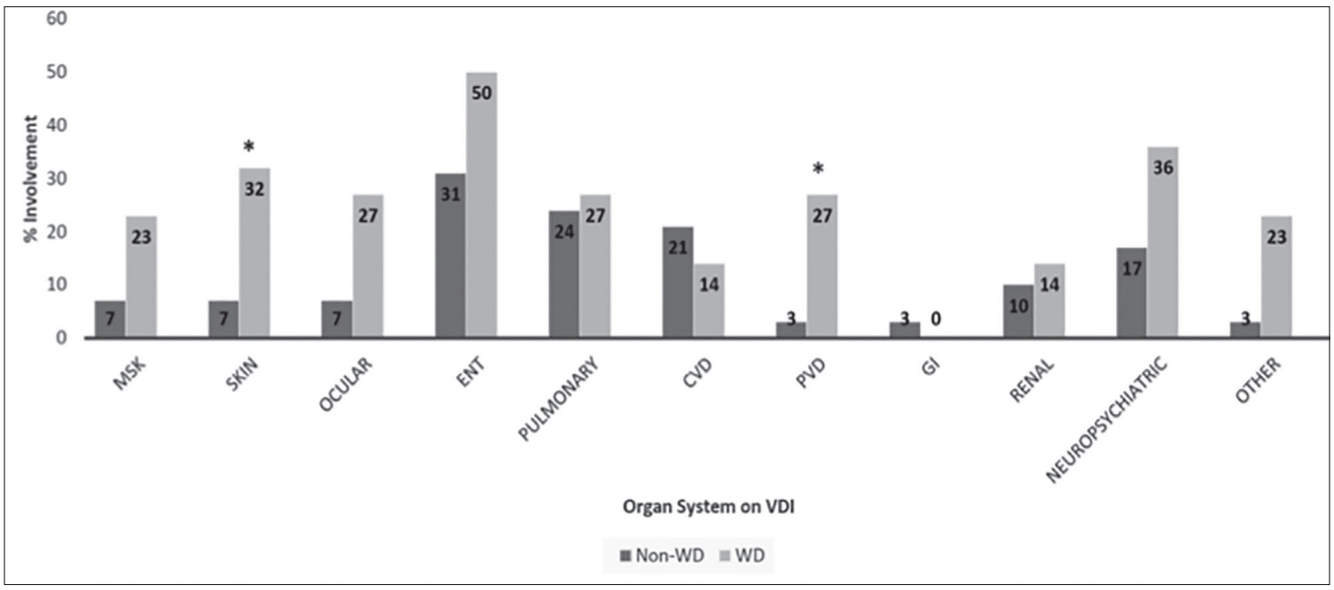

Fig. 1. Organ damage in WD vs. non-WD subjects. Values shown are % of subjects with organ system damage as determined by VDI.
*p<0.05
WD: work disabled; VDI: Vasculitis Damage Index; MSK: musculoskeletal; ENT: ear, nose and throat; CVD: cardiovascular; PVD: peripheral vascular disease; GI: gastrointestinal.

Table I. There was no significant difference in age, gender, race and type of vasculitis. WD subjects were less likely to have attained a post-secondary education (p=0.003). The mean decrease in income was significantly greater in WD compared to non-WD subjects (46% *vs*. 3%; p=0.0006).

WD compared to non-WD had higher functional impairment scores (HAQ of 0.86 *vs*. 0.14; p<0.0001) and pain scores (VAS 4.2 *vs*. 2.2; p=0.001). Similarly, disease activity and damage scores were higher in WD than non-WD subjects: BVAS 2.4 *vs*. 1.6; p=0.02 and VDI 2.9 *vs*. 1.9; p=0.015). Figure 1 summarises organ system involvement with damage: musculoskeletal, cutaneous, ocular, ear, nose and throat, peripheral vascular, and neuropsychiatric systems were more commonly affected in WD than non-WD subjects. The WD group was also more likely to have ≥2 organ systems involved compared to the non-WD groups (55% *vs*. 21%; p=0.018).

The WLQ was completed by 38 subjects who were working in some capacity: mean work productivity loss due to health was 8.2%. Even in SV subjects who self-reported no work limitations (n=29), the productivity loss based on the WLQ was 5.0%. All domains of the WLQ were significantly affected: mean decreases in time management, physical, mental-interpersonal and output demands of 35%, 31%, 34% and 36%, respectively. Work productivity loss did not correlate with age, disease duration, BVAS or VDI; however, it was strongly correlated with HAQ and pain VAS (*rho*=0.585 and *rho*=0.458, respectively) (Table II).

Table II. Correlation of clinical characteristics and clinical outcome measures with WLQ.

Variable	Spearman's rho	p-value
Age	0.054	0.742
Disease duration	-0.206	0.215
HAQ	0.585	<0.0001
Pain VAS	0.536	0.004
BVAS	0.236	0.148
VDI	0.093	0.573

WLQ: Work Limitations Questionnaire; HAQ: Health Assessment Questionnaire Disability Index; VAS: visual analogue scale; BVAS: Birmingham Vasculitis Activity Score; VDI: Vasculitis Damage Index.

Discussion

This study found that work disability in patients with systemic vasculitis is common and results in an average work productivity loss due to health of 8.2%; higher than reported in rheumatoid arthritis (4.9%), psoriatic arthritis (4.3%) and ankylosing spondylitis (6.3–8.3%) (5, 14-16). We further show that SV has a multifactorial influence on work ability affecting all work domains (time management, physical, mental/interpersonal and output demands); whereas, inflammatory arthritis appears to predominately affect time management and physical demands (5, 15). These findings are consistent with the low physical and mental quality of life reported by patients with SV (17).

Although there is a large body of evidence supporting increased work disability in inflammatory rheumatologic conditions, there is a paucity of data on work disability in SV. The majority of prior studies focused on granulomatosis with polyangiitis and did not use validated measures for work limitations (6-9). The proportion of work disabled subjects with SV in these studies varied significantly from 13–73%, re-

flecting the disparate populations studied and definitions of work disabled (WD). Based on these studies, WD was associated with age, female gender and disease severity (6-8).

Our study included subjects with all types of SV; the mean disease duration was 4 years and all patients were being treated with immunosuppression. Disease activity and damage were mild to moderate with a mean BVAS and VDI of 2. In our population with relatively well-controlled disease, work disability secondary to SV was 21% with a mean income loss of 23%, which is similar to prior studies (6, 7). Basu *et al*. found that WD subjects were more likely overweight, depressed, fatigued and to have severe disease damage (VDI>4) (6). We also found that WD subjects had significantly higher VDI and BVAS scores. In addition, higher pain and functional impairment scores (HAQ) was associated with WD and strongly correlated with loss of work productivity using the WLQ score, suggesting that better pain management and measures to improve function may be of benefit.

Limitations of our study include its cross-sectional, single-centre design, which does not allow us to evaluate a causal effect of treatment or natural history of SV on work limitations. SV is rare and like most prior studies of WD in vasculitis, the sample size is small and does not allow for detailed subgroup analysis; in particular for the different types of SV. Our study had a higher proportion of patients with EGPA compared to MPA than what would be expected from epidemiologic studies in other countries (18, 19). The prevalence of AAV and its different types in Ontario, Canada has not been previously investigated; however, regional variations in Europe have been reported and it is possible that EGPA is more common in the region where this study was conducted (19). EGPA may be more likely to present with life-threatening disease (20), but in our outpatient population, we did not find that disease severity or damage was significantly different for the types of AAV; larger studies can address whether work disability varies for EGPA compared to MPA or GPA. The major strength of our study is that we used a validated measure of work ability (WLQ), which accounts for presenteism and considers multiple domains of work affected by health, allowing for comparisons across different diseases and future economic analyses.

Conclusion

This study demonstrates that work disability is common in SV, occurring in 21% of working age subjects. These WD subjects had higher BVAS and VDI scores. SV subjects who were working experienced 8.2% productivity loss due to health, higher than what has been reported in inflammatory arthritis. The loss of productivity was strongly correlated with HAQ and pain scores. Early interventions to prevent damage and better management of pain and functional impairment may improve work ability in patients with SV.

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