Impact of Marital Status on 20-Year Subjective Well-being Trajectories

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Background: It is well-known that marital status has a significant impact on subjective well-being (SWB). However, research examining the long-term influence of marital status on SWB after spinal cord injury (SCI) is limited. **Objective:** To identify the relationship between marital status and SWB trajectories over time, using 20 years of longitudinal data. **Methods:** We conducted a cohort study, including 1,032 participants surveyed 5 times in 1993, 1998, 2003, 2008, and 2013. Participants were identified from outpatient records of 2 Midwestern hospitals and 1 Southeastern specialty hospital. The Life Situation Questionnaire-Revised (LSQ-R) was used to measure multiple aspects of SWB. A multilevel model was applied to analyze the 5 repeated measurements. **Results:** The married or cohabitating participants enjoyed the best SWB at baseline, but their home satisfaction and global satisfaction declined over time and their social isolation increased slightly. For divorced, separated, or widowed people, the negative effects of marital loss attenuated over time. For single individuals, SWB, except for environmental barriers, did not change positively over time if they remained single. **Conclusions:** Using longitudinal data with 5 repeated measurements, our study showed a complicated relationship between marital and relationship status with SWB and how these relationships change over time for people with chronic SCI. **Key words:** life problem, life satisfaction, marital status, spinal cord injury, subjective well-being

Married individuals have generally been found to have more positive appraisal of their subjective health, emotional feeling, and social well-being than individuals who are divorced or single, because of their greater economic resources and more social support.¹⁻⁵ Among people with spinal cord injury (SCI), marriage also has been associated with greater life satisfaction and psychological well-being, lower mortality, more independent-living outcomes, better social integration, and economic self-sufficiency.⁶⁻¹¹

Differences in outcomes have been found to be related to preinjury and postinjury marriages, with trends indicating better outcomes among persons in postinjury marriages. Specifically, individuals who married after injury were more satisfied with life situations,¹² living arrangements, sexual activity, and their physical and psychological health¹³ compared to individuals who married prior to injury. Individuals who married after injury also

indicated greater community reintegration via social integration, educational achievement, and employment.¹³

Although some prior studies were longitudinal in nature, research examining the trajectory of subjective well-being (SWB) following injury as influenced by marital status is limited. One study examined the influence of marital status and family satisfaction on the trajectory of life satisfaction over 5 years following a traumatically acquired disability (ie, SCI, burns, or interarticular fractures). Findings indicated that being married and having greater family satisfaction were associated with trajectories of higher life satisfaction over the first 5 years following injury.¹⁴ Another longitudinal study found that marital loss had a consistent negative impact on the SWB of SCI participants, but the effects were moderated by gender.¹⁵

Because SWB and needs change over time, outcomes at a single time point provide a limited

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view and do not reflect the dynamic changes. With few exceptions,^{14,15} most studies on this topic are cross-sectional and cannot address the long-term impact of marital status after SCI. Our purpose was to examine 20-year longitudinal data to identify the relationship between marital status and trajectories in SWB over time after SCI.

Methods

Participants

We assessed 1,032 participants from 2 Midwestern hospitals and 1 Southeastern specialty hospital at 5 time points separated by 5 years (1993, 1998, 2003, 2008, and 2013). The sample included people who sustained traumatic SCI, were a minimum of 1 year post injury, and were at least 18 years old at the time of enrollment.

Procedures

Institutional review board approval was received at each time of measurement prior to initiating data collection. Introductory letters were mailed to participants, and study materials were sent 4 to 6 weeks later. Study materials included the study instrument. All data were collected by mail. Those who did not respond were sent at least 1 follow-up mailing and received follow-up phone calls. Participants were offered \$20 to \$40 remuneration depending on the follow-up year.

Outcome measures

The Life Situation Questionnaire–Revised (LSQ-R)^{16,17} was used as the measure of SWB. It is a multidimensional construct containing 20 life satisfaction items and 30 life problems items with a 5-point scale for each item. Satisfaction items are rated from 1 = *very dissatisfied* to 5 = *very satisfied*. Problems items are rated from 1 = *no problem* to 5 = *major problem*. There are 9 subscales validated within the LSQ-R.^{18,19} The 3 life satisfaction scales include (1) home life satisfaction, (2) vocational satisfaction, and

(3) global satisfaction. The 6 problems scales include (1) health problems, (2) social isolation, (3) emotional distress, (4) environmental barriers, (5) money problems, and (6) lack of opportunities. Details regarding the reliability and validity of the 9-subscale structure can be found elsewhere.^{18,19}

Predictors and covariates

Our variable of interest is marital status. All participants were categorized into 3 groups: married or cohabitating (MC); divorced, separated, or widowed (DSW); and single, noncohabitating (S). Marital status was a time-variant predictor, which could change at each time point. All other covariates were time invariant and were measured at 1993 (we use the values obtained at the first time of measurement). These included chronological age, age at injury, race (White, non-Hispanic vs others), gender (male vs female), injury severity (nonambulatory, C1-C4; nonambulatory, C5-C8; nonambulatory, noncervical; ambulatory),^{20,21} and years of education. For easy interpretation, we recentered the 2 aging variables to their own sample means before performing the analysis.

Analysis

We analyzed participant characteristics first. Then we calculated the standardized alpha to measure the LSQ-R's reliability and the intraclass correlation coefficient (ICC) to assess the test-retest stability of the subscales over time, which ranges from 0 to 1.^{22,23} We also provided the mean scores of the 9 LSQ-R subscales by the 3 marital status groups (MC, DSW, and S) measured at 5 different time points to compare their changes across 20 years. We used SAS 9.3 PROC MIXED procedure to implement the multilevel model to analyze the 5 repeated measurements. The multilevel model is expressed as the sum of 2 parts: a fixed part with 4 fixed effects and a random part that estimates 3 variance components. The following equation summarizes our basic multilevel model:

$$\text{Level 1: } Y_{ij} = \pi_{0i} + \pi_{1i} \text{Time}_{ij} + \pi_{2i} \text{DSW}_{ij} + \pi_{3i} S_{ij} + \pi_{4i} \text{Time}_{ij} \text{DSW}_{ij} + \pi_{5i} \text{Time}_{ij} S_{ij} + \epsilon_{ij}$$

$$\text{Level 2: } \pi_{0i} = \gamma_{00} + \zeta_{0i}$$

$$\pi_{1i} = \gamma_{10} + \zeta_{1i}$$

$$\pi_{2i} = \gamma_{20} + \zeta_{2i}$$

$$\pi_{3i} = \gamma_{30} + \zeta_{3i}$$

$$\pi_{4i} = \gamma_{40} + \zeta_{4i}$$

$$\pi_{5i} = \gamma_{50} + \zeta_{5i}$$

- 1) γ_{00} represents the average initial status of a LSQ-R scale for an MC individual.
- 2) γ_{10} represents the average rate of change for a LSQ-R scale for an MC individual.
- 3) γ_{20} represents the average differential in the initial status of a LSQ-R scale between an MC individual and a DSW individual.
- 4) γ_{30} represents the average differential in the initial status of a LSQ-R scale between an MC individual and an S individual.
- 5) γ_{40} represents the average differential in the rate of change between an MC individual and a DSW individual.
- 6) γ_{50} represents the average differential in the rate of change between an MC individual and an S individual.
- 7) ϵ_{ij} , ζ_{0i} , ζ_{1i} , ζ_{2i} , ζ_{3i} , ζ_{4i} , and ζ_{5i} represents variance components.

Our final multilevel models added 6 control variables measured at baseline (chronological age, age at injury, gender, race, years of education, and injury severity) into the basic models.

Results

During the 5 time points, we collected 3,229 valid interview records from 1,032 participants, with an average of 3 measurements per participant. Participant characteristics at baseline (1993) are presented in **Table 1**. All 9 subscales had test-retest stability with at least 0.48 ICC and had standardized alpha ranging from 0.68 to 0.93 (**Table 2**).

The mean scores of the 9 subscales by marital status at each time point are presented in **Table 3**. The mean scores indicate that MC individuals had consistently higher scores than others in home satisfaction, vocational satisfaction, and global satisfaction and had lower scores in the other life problem subscales.

The relationship between marital status and the 20-year linear trajectory represented by 2 parameters, initial status and rate of change, are presented in **Table 4**. The initial status intercept (γ_{00}) is the average initial status for MC individuals, and the rate of change intercept (γ_{10}) is the average rate of change for MC individuals when all other control variables are equal to 0. The second and third columns show the average difference in initial status between MC and DSW individuals (γ_{20}) and between MC and S individuals (γ_{30}). The fifth and sixth columns provided the average difference in rate of change between MC and DSW individuals (γ_{40}) and between MC and S individuals (γ_{50}).

At initial status, DSW individuals had significant lower scores in home satisfaction ($\gamma_{20} = -2.65^*$) and vocational satisfaction ($\gamma_{20} = -1.08^*$) than the MC individuals. DSW individuals encountered significantly more problems in isolation ($\gamma_{20} = 1.56^*$), distress ($\gamma_{20} = 1.43^*$), environmental barriers ($\gamma_{20} = 0.67^*$), money problems ($\gamma_{20} = 1.44^*$), and lack of opportunities ($\gamma_{20} = 0.48^*$). The S individuals reported significantly lower scores in home satisfaction ($\gamma_{30} = -1.95^*$) and vocational satisfaction ($\gamma_{30} = -0.66^*$) and higher scores in isolation ($\gamma_{30} = 1.24^*$), distress ($\gamma_{30} = 0.65^*$), environmental barriers ($\gamma_{30} = 0.45^*$), and money problems ($\gamma_{30} = 0.56^*$) at the initial status than those in the MC group.

The rate of change presents a different scenario for the 3 groups. For the MC individuals, the home satisfaction score ($\gamma_{10} = -0.02^*$) and global satisfaction score ($\gamma_{10} = -0.11^*$) declined modestly but significantly over 20 years. Their social isolation increased ($\gamma_{10} = 0.03^*$), while environmental barriers decreased ($\gamma_{10} = -0.03^*$). For DSW individuals, their SWB had favorable changes compared to MC individuals, with increased home satisfaction ($\gamma_{40} = 0.05^*$), decreased isolation ($\gamma_{40} = -0.06^*$), distress ($\gamma_{40} = -0.10^*$), environmental barriers ($\gamma_{40} = -0.04^*$), money problems ($\gamma_{40} = -0.05^*$), and opportunities problems ($\gamma_{40} = -0.03^*$). For S individuals, SWB trajectories were very similar to the MC individuals. The only difference was the health problems of S individuals increased significantly ($\gamma_{50} = 0.07^*$).

Table 1. Demographic and injury characteristics measured at baseline (1993)

Characteristics	<i>n</i>	%
Marital status		
Married or cohabitating (MC)	409	39.71
Divorced, separated, or widowed (DSW)	224	21.75
Single (S)	397	38.54
Male	710	68.8
Non-Hispanic White	772	74.81
Injury severity		
Nonambulatory, C1-C4	105	10.17
Nonambulatory, C5-C8	400	38.76
Nonambulatory, noncervical	351	34.01
Ambulatory	176	17.05
	Mean	<i>SD</i>
Age at injury	29.09	13.83
Chronic age	42.36	13.81
Years post injury	13.27	9.21
Years of education	13.45	3.21

Table 2. Standardized alpha coefficients and intraclass correlation coefficient (ICC) of the 9 LSQ-R subscales

Subscales	Alpha (1993)	Alpha (1998)	Alpha (2003)	Alpha (2008)	Alpha (2013)	ICC
Home satisfaction	0.75	0.79	0.79	0.78	0.77	0.48
Vocational satisfaction	0.81	0.84	0.86	0.84	0.83	0.57
Global satisfaction	0.91	0.92	0.93	0.92	0.92	0.57
Health problems	0.74	0.74	0.74	0.77	0.74	0.61
Social isolation	0.82	0.82	0.84	0.83	0.81	0.52
Emotional distress	0.92	0.91	0.93	0.93	0.93	0.64
Environmental barriers	0.68	0.69	0.73	0.71	0.73	0.61
Money problems	0.88	0.87	0.88	0.88	0.81	0.62
Lack opportunities	0.82	0.78	0.82	0.79	0.81	0.61

Note: LSQ-R = Life Situation Questionnaire–Revised.

Table 3. Mean scores of the LSQ-R subscales by 3 marital status groups

Marital status	1993	1998	2003	2008	2013
<i>Married or cohabitating</i>					
Home satisfaction	17.34	16.73	16.72	16.72	17.58
Vocational satisfaction	9.98	10.16	10.25	10.11	10.59
Global satisfaction	40.34	39.33	39.83	39.07	41.06
Health problems	14.14	13.95	13.85	13.87	13.14
Social isolation	9.78	9.24	9.15	9.40	8.96
Emotional distress	10.56	10.38	9.98	10.11	9.54
Environmental barriers	5.46	5.46	4.84	5.07	4.88
Money problems	7.33	6.67	6.42	6.85	6.39
Lack opportunities	5.62	5.43	5.06	5.55	4.96
<i>Divorced, separated, or widowed</i>					
Home satisfaction	14.43	14.29	14.28	14.92	14.57
Vocational satisfaction	7.83	8.45	8.45	8.92	8.57
Global satisfaction	38.20	37.57	37.46	37.61	37.18
Health problems	14.97	14.71	14.76	13.99	13.59
Social isolation	11.45	11.57	10.43	10.31	10.62
Emotional distress	11.96	12.08	11.07	9.64	10.57
Environmental barriers	6.14	6.10	5.51	5.32	4.99
Money problems	9.57	8.71	7.87	7.61	8.13
Lack opportunities	6.64	6.45	5.66	5.54	5.81
<i>Single</i>					
Home satisfaction	14.79	14.46	14.42	14.39	14.39
Vocational satisfaction	8.42	8.76	8.47	8.78	8.75
Global satisfaction	39.60	39.23	38.02	36.44	37.34
Health problems	13.93	14.06	14.11	15.14	15.13
Social isolation	11.12	10.92	10.96	11.70	11.60
Emotional distress	11.37	10.58	10.39	11.01	10.88
Environmental barriers	6.29	5.86	5.43	5.72	5.56
Money problems	8.62	8.51	7.89	8.36	8.27
Lack opportunities	6.47	6.05	5.94	6.36	6.19

Note: LSQ-R = Life Situation Questionnaire-Revised.

To illustrate the results, trajectories for each of the 3 life satisfaction subscales are presented in **Figure 1** and trajectories for the 6 life problem subscales are shown in **Figure 2**. Those trajectories assume constant marital status for a male, White participant who could walk, injured at the age 29,

surveyed at the age of 42, and had 12 years of education. However, a change in status would alter these trajectories. For instance, if a married participant was found divorced in 2003 and a divorced participant was found married again in 2003, their initial trajectories would shift

Table 4. Results of the multilevel models for the 9 scales of the LSQ-R^a

Scales	Initial status (reference group: married or cohabitating)			Rate of change (reference group: married or cohabitating)		
	Intercept (γ_{00}) ^b	Divorced, separated, or widowed (γ_{20}) ^c	Single (γ_{30}) ^d	Intercept (γ_{10}) ^e	Divorced, separated, or widowed (γ_{40}) ^f	Single (γ_{50}) ^g
Home satisfaction	15.72*	-2.65*	-1.95*	-0.02*	0.05*	-0.01
Vocational satisfaction	4.36*	-1.08*	-0.66*	0.00	0.02	0.01
Global satisfaction	33.68*	-0.82	-0.05	-0.11*	0.04	-0.11
Health problems	18.00*	0.43	-0.11	0.02	-0.02	0.07*
Social isolation	10.71*	1.56*	1.24*	0.03*	-0.06*	-0.01
Emotional distress	13.18*	1.43*	0.65*	0.00	-0.10*	0.47
Environmental barriers	5.64*	0.67*	0.45*	-0.03*	-0.04*	0.00
Money problems	11.83*	1.44*	0.56*	-0.02	-0.05*	0.00
Lack opportunities	9.93*	0.48*	0.30	0.01	-0.03*	0.00

Note: LSQ-R = Life Situation Questionnaire-Revised

^aThe multilevel models also controlled 6 variables: chronological age, age at injury, gender, race, years of education, and injury severity.

* $P < .05$.

^bThe average initial status of a LSQ-R scale for a married or cohabitating individual.

^cThe average differential in the initial status between a married or cohabitating individual and a divorced/separated/widowed individual.

^dThe average differential in the initial status between a married or cohabitating individual and a single individual.

^eThe average rate of change for a LSQ-R scale for a married or cohabitating individual.

^fThe average differential in the rate of change between a married or cohabitating individual and a divorced/separated/widowed individual.

^gThe average differential in the rate of change between a married or cohabitating individual and a single individual.

to a different one as presented in **Figure 3**. To save space, we only used the home satisfaction trajectory as an example in **Figure 3**.

Discussion

The results of the study provide new insights about the relationship between marital status and SWB and how this relationship changes over time. The SWB observed among MC individuals at baseline was consistent with what has been found in previous studies using cross-sectional data, as they reported significantly higher SWB. The more surprising findings were the decrease in home satisfaction and global satisfaction of MC individuals and the slight increase in their social isolation over time. Meanwhile, except for perceived environmental barriers, all other SWB trajectories did not change significantly. The data present a mixed picture and indicate that some of the benefits of marriage might dissipate over time.

It is possible that dynamics in a marriage may change after SCI, if caregiving creates an unequal balance of power within the relationship²⁴ or if the onset of SCI causes stress in both partners, which may lead to decreased support.^{25,26}

Although DSW individuals experienced lower SWB at baseline, the negative effects of marital loss can attenuate over time. Their home satisfaction improved, and their social isolation, emotional distress, environmental barriers, money problems, and perceived lack of opportunities declined. These findings are in contrast to prior research examining marital status and life satisfaction trajectories in a broader disability sample.¹⁴ However, our study focuses specifically on individuals with SCI and examines SWB over a substantially longer follow-up period (20 years vs 5 years). Therefore, the trends appeared to develop over a much longer time frame. For S individuals, except for environmental barriers, SWB did not change positively over time if they

Figure 1. Three marital status trajectories of 3 life satisfaction subscales, assuming the marital status does not change over 20 years for a male, White participant who could walk, injured at the age 29, surveyed at the age of 42, and had 12 years of education. DSW = divorced, separated, or widowed; MC = married or cohabitating; S = single, noncohabitating.

remained single. All 3 groups experienced less environmental barriers, which may be explained by the advancement in technology and in physical and societal accessibility over the past 20 years.

Limitations

This study has several limitations. Our sample only included persons with chronic SCI, and we should be cautious in generalizing the SWB trajectories to the newly injured. Second, 253 participants (24.5%) were lost to follow-up and had only 1 measurement; 152 (14.7%) had 2 measurements, and 160 (15.5%) had 3 measurements. Considering the high

mortality among people with SCI,²⁷ the attrition might lead to potential biases resulting from unobserved, nonrandom loss of respondents. This is consistent with studies that indicate that those who have the greatest number of problems are at the greatest risk for mortality and those who survive are the ones who show higher levels of adaptation.^{28,29} Third, all data are self-report measures. Therefore, the variables are, by definition, subjective and represent perceptions of life satisfaction and life problems. Lastly, our measurements were separated by 5 years. Marital status could change at any time during the 5-year period, and our estimated trajectories cannot capture this change.

Figure 2. Three marital status trajectories of 6 life problem subscales, assuming the marital status does not change over 20 years for a male, White participant who could walk, injured at the age 29, surveyed at the age of 42, and had 12 years of education. DSW = divorced, separated, or widowed; MC = married or cohabitating; S = single, noncohabitating.

Conclusion

By using longitudinal data with 5 repeated measurements, our study showed a complicated picture of the impact of marital status on the SWB of people with chronic SCI. The MC individuals had the best outcomes of SWB at baseline. Although DSW individuals reported the least favorable SWB at baseline, they showed recovery over time. People who remained single reported the least favorable SWB outcomes at the end of the study.

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Figure 3. Home satisfaction trajectories for changed marital status, assuming the marital status does not change over 20 years for a male, White participant who could walk, injured at the age 29, surveyed at the age of 42, and had 12 years of education and assuming a married participant was divorced at the third measures, and a divorced participant was married again at the third measures, and a single one kept the same. DSW = divorced, separated, or widowed; MC = married or cohabitating; S = single, noncohabitating.

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REFERENCES

1. Ross CE, Mirowsky J, Goldsteen K. The impact of the family on health: The decade in review. *J Marriage Family*. 1990;52(4):1059-1078.
2. LaPierre TA. Marital status and depressive symptoms over time: Age and gender variations. *Family Relations*. 2009;58(4):404-416.
3. Powdthavee N. I can't smile without you: Spousal correlation in life satisfaction. *J Econ Psychol*. 2009;30(4):675-689.
4. Dush CMK, Amato PR. Consequences of relationship status and quality for subjective well-being. *J Soc Pers Rel*. 2005;22(5):607-627.
5. Ross CE. Reconceptualizing marital status as a continuum of social attachment. *J Marriage Family*. 1995;129-140.
6. Dowler R, Richards JS, Putzke JD, Gordon W, Tate D. Impact of demographic and medical factors on satisfaction with life after spinal cord injury: A normative study. *J Spinal Cord Med*. 2001;24(2):87-91.
7. Putzke J, Elliott T, Richards J. Marital status and adjustment 1 year post-spinal cord injury. *J Clin Psychol Med Setting*. 2001;8(2):101-107.
8. DeJong G, Branch LG, Corcoran PJ. Independent living outcomes in spinal cord injury: Multivariate analyses. *Arch Phys Med Rehabil*. 1984;65:66-73.
9. Kreuter M, Sullivan M, Dahllof AG, Siosteen A. Partner relationships, functioning, mood and global quality of life in persons with spinal cord injury and traumatic brain injury. *Spinal Cord*. 1998;36(4):252-261.
10. Charlifue RH, Susan. Ageing with spinal cord injury: The impact of spousal support. *Disabil Rehabil*. 1999;21(5-6):250-257.

11. Krause JS, DeVivo MJ, Jackson AB. Health status, community integration, and economic risk factors for mortality after spinal cord injury. *Arch Phys Med Rehabil*. 2004;85(11):1764-1773.
12. Crewe NM, Krause JS. Marital status and adjustment to spinal cord injury. *J Am Para Soc*. 1992;15(1):14-18.
13. Crewe NM, Krause JS. Marital relationships and spinal cord injury. *Arch Phys Med Rehabil*. 1988;69:435-438.
14. Hernandez CL, Elliott TR, Berry JW, Underhill AT, Fine PR, Lai MH. Trajectories of life satisfaction five years after medical discharge for traumatically acquired disability. *Rehabil Psychol*. 2014;59(2):183-192.
15. Kalpakjian CZ, Houlihan B, Meade MA, et al. Marital status, marital transitions, well-being, and spinal cord injury: An examination of the effects of sex and time. *Arch Phys Med Rehabil*. 2011;92(3):433-440.
16. Krause JS. Dimensions of subjective well-being after spinal cord injury: An empirical analysis by gender and race/ethnicity. *Arch Phys Med Rehabil*. 1998;79(8):900-909.
17. Krause JS. Intercorrelations between secondary conditions and life adjustment among people with spinal cord injuries. *SCI Psychosocial Process*. 1998;11:3-7.
18. Krause JS, Reed KS. Life satisfaction and self-reported problems after spinal cord injury: Measurement of underlying dimensions. *Rehabil Psychol*. 2009;54(3):343-350.
19. Krause JS. Aging, life satisfaction, and self-reported problems among participants with spinal cord injury. *Top Spinal Cord Inj Rehabil*. 2010;15:34-40.
20. Saunders LL, Krause JS, Peters BA, Reed KS. The relationship of pressure ulcers, race, and socioeconomic conditions after spinal cord injury. *J Spinal Cord Med*. 2010;33(4):387-395.
21. Saladin LS, Krause JS, Adkins RH. Pressure ulcer prevalence and barriers to treatment after spinal cord injury: Comparisons of 4 groups based on race-ethnicity. *NeuroRehabil*. 2009;24(1):57-66.
22. Evenson KR, McGinn AP. Test-retest reliability of a questionnaire to assess physical environmental factors pertaining to physical activity. *Int J Behav Nutr Phys Act*. 2005;2(1):7.
23. Landis JR, Koch G. The measurement of observer agreement for categorical data. *Biometrics*. 1977;33:159-174.
24. Kreuter M. Spinal cord injury and partner relationships. *Spinal Cord*. 2000;38:2-6.
25. Bolger N, Foster M, Vinokur AD, Ng R. Close relationships and adjustment to a life crisis: The case of breast cancer. *J Pers Soc Psychol*. 1996;70(2):283-294.
26. Lane C, Hobfoll SE. How loss affects anger and alienates potential supporters. *J Consult Clin Psychol*. 1992;60(6):935-942.
27. DeVivo MJ, Krause JS, Lammertse DP. Recent trends in mortality and causes of death among persons with spinal cord injury. *Arch Phys Med Rehabil*. 1999;80(11):1411-1419.
28. Cao Y, Krause JS, Dipiro N. Risk factors for mortality after spinal cord injury in the USA. *Spinal Cord*. 2013;51(5):413-418.
29. Krause JS, Kjorsvig JM. Mortality after spinal cord injury: A four-year prospective study. *Arch Phys Med Rehabil*. 1992;73(6):558-563.