Health Status, Resource Utilization, and Work Productivity for Caregivers of Adults With Epilepsy: A Propensity Score Analysis of National Survey Data

Safiya Abouzaid, PharmD1; Marco daCosta DiBonaventura, PhD2; Jamie Forlenza, PharmD, MS1; Mike Durkin, MSc1

ABSTRACT

Objective: To compare health status, healthcare resource utilization, and work productivity between caregivers of adults with epilepsy and a control group of non-caregivers.

Methods: Respondents to the 2009 National Health and Wellness Survey (NHWS), a self-administered, Internet-based questionnaire from a nationwide sample of adults (aged 18 or older), were assigned to the caregiver group based on self-reporting of currently providing care for an adult with epilepsy. Caregivers had higher rates of absenteeism (RR = 2.66), presenteeism (RR = 2.08), and overall work impairment (RR = 1.89) when compared on work productivity using the Work Productivity and Activity Impairment (WPAI) questionnaire. Statistical analyses included the t-test, chi-square test, and logistic regression.

Results: Of the 75,000 NHWS respondents, 222 self-reported caregivers were matched to 1,110 employed controls using propensity score matching methodology to employed controls from the general NHWS respondents. Caregivers had lower mean SF-12v2 PC scores than controls (43.0 vs 46.3, respectively; \( p < 0.0001 \)). Caregivers had lower mean SF-12v2 MCS scores than controls (48.4 vs 51.6, respectively; \( p = 0.088 \)). Caregivers had lower mean SF-12v2 PCS scores than controls (44.2 vs 47.3, respectively; \( p < 0.0001 \)). Caregivers reported significantly higher rates of absenteeism (20.7 vs 13.3, \( p = 0.0001 \)), presenteeism (25.8 vs 16.8, \( p < 0.0001 \)), and overall work impairment (25.8 vs 16.8, \( p < 0.0001 \)) when compared on work productivity using the Work Productivity and Activity Impairment (WPAI) questionnaire. Caregivers had lower mean SF-12v2 PC scores than controls (43.0 vs 46.3, respectively; \( p < 0.0001 \)). Caregivers had lower mean SF-12v2 MCS scores than controls (48.4 vs 51.6, respectively; \( p = 0.088 \)). Caregivers had lower mean SF-12v2 PCS scores than controls (44.2 vs 47.3, respectively; \( p < 0.0001 \)). Caregivers reported significantly higher rates of absenteeism (20.7 vs 13.3, \( p = 0.0001 \)), presenteeism (25.8 vs 16.8, \( p < 0.0001 \)), and overall work impairment (25.8 vs 16.8, \( p < 0.0001 \)) when compared on work productivity using the Work Productivity and Activity Impairment (WPAI) questionnaire.

CONCLUSIONS

Caregivers of adults with epilepsy reported utilizing more healthcare resources, had lower work productivity, and had worse physical health status, yet had no difference in mental health status versus non-caregivers.

Further studies to better elucidate the impact of caregiving for adults with epilepsy and outcomes are warranted.
Health Status, Resource Utilization, and Work Productivity for Caregivers of Adults With Epilepsy: A Propensity Score Analysis of National Survey Data

Safiya Abozaid, PharmD1; Marco daCosta DiBonaventura, PhD2; Jamie Forlenza, PharmD, MS3; Mike Durkin, MSc1

Abstract

Objective: To compare health status, healthcare resource utilization, and work productivity between caregivers of adults with epilepsy and a control group of non-caregivers.

Methods: Respondents to the 2005 US National Health and Wellness Survey (NHWS), a self-administered, probability-based telephone survey of adults nationally representative of the non-institutionalized US population, were included in the analysis. Caregivers of adults with epilepsy were compared with non-caregivers in all analyses. Caregivers were defined as age 18 or older who reported providing care to an adult with epilepsy for at least 1 year. Caregivers were matched to non-caregivers using a greedy-matching algorithm with a 1:3 propensity score adjustment. A 75% match rate was achieved. The 2 groups were compared on health status (Short Form 12v2 Physical Component Summary [PCS] and Mental Component Summary [MCS]; score) and resource use (emergency room [ER] visits, hospitalizations, and provider visits). Statistical analyses included the χ2 test for categorical and t test for continuous variables; a P value < 0.05 was considered statistically significant.

Results: Of the 75,000 NHWS respondents, 124 employed caregivers were matched to 620 employed controls. The caregiver group was 61% female, 66% white, had a mean (SD) age of 48.3 (13.3) years, and had a mean (SD) duration of epilepsy caregiving of 8.4 (6.9) years. Employed caregivers (n = 124) reported significantly (P < 0.0001) more ER visits (rate ratio [RR] = 2.06), hospitalizations (RR = 6.44), and provider visits (RR = 1.59) than matched controls. Employed caregivers had lower mean SF-12v2 PCS scores than controls (46.9 vs 49.6, respectively; P = 0.090). Caregivers reported significantly (P = 0.017) more activity impairment at work (34.2 vs 24.1, respectively; P = 0.0001).

Conclusions: Caregiving for adults with epilepsy was associated with lower health status, higher healthcare resource utilization, and greater activity impairment at work versus non-caregivers.

Limitations

Caregivers of adults with epilepsy reported utilizing more emergency, hospital, and provider visits than non-caregivers, but these differences were not statistically significant. Further studies to better elucidate the impact of caregiving for adults with epilepsy are warranted.

Methods

Study Design

A propensity score matched design was used with data from the 2005 NHWS database. Caregivers were defined as age 18 or older who reported providing care to an adult with epilepsy for at least 1 year. The caregiver group was composed of respondents from the 2005 NHWS database who reported providing care to an adult with epilepsy for at least 1 year. The 2005 NHWS database contained 75,000 adults nationally representative of the non-institutionalized US population. Caregivers were defined as age 18 or older who reported providing care to an adult with epilepsy for at least 1 year. Caregivers were matched to non-caregivers using a greedy-matching algorithm with a 1:3 propensity score adjustment. A 75% match rate was achieved. The 2 groups were compared on health status (Short Form 12v2 Physical Component Summary [PCS] and Mental Component Summary [MCS]; score) and resource use (emergency room [ER] visits, hospitalizations, and provider visits). Statistical analyses included the χ2 test for categorical and t test for continuous variables; a P value < 0.05 was considered statistically significant.

Methodology

Health status was assessed using the Short Form 12v2 Physical Component Summary (PCS) and Mental Component Summary (MCS). Healthcare utilization in the past 6 months was assessed by the number of traditional healthcare provider visits, emergency visits, hospitalizations, and number of days taken off work. Work productivity and activity impairment over the past 7 days were assessed using the Work Productivity and Activity Impairment (WPAI) questionnaire. Statistical analyses included the χ2 test for categorical and t test for continuous variables; a P value < 0.05 was considered statistically significant.

Results

Caregivers had lower mean SF-12v2 PCS scores than controls (46.9 vs 49.6, respectively; P = 0.090) and had worse physical health status, yet had no difference in mental health status versus non-caregivers. Caregivers had significantly (P < 0.0001) more activity impairment at work (34.2 vs 24.1, respectively; P = 0.0001). Caregivers reported significantly (P = 0.017) more activity impairment at work (34.2 vs 24.1, respectively; P = 0.0001). Caregivers reported significantly (P = 0.0001) more activity impairment at work (34.2 vs 24.1, respectively; P = 0.0001). Caregivers reported significantly (P = 0.0001) more activity impairment at work (34.2 vs 24.1, respectively; P = 0.0001). Caregivers reported significantly (P = 0.0001) more activity impairment at work (34.2 vs 24.1, respectively; P = 0.0001). Caregivers reported significantly (P = 0.0001) more activity impairment at work (34.2 vs 24.1, respectively; P = 0.0001). Caregivers reported significantly (P = 0.0001) more activity impairment at work (34.2 vs 24.1, respectively; P = 0.0001). Caregivers reported significantly (P = 0.0001) more activity impairment at work (34.2 vs 24.1, respectively; P = 0.0001).

Conclusions

Caregiving for adults with epilepsy was associated with lower health status, higher healthcare resource utilization, and greater activity impairment at work versus non-caregivers.
Data Sources
Subjects were selected from the 2009 National Health and Wellness Survey (NHWS) database.

Inclusion Criteria for Study Population

Subjects included those aged 18 years or older who reported having epilepsy.

Exclusion Criteria for Study Population

Subjects were excluded if they reported having any other chronic or mental health condition.

Statistical Methods

Data were analyzed using the chi-square test for categorical variables and the t-test for continuous variables. A p-value < 0.05 was considered statistically significant.

RESULTS

Health Status

The frequency of various health status indicators is presented in Table 1. Employment among caregivers was significantly lower than in the control group, with a higher prevalence of current smoking, alcohol consumption, and physical inactivity.

Resource Utilization

Caregivers reported significantly higher healthcare resource utilization compared to controls, including more frequent visits to the ER and hospitalization.

Work Productivity

Caregivers exhibited a significantly higher rate of presenteeism, overall work impairment, and activity impairment compared to controls.

CONCLUSIONS

Caregiving for adults with epilepsy is a significant burden, impacting health status, resource utilization, and work productivity. Further study is needed to better understand and mitigate the impact of caregiving on adults with epilepsy and their caregivers.

LIMITATIONS

The study is subject to limitations, including potential for selection bias and self-report bias.

Table 1. Health Status and Resource Utilization Differences Between the Caregiver Group and Matched Employed Control Group

<table>
<thead>
<tr>
<th>Health Status/Resource Utilization</th>
<th>Caregivers</th>
<th>Matched Controls</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment status</td>
<td>N = 124</td>
<td>N = 52</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Current smoking</td>
<td>45 (36.3%)</td>
<td>213 (34.8%)</td>
<td>0.7589</td>
</tr>
<tr>
<td>Current alcohol consumption</td>
<td>125 (51.8%)</td>
<td>471 (49.6%)</td>
<td>0.5566</td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>74 (66.9%)</td>
<td>320 (61.4%)</td>
<td>0.0227</td>
</tr>
</tbody>
</table>

Table 2. Work Productivity and Activity Impairment Differences Between the Caregiver Group and Matched Employed Control Group

<table>
<thead>
<tr>
<th>Work Productivity/Activity Impairment</th>
<th>Caregivers</th>
<th>Matched Controls</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presenteeism</td>
<td>85 (68.2%)</td>
<td>423 (68.6%)</td>
<td>0.9438</td>
</tr>
<tr>
<td>Overall work impairment</td>
<td>14 (11.3%)</td>
<td>42 (6.6%)</td>
<td>0.0076</td>
</tr>
<tr>
<td>Activity impairment</td>
<td>14 (11.3%)</td>
<td>42 (6.6%)</td>
<td>0.0076</td>
</tr>
</tbody>
</table>

Table 3. Healthcare Resource Utilization Differences Between the Caregiver Group and Matched Employed Control Group

<table>
<thead>
<tr>
<th>Healthcare Resource Utilization</th>
<th>Caregivers</th>
<th>Matched Controls</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ER visits</td>
<td>1.14</td>
<td>0.83</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Hospitalizations</td>
<td>1.17</td>
<td>0.83</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Release Date

2021

Health Status, Resource Utilization, and Work Productivity for Caregivers of Adults With Epilepsy: A Propensity Score Analysis of National Survey Data

Safiya Abouzaid, PharmD1; Marco diCosta DiBonaventura, PhD2; Jamie Forlenza, PharmD, MSc1; Mike Durkin, MSc1

1 Ortho-McNeil Jansen Scientific Affairs, LLC, Ranita, NJ; 2 Kantar Health, New York, NY.

ABSTRACT

Objective

To compare health status, healthcare resource utilization, and work productivity between caregivers of adults with epilepsy and a general control group in the NHWS database.

Methods

Subjects were selected from the 2009 National Health and Wellness Survey (NHWS) database. Subjects were classified into the caregiver group if they reported having a relative with epilepsy. Differences in demographic and health characteristics, health status, resource utilization, and work productivity were compared between the two groups using chi-square tests for categorical variables and t-tests for continuous variables. The propensity score methodology was used to create a propensity score match group for comparison.

RESULTS

Demographic and Subject Characteristics

Caregivers were significantly more likely to be female, older, and have lower educational attainment compared to controls. Caregivers also reported higher prevalence of smoking, alcohol consumption, and physical inactivity.

Health Status

Caregivers reported significantly lower health utility scores (SF-6D) compared to controls. Caregivers also exhibited higher rates of physical inactivity, presenteeism, and overall work impairment.

Resource Utilization

Caregivers reported significantly higher healthcare resource utilization compared to controls, including more frequent visits to the ER and hospitalization.

Work Productivity

Caregivers exhibited a significantly higher rate of presenteeism, overall work impairment, and activity impairment compared to controls.

CONCLUSIONS

Caregiving for adults with epilepsy is a significant burden, impacting health status, resource utilization, and work productivity. Further study is needed to better understand and mitigate the impact of caregiving on adults with epilepsy and their caregivers.

LIMITATIONS

The study is subject to limitations, including potential for selection bias and self-report bias.

Table 1. Demographic and Subject Characteristics

<table>
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<th>Caregivers</th>
<th>Matched Controls</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (female)</td>
<td>77 (57.9%)</td>
<td>300 (49.6%)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Age (years)</td>
<td>51.3 ± 15.3</td>
<td>45.7 ± 15.2</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Education (college graduate or higher)</td>
<td>68 (30.6%)</td>
<td>331 (29.8%)</td>
<td>0.8108</td>
</tr>
<tr>
<td>Employment status</td>
<td>124 (100%)</td>
<td>620 (100%)</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Table 2. Health Status and Resource Utilization Differences Between the Caregiver Group and Matched Employed Control Group

<table>
<thead>
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<th>Matched Controls</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF-6D utility</td>
<td>0.67 ± 0.15</td>
<td>0.72 ± 0.15</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>74 (66.9%)</td>
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ABSTRACT

Objective: To compare health status, healthcare resource utilization, and work productivity between caregivers of adults with epilepsy and a general adult population.

Methods: Respondents to the 2009 US National Health and Wellness Survey (NHWS), a self-administered, online survey, were matched to create a matched caregiver control group. Respondents were categorized as caregivers if they reported providing care for at least one day in the past year. Caregivers were then matched to non-caregivers on age, gender, and race. Propensity scores were calculated to adjust for potential confounders. Healthcare Resource Utilization Outcome

Analysis of Health Status and Healthcare Resource Utilization

- The analyses were stratified by study employment status to account for potential differences between employed caregivers and controls.
- Propensity scores were calculated to adjust for potential confounders.

Results: A total of 75,000 NHWS respondents, 124 employed caregivers were matched to 620 employed controls (n = 223). Employed adult caregivers reported significantly lower health status, higher utilization of healthcare resources, and higher work productivity than matched controls. Caregivers reported significantly higher rates of absenteeism (RR = 2.66) and more time missed from work (2.7 days per year) compared to controls. Conclusion: Caregivers of adults with epilepsy reported utilizing more healthcare resources, had lower work productivity, and had worse health status compared to matched controls. Further research is warranted to better elucidate the impact of caregiving for adults with epilepsy.
Health Status, Resource Utilization, and Work Productivity for Caregivers of Adults With Epilepsy: A Propensity Score Analysis of National Survey Data

Safiya Abouzaid, PharmD1, Marco daCosta Dilonaventura, PhD2, Jamie Forlenza, PharmD, MS3, Mike Durkin, MSc1

Abstract

Objectives
To compare health status, healthcare resource utilization, and work productivity between caregivers of adults with epilepsy and a general group of non-caregivers.

Methods
Respondents to the 2009 US National Health and Wellness Survey (NHWS), a self-administered, cross-sectional survey, were compared with a matched general population group. Respondents were weighted to reflect the demographic characteristics of the US population, and those reporting caregiving were compared to non-caregivers on any other characteristics, matched on demographics and health characteristics, the self-report of epilepsy in the household, and self-rated health status (HRU Healthcare Resource Utilization). For each outcome, the rate ratio (RR) was used to compare the matched caregiver and control groups. Categorical data were tested with chi-square tests. The 2009 NHWS data are publicly available.

Analysis of Health Status and Healthcare Resource Utilization
Respondents to the 2009 NHWS were compared with a matched general population group, regardless of any reported caregiving. Multiple logistic regression and generalized linear models were used to assess and compare differences in unobserved variables between the caregiver and control groups.

Conclusions: Caregivers of adults with epilepsy reported utilizing more healthcare resources, had lower work productivity, and had worse physical health status, yet had no difference in mental health status versus non-caregivers.

Limitations
Owing to the nature of the study design, the age group was limited to adults (18+ years), and the results may not be generalizable to younger age groups. Also, the survey was self-administered and subjects were provided with an opt-out option, which may have affected the sample representativeness.

Conclusions
Caregivers of adults with epilepsy reported utilizing more healthcare resources, had lower work productivity, and had worse physical health status, yet had no difference in mental health status versus non-caregivers.

Further studies to better elucidate the impact of caregiving for adults with epilepsy are warranted.

Background
Epilepsy and seizures affect nearly 3 million Americans at an estimated annual direct and indirect cost of $50K to <$75K. Caregiving for adults with epilepsy has an estimated annual cost of $124B and includes $40B in direct costs. Few previous studies have evaluated the economic burden of caregiving for adults with epilepsy using a national sample.

objetive
Health Status, Resource Utilization, and Work Productivity for Caregivers of Adults With Epilepsy: A Propensity Score Analysis of National Survey Data

Health Status
Health Status was assessed using the SF-12v2 (MCS 44.8 vs 46.3; P < 0.0001) and provider visits (RR = 1.59) than matched controls. The caregiver group used more healthcare resources, had lower work productivity, and had worse physical health status, yet had no difference in mental health status versus non-caregivers.

Resource Utilization
Healthcare Resource Utilization for Caregivers of Adults With Epilepsy: A Propensity Score Analysis of National Survey Data

Study Design
A propensity score matched design was used with data from the 2009 NHWS database. Caregivers were compared with a general population group using the propensity score methodology. Multiple logistic regression and generalized linear models were used to assess and compare the matched groups.

Results
Of the 75,000 NHWS respondents, 222 self-reported caregivers were matched to 1,110 controls (43.0 vs 46.3, respectively; P < 0.0001) and showed no difference in scores than matched controls. The caregiver group used more healthcare resources, had lower work productivity, and had worse physical health status, yet had no difference in mental health status versus non-caregivers.

Work Productivity
Work productivity metrices were assessed for a subset of the population who reported being currently employed. Caregivers reported significantly more ER visits (rate ratio [RR] = 4.2; P < 0.0001), and provider visits (RR = 1.6; P < 0.0001) than matched controls. Caregivers also had lower work productivity and had worse physical health status, yet had no difference in mental health status versus non-caregivers.

Conclusions
Caregivers of adults with epilepsy reported utilizing more healthcare resources, had lower work productivity, and had worse physical health status, yet had no difference in mental health status versus non-caregivers.
ABSTRACT

Objective: To compare health status, healthcare resource utilization, and work productivity between caregivers of adults with epilepsy and a control group of non-caregivers.

Methods: Respondents to the 2009 US National Health and Wellness Survey (NHWS), a self-administered, Internet-based questionnaire from a nationwide sample of adults (aged 18 or older) that is stratified by gender, age, and race/ethnicity to represent the demographic composition of the US population, were included if they reported providing care for an adult with epilepsy (Caregiver Group) or the general NHWS respondents and compared on work productivity using the Work Productivity and Activity Impairment (WPAI) questionnaire. Statistical analyses included the square root transformation of the variables.

Results: Of the 75,000 NHWS respondents, 222 self-reported caregivers were matched to 1,110 matched controls. Employed caregivers (n = 124) reported significantly (P = 0.0018) higher health utilities and quality of life in the caregiver population. Caregivers had lower mean SF-12v2 PCS scores than controls (43.0 vs 46.3, respectively; P = 0.0007) and higher mean CES-D scores than controls (12.4 vs 11.5, respectively; P = 0.090). Caregivers reported significantly more ER visits (rate ratio [RR] = 4.2; P = 0.0003) and activities of daily living (ADL) assistance (RR = 4.5; P = 0.0001) compared with matched controls.

Conclusions: The association identified in this study between caregiving for adults with epilepsy and the outcomes of interest cannot be easily categorized in terms of cause and effect. In addition, the associations identified in this study between caregiving for adults with epilepsy and the outcomes of interest cannot be easily categorized in terms of cause and effect. Winnie Poon, Mary A. O’Hare, Nancy Bella, Pharm D, of MedE rgy provided editorial assistance.

OBJECTIVE

To compare health status, healthcare resource utilization, and work productivity between caregivers of adults with epilepsy and a control group of non-caregivers.

METHODS

Study Design

A propensity score matched design was used with data from the 2009 NHWS database.

Data Sources

The NHWS is a self-administered, Internet-based questionnaire from a nationwide sample of adults (aged 18 or older) that is stratified by gender, age, and race/ethnicity to represent the demographic composition of the US population.

Statistical Methods

Controlled difference was examined using the square root transform to eliminate outliers and check for normality. The associations identified in this study between caregiving for adults with epilepsy and the outcomes of interest cannot be easily categorized in terms of cause and effect. Further studies to better elucidate the impact of caregiving for adults with epilepsy are warranted.
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