**Supplementary Material**

*Naik et al.* *Productivity Loss Associated with Disability from Migraine: A Canada-wide Cross-sectional Study*

**Supplementary Tables**

**Table S1: Migraine preventative strategies, treatments, and workplace supports reported by participants**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Questions** | **Little to no**  **(MIDAS 0-5)**  N=109 | **Mild**  **(MIDAS 6-10)**  N=111 | **Moderate**  **(MIDAS 11-20)**  N=111 | **Severe**  **(MIDAS ≥21)**  N=110 | **Total**  N=441 |
| **What do you use to prevent migraines?** |  |  |  |  |  |
| Lifestyle changes  (e.g., exercise; dietary changes; hydration) | 74 (67.9%) | 85 (76.6%) | 83 (74.8%) | 80 (72.7%) | 322 (73.0%) |
| Changes to the physical environment (e.g., changing lights or cleaning products) | 42 (38.5%) | 53 (47.7%) | 51 (45.9%) | 68 (61.8%) | 214 (48.5%) |
| Oral medications | 67 (61.5%) | 76 (68.5%) | 76 (68.5%) | 84 (76.4%) | 303 (68.7%) |
| Neuromodulation devices | 12 (11.0%) | 23 (20.7%) | 14 (12.6%) | 6 (5.5%) | 55 (12.5%) |
| Vitamin supplements  (e.g., B2; magnesium) | 34 (31.2%) | 51 (45.9%) | 62 (55.9%) | 42 (38.2%) | 189 (42.9%) |
| Botox and/or IV infusionsa | ≤5 (≤4.6) | ≤5 (≤4.5) | ≤5 (≤4.5) | ≤5 (≤4.5) | 30 (6.8%) |
| **What do you use to treat your migraines?** |  |  |  |  |  |
| Oral medications  (e.g., triptans) | 96 (88.1%) | 91 (82.0%) | 103 (92.8%) | 95 (86.4%) | 385 (87.3%) |
| Intramuscular medications | 23 (21.1%) | 27 (24.3%) | 23 (20.7%) | 20 (18.2%) | 93 (21.1%) |
| Intravenous medications | 15 (13.8%) | 32 (28.8%) | 19 (17.1%) | 10 (9.1%) | 76 (17.2%) |
| Neuromodulation devices | 8 (7.3%) | 18 (16.2%) | 10 (9.0%) | 7 (6.4%) | 43 (9.8%) |
| **To accommodate your health conditions, has any of the following workplace support been provided to you in the past 12 months?** |  |  |  |  |  |
| Paid leave | 37 (33.9%) | 46 (41.4%) | 50 (45.0%) | 35 (31.8%) | 168 (38.1%) |
| Unpaid leave options | 18 (16.5%) | 24 (21.6%) | 22 (19.8%) | 26 (23.6%) | 90 (20.4%) |
| Flexible work arrangements | 22 (20.2%) | 37 (33.3%) | 38 (34.2%) | 30 (27.3%) | 127 (28.8%) |
| Options to work part-time/reduced hours | 17 (15.6%) | 25 (22.5%) | 14 (12.6%) | 15 (13.6%) | 71 (16.1%) |
| Extended health insurance coverage that is relevant | 15 (13.8%) | 22 (19.8%) | 26 (23.4%) | 9 (8.2%) | 72 (16.3%) |
| Information or advice | 23 (21.1%) | 29 (26.1%) | 14 (12.6%) | 16 (14.5%) | 82 (18.6%) |
| Emotional support or counseling | 18 (16.5%) | 24 (21.6%) | 30 (27.0%) | 21 (19.1%) | 93 (21.1%) |
| Change to layout or equipment | 14 (12.8%) | 13 (11.7%) | 9 (8.1%) | 11 (10.0%) | 47 (10.7%) |
| A lighter or easier job | 24 (22.0%) | 30 (27.0%) | 20 (18.0%) | 19 (17.3%) | 93 (21.1%) |
| Modification of work tasks | 16 (14.7%) | 10 (9.0%) | 10 (9.0%) | 20 (18.2%) | 56 (12.7%) |
| Special training | ≤5 (≤4.6) | ≤5 (≤4.5) | ≤5 (≤4.5) | ≤5 (≤4.5) | 12 (2.7%) |

**Legend:** All percentages represent the proportion of respondents that reported using the particular intervention or receiving the support (vs. not using the intervention or receiving the support). aOf note, subcutaneous injections were not specifically provided as an option to participants, and no particular medication or class of medication was listed.Abbreviations: IV- intravenous; MIDAS- migraine disability assessment.

**Table S2: Multiple regression models for hours of productivity loss based on the Valuation of Lost Productivity (VOLP)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Characteristic** | **Total productivity loss hours**  Coefficient (95%CI) | **Paid productivity loss hours**  Coefficient (95%CI) | **Unpaid productivity loss hours**  Coefficient (95%CI) |
| **Intercept** | 117.2 (38.7,195.7)\*\* | 66.5 (14.1,118.9)\* | 52.21 (-1.4, 105.8) |
| **Migraine-related disability level** |  |  |  |
| Little to no (MIDAS 0-5) | [Reference] | [Reference] | [Reference] |
| Mild (MIDAS 6-10) | 37.4 (-6.5, 81.4) | 16.8 (-12.5, 46.1) | 15.6 (-14.2, 45.5) |
| Moderate (MIDAS 11-20) | 54.1 (10.2, 98.1)\* | 32.4 (3.1, 61.8)\* | 17.3 (-12.7, 47.2) |
| Severe (MIDAS >20) | 110.5 (65.5, 155.6)\*\*\* | 61.6 (31.5, 91.7) \*\*\* | 43.5 (12.7, 74.3)\*\* |
| **Gender** |  |  |  |
| Man | [Reference] | [Reference] | [Reference] |
| Woman | -13.7 (-45.6, 18.2) | 1.4 (-19.9, 22.7) | -15.0 (-36.7, 6.9) |
| **Age**, **per year** | -0.3 (-1.8, 1.2) | 0.3 (-0.7, 1.2) | -0.6 (-1.6, 0.4) |
| **Ethnicity** |  |  |  |
| Other ethnicity | [Reference] | [Reference] | [Reference] |
| White | -79.1 (-115.9, -42.4)\*\*\* | -24.1 (-48.6, 0.4) | -55.3 (-80.3, -30.3)\*\*\* |
| **Marital status** |  |  |  |
| Not married or common-law | [Reference] | [Reference] | [Reference] |
| Married or common-law | 30.0 (-2.9, 63.0) | -6.3 (-28.2, 15.7) | -9.3 (-31.4,12.8) |
| **Education** |  |  |  |
| No university/college education | [Reference] | [Reference] | [Reference] |
| University/ college education | -17.9 (-50.2, 14.4) | -10.0 (-31.5, 11.6) | 36.3 (13.7, 58.8)\*\* |
| **Household income** |  |  |  |
| <$50,000 | [Reference] | [Reference] | [Reference] |
| $50,000- $99,999 | -2.5 (-49.9, 44.8) | -7.0 (-38.6, 24.5) | 8.9 (-23.7, 41.4) |
| $100,000- $149,999 | -17.9 (-68.8, 33.0) | -5.3 (-39.2, 28.7) | -9.9 (-44.7, 24.8) |
| ≥$150,000 | 21.5 (-32.1, 75.0) | -2.8 (-38.5, 32.9) | 25.5 (-11.3, 62.3) |
| **Number of comorbidities** |  |  |  |
| 0 | [Reference] | [Reference] | [Reference] |
| 1 | 39.4 (3.4, 75.3)\* | 3.6 (-20.4, 27.5) | 37.4 (12.9, 61.9)\*\* |
| ≥2 | 66.5 (28.2, 104.8)\*\*\* | 32.5 (6.9, 58.0)\* | 34.7 (8.3, 61.0)\* |
| **Employment status** |  |  |  |
| Working full-time | [Reference] | [Reference] | [Reference] |
| Working part-time, self-employed, or other | 10.2 (-31.6, 52.0) | -4.3 (-32.2, 23.6) | 14.58 (-14.1, 43.3) |
| **Work habits** |  |  |  |
| Sedentary at work | [Reference] | [Reference] | [Reference] |
| Mildly active at work | -12.6 (-45.0, 19.9) | -8.7 (-30.3, 12.9) | -1.8 (-24.0, 20.4) |
| Moderate to strenuous activity at work | -32.0 (-79.2, 15.1) | -18.6 (-50.0, 12.9) | -13.2 (-45.8, 19.4) |

**Legend:** Abbreviations: CI- confidence interval; MIDAS- migraine disability assessment; \*p<0.05; \*\*p<0.01; \*\*\*p<0.001.

**Table S3: Multiple regression models for percent of overall work and activity impairment based on the Work and Activity Impairment (WPAI)**

|  |  |  |
| --- | --- | --- |
| **Characteristic** | **Percent overall work impairment**  Coefficient (95%CI) | **Percent activity impairment**  Coefficient (95%CI) |
| **Intercept** | 33.2 (20.8, 45.6)\*\*\* | 34.2 (22.9, 45.4)\*\*\* |
| **Migraine disability level** |  |  |
| Little to no (MIDAS 0-5) | [Reference] | [Reference] |
| Mild (MIDAS 6-10) | 13.1 (6.2, 20.0)\*\*\* | 11.7 (5.4, 17.9) \*\*\* |
| Moderate (MIDAS 11-20) | 23.0 (16.3, 29.8)\*\*\* | 20.9 (14.7, 27.2)\*\*\* |
| Severe (MIDAS ≥21) | 37.3 (30.3, 44.2)\*\*\* | 31.2 (24.7, 37.7)\*\*\* |
| **Gender** |  |  |
| Man | [Reference] | [Reference] |
| Woman | 1.9 (-3.1, 6.8) | 2.0 (-2.5, 6.6) |
| **Age**, **per year** | -0.25 (-0.48, -0.02)\* | -0.22 (-0.43, -0.01)\* |
| **Ethnicity** |  |  |
| Other race/ ethnicity\* | [Reference] | [Reference] |
| White | -7.3 (-12.9, -1.6)\* | -4.8 (-10.0, 0.5) |
| **Marital status** |  |  |
| Not married or common-law | [Reference] | [Reference] |
| Married or common-law | 3.8 (-1.4, 8.9) | 2.7 (-2.1, 7.4) |
| **Education** |  |  |
| No university/college education | [Reference] | [Reference] |
| University/ college education | -5.2 (-10.3, -0.2)\* | -7.1 (-11.8, -2.5)\*\* |
| **Household income** |  |  |
| <$50,000 | [Reference] | [Reference] |
| $50,000- $99,999 | -1.2 (-8.8, 6.3) | -1.4 (-8.2, 5.5) |
| $100,000- $149,999 | -3.2 (-11.2, 4.8) | -1.4 (-8.7, 5.9) |
| ≥$150,000 | 2.6 (-5.9, 11.1) | -0.3 (-8.0, 7.4) |
| **Number of comorbidities** |  |  |
| 0 | [Reference] | [Reference] |
| 1 | 6.9 (1.3, 12.5)\* | 4.3 (-0.8, 9.5) |
| ≥2 | 10.7 (4.7, 16.7)\*\*\* | 7.9 (2.4, 13.4)\*\* |
| **Employment status** |  |  |
| Working full-time | [Reference] | [Reference] |
| Working part-time, self-employed, or other | 4.6 (-2.1, 11.2) | 4.76 (-1.3, 10.8) |
| **Work habits** |  |  |
| Sedentary at work | [Reference] | [Reference] |
| Mildly active at work | 0.9 (-4.1, 6.0) | -1.0 (-5.7, 3.7) |
| Moderate to strenuous activity at work | 1.8 (-5.8, 9.4]) | -1.3 (-8.2, 5.5) |

**Legend**: Abbreviations: CI- confidence interval; MIDAS- migraine disability assessment; \*p<0.05; \*\*p<0.01; \*\*\*p<0.001.

**Table S4: Sensitivity analyses of multiple regression models using other indications of migraine-related disability from MIDAS.**

|  |  |  |
| --- | --- | --- |
| **Outcomes** | **Number of days experiencing headaches in the last 3 months**  Coefficient (95%CI) | **Average pain of headaches (0 to 10 scale)**  Coefficient (95%CI) |
|  |  |  |
| **VOLP (last 3 months)** |  |  |
| Total productivity loss hours | 3.2 (2.0, 4.4) \*\*\* | 18.8 (11.3, 26.2) \*\*\* |
| Paid productivity loss hours | 1.6 (0.8, 2.4) \*\*\* | 10.4 (5.5, 15.4) \*\*\* |
| Unpaid productivity loss hours | 1.5 (0.7, 2.3) \*\*\* | 7.9 (2.8, 13.) \*\* |
| **WPAI (last 7 days)** |  |  |
| Percent overall work impairment | 0.4 (0.2, 0.6) \*\*\* | 5.6 (4.4, 6.8) \*\*\* |
| Percent activity impairment | 0.5 (0.3, 0.6) \*\*\* | 5.4 (4.3, 6.4) \*\*\* |

**Legend**: Abbreviations: CI- confidence interval; MIDAS- migraine disability assessment; \*p<0.05; \*\*p<0.01; \*\*\*p<0.001.

**Supplemental Methods**

**Calculation of Productivity Loss using the Valuation of Lost Productivity (VOLP) questionnaire**

|  |  |  |
| --- | --- | --- |
| **VOLP component** | | **Questions and Calculation** |
| **Paid productivity loss (hours)** | Absenteeism (hours) | Participants were asked for the total number of work days they have been absent from work in the past three months because of their health (physical, mental, or emotional problems or symptoms). Responses were converted to hours using the number of work hours per day calculated based on the number of work hours per week and the average amount of work days per week reported by participants. |
| Presenteeism (hours) | Participants are asked to think of all the work they have completed during the past 7 days and then to answer whether they would complete the same work in less time if they did NOT experience any health problems (physical, mental, or emotional problems or symptoms). If they answered “yes”, they were asked a) how many hours they took to complete all their work during the past 7 days and b) how many hours they would take to complete the same work if they did not experience any health problems. The percent of time lost was calculated based on a) and b) using the formula (a-b)/a. This was converted to hours by multiplying the percent of time lost by (the number of work hours per week x 13 weeks – absenteeism). For participants who reported they had not gone to work in the past 7 days but were employed according to their employment status, we assumed final presenteeism of 0 hours. Participants who were eligible for questions a and b but answered 0 hours for either of them was considered invalid. |
| **Unpaid productivity loss (hours)** | | Participants were asked how many hours in the past 7 days they have had help from family and others (paid or unpaid) for their unpaid work (housework, shopping, odd jobs and chores, childcare, and voluntary activities). This was multiplied by 13 weeks. |

**Calculation of Impairment using the Work Productivity and Activity Impairment (WPAI) Questionnaire**

|  |  |
| --- | --- |
| **WPAI component** | **Calculation** |
| Percent overall work impairment due to health | This was calculated using the formula  Q2/(Q2+Q4)+[(1-(Q2/(Q2+Q4)))x(Q5/10)] for those with Q4 >0;  Q2/(Q2+Q4) or 100% for those with Q4 = 0 but Q2>0  where:  Q2= hours missed from work during the past 7 days because of health problems  Q4= hours actually worked during the past 7 days  Q5= how much health problems affected productivity while working, reported on a scale from 0 (health problems had no effect on work) to 10 (health problems completely prevented working) |
| Percent activity impairment due to health | This was calculated using the formula Q6/10, where Q6 asked for how much health problem affected the ability to do regular daily activities other than work at a job; 0 (health problems had no effect on daily activities) to 10 (health problems completely prevented doing daily activities) |