**SUPPLEMENTAL TABLE 1.** Status at T3 for Participants Who Did Not Return for T3 Follow-Up Visit

| **T3 Participant Status** |  | **Did Not Return for T3 Follow-Up**  N=733 | |
| --- | --- | --- | --- |
|  | **n** | **(%)** |
|  |  |  |  |
| Deceased |  | 225 | (30.7) |
| Physically or Mentally Unable to Return |  | 196 | (26.7) |
| Unknown Status/Cannot Find |  | 88 | (12.0) |
| Not Interested (Refused) |  | 77 | (10.5) |
| Not a Participant at This Timepoint |  | 76 | (10.4) |
| Moved Away |  | 49 | (6.7) |
| Unable to Contacta |  | 22 | (3.0) |

a Participant contact information was known and multiple attempts were made to contact the individual.

**SUPPLEMENTAL TABLE 2.** Participant Characteristics at the 2006-2010 Study Visit (T2), Stratified by Return to 2013-2015 Study Visit (T3), Johnston County Osteoarthritis Project

| **Participant Characteristic** |  | **Returned for T3 Follow-Up**  N=786 | | **Did Not Return for T3 Follow-Up**  N=733 | |
| --- | --- | --- | --- | --- | --- |
|  | **n** | **(%)** | **n** | **(%)** |
| **Age (years)** |  |  |  |  |  |
| 50–60 |  | 174 | (22.1) | 108 | (14.7) |
| 60–69 |  | 378 | (48.1) | 217 | (29.6) |
| ≥70 |  | 234 | (29.8) | 408 | (55.7) |
| Missing |  | 0 |  | 0 |  |
| **Sex** |  |  |  |  |  |
| Male |  | 259 | (33.0) | 234 | (31.9) |
| Female |  | 527 | (67.0) | 499 | (68.1) |
| Missing |  | 0 |  | 0 |  |
| **Race** |  |  |  |  |  |
| White |  | 545 | (69.3) | 514 | (70.1) |
| Black |  | 241 | (30.7) | 219 | (29.9) |
| Missing |  | 0 |  | 0 |  |
| **Body Mass Index** |  |  |  |  |  |
| < 30 kg/m2 |  | 356 | (45.3) | 388 | (53.0) |
| ≥ 30 kg/m2 |  | 430 | (54.7) | 344 | (47.0) |
| Missing |  | 0 |  | 0 |  |
| **Educational Attainment** |  |  |  |  |  |
| ≥ 12 years |  | 676 | (86.6) | 518 | (71.1) |
| < 12 years |  | 105 | (13.4) | 211 | (28.9) |
| Missing |  | 5 |  | 4 |  |
| **Employment Status** |  |  |  |  |  |
| Employed/Retired |  | 687 | (87.9) | 641 | (87.7) |
| Unemployed |  | 95 | (12.1) | 90 | (12.3) |
| Missing |  | 4 |  | 2 |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| **Household Poverty Ratea** |  |  |  |  |  |
| <12% |  | 296 | (37.7) | 253 | (34.5) |
| 12%–24% |  | 380 | (48.3) | 367 | (50.1) |
| ≥25% |  | 110 | (14.0) | 113 | (15.4) |
| Missing |  | 0 |  | 0 |  |
| **Marital Status** |  |  |  |  |  |
| Married |  | 493 | (65.2) | 359 | (52.4) |
| Unmarriedb |  | 263 | (34.8) | 326 | (47.6) |
| Missing |  | 30 |  | 24 |  |
| **Depressive Symptomsc** |  |  |  |  |  |
| No |  | 617 | (79.6) | 547 | (76.4) |
| Yes |  | 158 | (20.4) | 169 | (23.6) |
| Missing |  | 11 |  | 17 |  |
| **Perceived Social Supportd** |  |  |  |  |  |
| Strong |  | 410 | (53.8) | 358 | (50.5) |
| Moderate/Poor |  | 352 | (46.2) | 351 | (49.5) |
| Missing |  | 24 |  | 24 |  |
| **Pain Catastrophizinge** |  |  |  |  |  |
| Normal |  | 549 | (71.3) | 510 | (71.5) |
| High |  | 221 | (28.7) | 203 | (28.5) |
| Missing |  | 16 |  | 20 |  |
| **Pain Sensitivityf** |  |  |  |  |  |
| Normal |  | 562 | (74.3) | 469 | (68.5) |
| High |  | 194 | (25.7) | 216 | (31.5) |
| Missing |  | 30 |  | 48 |  |
| **Health Insurance** |  |  |  |  |  |
| Private |  | 337 | (43.7) | 322 | (44.8) |
| Public |  | 255 | (33.1) | 312 | (43.4) |
| Uninsured |  | 179 | (23.2) | 85 | (11.8) |
| Missing |  | 15 |  | 14 |  |
| **Polypharmacy** |  |  |  |  |  |
| 0–4 Medications |  | 386 | (49.1) | 328 | (44.9) |
| ≥5 Medications |  | 400 | (50.9) | 402 | (55.1) |
| Missing |  | 0 |  | 0 |  |
| **Smoking Status** |  |  |  |  |  |
| Never a Smoker |  | 379 | (48.3) | 366 | (50.2) |
| Current/Former Smoker |  | 406 | (51.1) | 363 | (49.8) |
| Missing |  | 1 |  | 4 |  |
|  |  |  |  |  |  |

a Defined as percentage of households in participant’s United States Census block group with income below poverty level

b Includes never married, separated, divorced, widowed

c Presence of depressive symptoms defined as self-report of doctor, nurse, or health professional diagnosis of depression and/or Center for Epidemiologic Studies Depression Scale score≥16

d Strong Ties Measure of Social Support; strong perceived social support defined as score≥19

e Pain Catastrophizing Scale Helplessness Subscale; high pain catastrophizing defined as score≥15

f Based on pressure-pain threshold (PPT); high pain sensitivity defined as PPT<4kg

**SUPPLEMENTAL TABLE 3**. Complete-Case Analysis of Univariable and Multivariable Associations between Sociodemographic and Clinical Factors (T2) and Opioid Use (T3) among Johnston County Osteoarthritis Project Participants

| **Participant Characteristica** |  | **Opioid Useb** | | **No Opioid Use** | |  | **Univariable Models** | | |  | **Multivariable Modelc** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **OR** | **(95% CI)** | **p-value** |  | **aOR** | **(95% CI)** | **p-value** |
| **Age (years), n (%)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 50–60 |  | 30 | (17.2) | 144 | (82.8) |  | **2.23** | **(1.22, 4.08)** | **0.009** |  | **2.52** | **(1.08, 5.88)** | **0.033** |
| 60–69 |  | 50 | (13.2) | 328 | (86.8) |  | 1.63 | (0.94, 2.82) | 0.079 |  | 1.70 | (0.87, 3.33) | 0.119 |
| ≥70 |  | 20 | (8.5) | 214 | (91.5) |  | ref. |  |  |  | ref. |  |  |
| **Sex, n (%)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Male |  | 24 | (9.3) | 235 | (90.7) |  | ref. |  |  |  | ref. |  |  |
| Female |  | 76 | (14.4) | 451 | (85.6) |  | **1.65** | **(1.02, 2.68)** | **0.043** |  | 1.27 | (0.72, 2.24) | 0.406 |
| **Race, n (%)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| White |  | 65 | (11.9) | 480 | (88.1) |  | ref. |  |  |  |  |  |  |
| Black |  | 35 | (14.5) | 206 | (85.5) |  | 1.26 | (0.81, 1.95) | 0.315 |  |  |  |  |
| **Body Mass Index, n (%)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| < 30 kg/m2 |  | 28 | (7.9) | 328 | (92.1) |  | ref. |  |  |  | ref. |  |  |
| ≥ 30 kg/m2 |  | 72 | (16.7) | 358 | (83.3) |  | **2.36** | **(1.49 , 3.74)** | **<0.001** |  | 1.59 | (0.95, 2.67) | 0.079 |
| **Educational Attainment, n (%)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ≥ 12 years |  | 82 | (12.1) | 594 | (87.9) |  | ref. |  |  |  |  |  |  |
| < 12 years |  | 18 | (17.1) | 87 | (82.9) |  | 1.50 | (0.86, 2.62) | 0.155 |  |  |  |  |
| **Employment Status, n (%)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Employed/Retired |  | 75 | (10.9) | 612 | (89.1) |  | ref. |  |  |  | ref. |  |  |
| Unemployed |  | 25 | (26.3) | 70 | (73.7) |  | **2.92** | **(1.74, 4.88)** | **<0.001** |  | 1.31 | (0.65, 2.62) | 0.453 |
| **Household Poverty Rate,d n (%)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <12% |  | 30 | (10.1) | 266 | (89.9) |  | ref. |  |  |  |  |  |  |
| 12%–24% |  | 51 | (13.4) | 329 | (86.6) |  | 1.37 | (0.85, 2.22) | 0.193 |  |  |  |  |
| ≥25% |  | 19 | (17.3) | 91 | (82.7) |  | 1.85 | (0.99, 3.45) | 0.052 |  |  |  |  |
| **Marital Status, n (%)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Married |  | 53 | (10.8) | 440 | (89.2) |  | ref. |  |  |  |  |  |  |
| Unmarriede |  | 41 | (15.6) | 222 | (84.4) |  | 1.53 | (0.99, 2.38) | 0.056 |  |  |  |  |
| **Depressive Symptoms,f n (%)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| No |  | 56 | (9.1) | 561 | (90.9) |  | ref. |  |  |  | ref. |  |  |
| Yes |  | 44 | (27.8) | 114 | (72.2) |  | **3.87** | **(2.48, 6.02)** | **<0.001** |  | **2.00** | **(1.17, 3.43)** | **0.012** |
| **Perceived Social Support,g n (%)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Strong |  | 39 | (9.5) | 371 | (90.5) |  | ref. |  |  |  | ref. |  |  |
| Moderate/Poor |  | 56 | (15.9) | 296 | (84.1) |  | **1.80** | **(1.16, 2.78)** | **0.008** |  | 1.24 | (0.76, 2.04) | 0.385 |
| **Pain Catastrophizing,h n (%)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Normal |  | 47 | (8.6) | 502 | (91.4) |  | ref. |  |  |  | ref. |  |  |
| High |  | 51 | (23.1) | 170 | (76.9) |  | **3.20** | **(2.08, 4.94)** | **<0.001** |  | **2.17** | **(1.33, 3.56)** | **0.002** |
| **Pain Sensitivity,i n (%)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Normal |  | 59 | (10.5) | 503 | (89.5) |  | ref. |  |  |  |  |  |  |
| High |  | 35 | (18.0) | 159 | (82.0) |  | **1.88** | **(1.19, 2.96)** | **0.007** |  | 1.24 | (0.72, 2.13) | 0.436 |
| **Health Insurance, n (%)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Private |  | 30 | (8.9) | 307 | (91.1) |  | ref. |  |  |  | ref. |  |  |
| Public |  | 46 | (18.0) | 209 | (82.0) |  | **2.25** | **(1.38, 3.69)** | **0.001** |  | 1.38 | (0.78, 2.46) | 0.270 |
| Uninsured |  | 22 | (12.3) | 157 | (87.7) |  | 1.43 | (0.80, 2.57) | 0.225 |  | 1.26 | (0.63, 2.49) | 0.513 |
| **Polypharmacy, n (%)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 0–4 Medications |  | 26 | (6.7) | 360 | (93.3) |  | ref. |  |  |  | ref. |  |  |
| ≥5 Medications |  | 74 | (18.5) | 326 | (81.5) |  | **3.14** | **(1.96, 5.04)** | **<0.001** |  | **2.16** | **(1.24, 3.77)** | **0.007** |
| **Smoking Status, n (%)** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Never a Smoker |  | 50 | (13.2) | 329 | (86.8) |  | ref. |  |  |  |  |  |  |
| Current/Former Smoker |  | 50 | (12.3) | 256 | (87.7) |  | 0.92 | (0.61, 1.41) | 0.713 |  |  |  |  |

Abbreviations: aOR=adjusted odds ratio, CI=confidence interval, OR=odds ratio

a All percentages are row percentages, out of the total number of participants within the category of each characteristic

b Medication names for prescription or over-the-counter drugs used on a regular or as-needed basis were reviewed for generic and brand name opioids (codeine, fentanyl, hydrocodone, hydromorphone, meperidine, methadone, morphine, oxycodone, oxymorphone, tramadol)

c Multivariable logistic regression model included all variables significantly associated with opioid use in univariable models; n=53 participants were excluded due to missing data for at least one variable

d Defined as percentage of households in participant’s United States Census block group with income below poverty level

e Includes never married, separated, divorced, widowed

f Presence of depressive symptoms defined as self-report of doctor, nurse, or health professional diagnosis of depression (n=120) and/or Center for Epidemiologic Studies Depression Scale score≥16 (n=76)

g Strong Ties Measure of Social Support; strong perceived social support defined as score≥19

h Pain Catastrophizing Scale Helplessness Subscale; high pain catastrophizing defined as score≥15

i Based on pressure-pain threshold (PPT); high pain sensitivity defined as PPT<4kg

**SUPPLEMENTAL TABLE 4**. Sensitivity Analysis of Multivariable Associations between Sociodemographic and Clinical Factors (T2) and Opioid Use (T3)a among Johnston County Osteoarthritis Project Participants (n=786)b

| **Participant Characteristic** |  | **Multivariable Modelc** | | |
| --- | --- | --- | --- | --- |
|  | **aOR** | **(95% CI)** | **p-value** |
| **Age (years)** |  |  |  |  |
| 50–60 |  | **2.32** | **(1.05, 5.13)** | **0.037** |
| 60–69 |  | 1.39 | (0.75, 2.57) | 0.293 |
| ≥70 |  | ref. |  |  |
| **Sex** |  |  |  |  |
| Male |  | ref. |  |  |
| Female |  | 1.16 | (0.67, 2.02) | 0.600 |
| **Body Mass Index** |  |  |  |  |
| < 30 kg/m2 |  | ref. |  |  |
| ≥ 30 kg/m2 |  | 1.52 | (0.92, 2.51) | 0.103 |
| **Employment Status** |  |  |  |  |
| Employed/Retired |  | ref. |  |  |
| Unemployed |  | 1.06 | (0.54, 2.07) | 0.872 |
| **Depressive Symptomsd** |  |  |  |  |
| No |  | ref. |  |  |
| Yes |  | **1.77** | **(1.04, 3.01)** | **0.034** |
| **Perceived Social Supporte** |  |  |  |  |
| Strong |  | ref. |  |  |
| Moderate/Poor |  | 1.22 | (0.75, 1.98) | 0.424 |
| **Pain Catastrophizingf** |  |  |  |  |
| Normal |  | ref. |  |  |
| High |  | **2.06** | **(1.27, 3.33)** | **0.003** |
| **Pain Sensitivityg** |  |  |  |  |
| Normal |  |  |  |  |
| High |  | 1.95 | (0.66, 1.95) | 0.652 |
| **Health Insurance** |  |  |  |  |
| Private |  | ref. |  |  |
| Public |  | 1.50 | (0.87, 2.60) | 0.143 |
| Uninsured |  | 1.25 | (0.63, 2.45) | 0.527 |
| **Polypharmacy** |  |  |  |  |
| 0–4 Medications |  | ref. |  |  |
| ≥5 Medications |  | **1.94** | **(1.14, 3.30)** | **0.014** |
| **Painh** |  |  |  |  |
| No |  | ref. |  |  |
| Yes |  | **2.15** | **(1.25, 3.70)** | **0.006** |

Abbreviations: aOR=adjusted odds ratio, CI=confidence interval

a Medication names for prescription or over-the-counter drugs used on a regular or as-needed basis were reviewed for generic and brand name opioids (codeine, fentanyl, hydrocodone, hydromorphone, meperidine, methadone, morphine, oxycodone, oxymorphone, tramadol)

b Data analyzed were multiply imputed to estimate missing baseline T2 variables

c Multivariable logistic regression model included all variables significantly associated with opioid use in univariable models

d Presence of depressive symptoms defined as self-report of doctor, nurse, or health professional diagnosis of depression and/or Center for Epidemiologic Studies Depression Scale score≥16

e Strong Ties Measure of Social Support; strong perceived social support defined as score≥19

f Pain Catastrophizing Scale Helplessness Subscale; high pain catastrophizing defined as score≥15

g Based on pressure-pain threshold (PPT); high pain sensitivity defined as PPT<4kg

h Self-reported presence of any pain in knee, hip, and/or low back