An Employer-Sponsored Musculoskeletal Care Coordination Service Can Improve Clinical Outcomes and Self-Reported Productivity

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Objective: To evaluate the effects of participation with a novel musculoskeletal care coordination service on clinical outcomes, self-reported productivity, and satisfaction. Methods: Prospective analysis of participants using the service from January 1, 2019 to December 31, 2019. Results: One hundred eighty nine participants were enrolled; 80 participants completed their recommended clinical pathway. Low back pain was the most common musculoskeletal issue (N = 86, 46%). 48 participants (28%) were referred to their EAP. Only 30 participants (16%) required a medical referral. Engagement was associated with improvements in pain, physical function, mood, and self-reported productivity (P < 0.01). The net promoter score for this service was 95. Conclusions: Employers with populations for whom musculoskeletal complaints are common might benefit from integrating a musculoskeletal care coordination service in their benefits offering.

Keywords: care coordination, musculoskeletal care, occupational health, physical medicine

BACKGROUND

Approximately one third of US adults suffer from musculoskeletal complaints—one of the most common reasons for outpatient visits.1,2 The direct costs associated with musculoskeletal conditions are among the highest in healthcare with costs for low back pain alone accounting for $96B annually.3 Given that musculoskeletal pain is the second leading cause of workplace absenteeism resulting in approximately 290 million lost workdays annually,3 employers bear a large share of costs associated with musculoskeletal conditions.

Thus, employers are increasingly seeking solutions that provide their employees with rapid access to high quality musculoskeletal care.1,5 A potential for serving this need—especially during the COVID-19 pandemic when patients may be reluctant to receive care outside of their homes—includes early access to home exercise programs and physical therapy. Historically, early access to this care has been associated with significant improvements in clinical outcomes at lower cost (from fewer surgeries, imaging, and invasive procedures).6,7 For patients who are not candidates for home exercise or physical therapy, triage to higher levels of care is a necessary component of a comprehensive musculoskeletal care pathway.

The purpose of this study was to evaluate a novel musculoskeletal care coordination service that attempts to engage employees in their course of musculoskeletal pain and guide them through an evidence-based, cost-effective care journey. This service has not been rigorously evaluated in the employer setting. Thus, our specific objective was to provide an evaluation of a pilot of the musculoskeletal care coordination service in an urban population of adult employees with either acute or chronic musculoskeletal complaints. We hypothesized that engagement with the service would result in improvements in three key outcomes: clinical outcomes (pain, physical function, and mood), workplace productivity, and participant satisfaction.

METHODS

Participants

Eligible participants were recruited by email and at employer-sponsored ergonomic and health events. We included all participants enrolled in the Risalto musculoskeletal care coordination service from January 1 to December 31, 2019. These participants were adult Comcast NBCUniversal employees and their dependents (age ≥18 y) living in the Philadelphia metropolitan area with self-identified knee, hip, back, or other musculoskeletal complaints.

Intervention and Data Collection

The service is provided by care coordinators who are certified health and wellness coaches with at least four years of experience. Before interacting with participants, they received an intensive 6-week training on the biopsychosocial model of musculoskeletal care (which involves approaching patients’ pain experience and biomechanics in a supportive environment that encourages movement and active therapy), clinical practice guidelines for musculoskeletal care; coaching modules on topics such as goal setting, activity and sleep counseling, coping with pain, and relaxation exercises; use of the care coordination technology that structures both the patient questions and the development of the care plan; referral management processes; and follow-up protocols.

In the recruitment materials, participants were given a phone number and access to an online portal to schedule an initial
consultation with a musculoskeletal care coordinator who screened them for eligibility in the pilot. Eligible participants were then given a baseline assessment during which they were asked to provide structured data specific to their musculoskeletal complaint including site of musculoskeletal pain; duration and severity of symptoms; symptoms consistent with depression or anxiety; pain (on a Likert scale where 1 was rated as “no pain at all” and 10 was rated as “the worst pain imaginable”); impact of pain on physical functioning (on a Likert scale of 1 was rated as “no interference with general day-to-day activity” and 10 was rated as “completely unable to do day-to-day activity”). Participants were also asked about their treatment preferences (eg, willingness to engage in home exercise, seeking a recommendation for a neurosurgeon or imaging center, willingness to accept a referral to the Comcast NBCUniversal Employee Assistance Program [EAP] for behavioral health support).

The specific baseline assessment questions varied by clinical scenario and were all taken from validated questionnaires (eg, general issues were measured by questions from the validated PROMIS). Low back pain questions were taken from the Oswestry, hip pain questions were taken from the HOOS, IR, and knee pain questions were taken from the KOOS. Participants flagged as moderate or high risk for a behavioral health issue or on the PROMIS were asked additional behavioral health questions taken from the PHQ-9 and GAD-7 for depression and anxiety respectively. Care coordinators used the data from the baseline assessment to rule out “red flags” suggestive of a serious condition (eg, history of cancer, significant neurological findings, bowel or bladder compromise, history of surgery). If a red flag was present, participants were referred for an urgent specialist consultation.

On the basis of these data, participants were triaged into the relevant care pathway (eg, home exercise, referral for physical therapy, referral for physical therapy). Care pathways were based on well-established clinical guidelines and a rigorous review of the evidence for each clinical condition (eg, for low back pain, hip pain, knee pain,19,25 knee pain18,25). Each participant was paired with a care coordinator who was responsible for that participant’s journey through their care plan. They followed participants at least weekly (but sometimes as often as daily) until 1 month after their graduation from their care pathway via secure text or phone to assess their condition-specific clinical status questions were asked weekly. Regardless of pathway, participants were also offered coaching for pain management, stress reduction, sleep management, cognitive reframing and coping strategies, activity pacing, relaxation exercises, weight loss, and goal setting. During each follow-up visit, care plans were updated based on clinical progress. Participants who did not engage in follow-up visits were contacted by their preferred means (telephone, text, email) three times over a two week period with encouragement to re-engage.

The outcomes of interest for each participant included: 1) engagement (measured both as the proportion of participants who adopted at least one recommended action [eg, start a home exercise program] and the proportion of participants who completed their expected care plan); 2) clinical outcomes (ie, change in pain, functional status, and mood scores); 3) productivity (measured using a single item from the Workplace Presenteeism and Absenteeism Inventory [WPAI]) that asked on a 0 to 10 visual analog scale: “During the past seven days, how much did your musculoskeletal pain affect your productivity while you were working?” where 0 represented “no effect on my work” and 10 represented “completely prevented me from working”; and 4) participant satisfaction (measured on a 5-point Likert scale where 1 is “completely dissatisfied” and 5 is “completely satisfied” and with a single item Net Promoter Score [NPS] that asked participants to rate, on a scale from −100 to +100, “How likely is it that you would recommend the Risalto service to a friend or colleague?”).55

Quality Review

All participant baseline calls were reviewed by senior clinical staff within 48 hours. Additionally, participants reporting severe clinical symptoms (eg, severe pain, reporting suicidality on the PHQ9) were immediately connected to the appropriate care provider (eg, the EAP) and flagged for urgent review by senior clinical staff.

Cost to Participants

Participants did not incur incremental costs associated with the care coordination service and did not receive any incentives for study participation. The home exercise program and coaching by care coordinators were provided at no cost to participants. Participants treated their healthcare benefits for physical therapy, imaging, and specialist visits (for participants in their deductible or co-insurance phases of their benefits, this would have resulted in out-of-pocket expenses).

Statistical Methods

We used univariate analyses to describe the outcomes of interest for participants in each of the care pathways. We compared outcomes at baseline and graduation with paired t-tests and considered values < 0.05 to be statistically significant. To evaluate the association among the outcomes of interest we calculated Pearson correlation coefficients and MANOVA. This protocol received IRB approval (AspireIRB Protocol Number XORisalto001, December 20, 2018). We conducted all statistical analyses in Excel v16.37.

RESULTS

Two hundred sixty-nine participants were screened and 189 met inclusion criteria and completed their baseline assessment. Table 1 presents the demographic and clinical characteristics of these 189 participants. Participants’ mean age was 43.1 years (SD

| Characteristic | Mean (SD) or % (N) |
|---------------|-------------------|
| Age (y)       | 43.1 (10.7)       |
| Engagement stage at end of evaluation period | |
| Still on care pathway | 22.2% (N = 42) |
| Completed care plan | 28.6% (N = 54) |
| Withdraw | 2.6% (N = 5) |
| Ineligible for Risalto service (primary workplace injury, referred to workers’ compensation program) | 2.1% (N = 4) |
| Lost to follow-up (some progress confirmed) | 23.8% (N = 45) |
| Lost to follow-up | 20.6% (N = 39) |
| Body part affected | |
| Low back | 45.5% (N = 86) |
| Knee | 18.5% (N = 35) |
| Neck | 11.6% (N = 22) |
| Hip | 7.9% (N = 15) |
| Shoulder | 5.3% (N = 10) |
| Other | 11.1% (N = 21) |
| Weeks to graduation from care pathway | |
| Neck | 13.8 (SD 12.9) (N = 8) |
| Low back | 10.5 (SD 9.0) (N = 19) |
| Knee | 13.8 (SD 9.1) (N = 16) |
| Other | 11.0 (SD 6.4) (N = 6) |
| Hip | 10.4 (SD 5.1) (N = 5) |
| Overall | 12.0 (SD 9.0) (N = 54) |

*Some participants who were lost to follow-up had progressed on their care plan (eg, accepted a referral to a specialist).
The vast majority of participants (95%) took at least one recommendation made by their care coordinator. Among those participants who did not take a recommended action, many reported that they would schedule an appointment with a recommended provider themselves; however, the extent to which that happened could not be verified.

On average, participants completed their care pathway in 16.9 (SD 9.9) weeks (Table 1). Hip pain patients tended to graduate from their care pathways most quickly and the neck and low back pain patients required longer treatment periods.

**Clinical Outcomes**

**Pain**

Among the 54 participants who completed their care plan, 37 provided both baseline and final pain assessments (range 1–10; a change of greater than 1 can be considered to be clinically relevant). Their baseline pain score decreased from 4.2 (SD 1.4) to 2.2 (SD 1.9) (Fig. 2A). Thirty-one participants (84%) had a change in their pain score of greater than 1, indicating a clinically relevant improvement.

**TABLE 2.** Care Pathway by Body Part Affected

| Initial Care Pathway | Overall Population (N = 189) | Lower Back (N = 86) | Knee (N = 35) | Neck (N = 22) | Hip (N = 15) | Shoulder (N = 10) | Other (N = 21) |
|----------------------|-----------------------------|---------------------|--------------|--------------|-------------|------------------|---------------|
| Home exercise        | 46.6% (N = 88)              | 41.9% (N = 36)      | 54.3% (N = 19) | 54.5% (N = 12) | 66.7% (N = 10) | 40.0% (N = 4) | 33.3% (N = 7)   |
| Physical therapy     | 31.2% (N = 59)              | 38.4% (N = 33)      | 28.6% (N = 10) | 18.2% (N = 4)  | 26.7% (N = 4)  | 30.0% (N = 3) | 23.8% (N = 5)   |
| Orthopedic referral  | 5.2% (N = 10)               | 1.2% (N = 1)        | 14.3% (N = 5)  | 4.5% (N = 1)   | 0.0% (N = 0)   | 10.0% (N = 1) | 9.5% (N = 2)    |
| Primary care referral| 2.1% (N = 4)                | 2.3% (N = 2)        | 0.0% (N = 0)   | 4.5% (N = 1)   | 0.0% (N = 0)   | 0.0% (N = 0) | 4.8% (N = 1)    |
| Physical medicine referral | 8.5% (N = 16)         | 16.3% (N = 14)      | 2.9% (N = 1)   | 0.0% (N = 0)   | 0.0% (N = 0)   | 10.0% (N = 1) | 0.0% (N = 0)    |
| Additional behavioral health referral to EAP | 24.9% (N = 47) | 27.9% (N = 24) | 20.0% (N = 7) | 31.8% (N = 7) | 20.0% (N = 3) | 50.0% (N = 5) | 4.8% (N = 1) |
| Exception†          | 2.1% (N = 4)               | 0.0% (N = 0)        | 0.0% (N = 0)   | 18.2% (N = 4)  | 0.0% (N = 0)   | 0.0% (N = 0) | 0.0% (N = 0)    |
| Other†              | 4.2% (N = 8)               | 0.0% (N = 0)        | 0.0% (N = 0)   | 0.0% (N = 0)   | 6.7% (N = 1)   | 10.0% (N = 1) | 28.6% (N = 6)   |

*EAP, employee assistance program.
†Participants who reported behavioral health symptoms were referred to their EAP in addition to their primary musculoskeletal pathway.
‡Exception refers to those participants who were not eligible for Risalto services and referred out for other care.
§Other refers to a non-standard care pathway (eg, for ankle or other body part for which there was not a standard pathway).
pain score of 1 or more. Three participants (8%) had no change in their pain scores. Three participants (8%) had higher final pain scores than at baseline but reported qualitative improvement, considered the pain to be well controlled, and requested that they be graduated from the program.

**Physical Function**

Among the 54 participants who completed their care plan, 15 provided both baseline and final physical functioning scores (range 1–10; a change of greater than 1 can be considered to be clinically relevant). Their average physical functioning score improved from

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**FIGURE 2.** Clinical outcomes among participants who completed their care plan. (A) Change in average pain scores from baseline to program completion by care pathway. (B) Change in average physical function scores from baseline to program completion by care pathway. (C) Change in average mood scores from baseline to program completion by care pathway.
behavioral health issues were conducted to determine if the participants had a greater impairment to productivity at their final assessment (including their care plan and five other participants indicated some workplace presenteeism and absenteeism inventory).

Workplace presenteeism and absenteeism inventory. were working?'' where 0 represents "no effect on my work" and did your musculoskeletal pain affect your productivity while you 10 visual analog scale: "During the past seven days, how much improvement in pain was associated with improvement in physical

improvements in pain, physical function, and mood. This finding of patient satisfaction.36 All participants included in this evaluation chose to work with their employer-sponsored care coordinator. This self-selection may have contributed to the excellent reported satisfaction with their experience.

The limitations of this evaluation include relatively small sample sizes for some of the care pathways, especially among those

Participants were highly satisfied with their care. The NPS of 95 compares highly favorably with other healthcare entities (eg, CVS Health [-10], Cigna [-1], Walgreens [25], Kaiser Healthcare).37 All participants included in this evaluation chose to work with their employer-sponsored care coordinator. This self-selection may have contributed to the excellent reported satisfaction with their experience.

Third, access to this musculoskeletal care coordination service was associated with improvements in self-reported workplace productivity. Not surprisingly productivity improved in concert with improvements in pain, physical function, and mood. This finding warrants further exploration both with more detailed self-reported absenteeism and presenteeism measures and with direct measurement of workplace productivity.

Finally, participants were highly satisfied with their care. The NPS of 95 compares highly favorably with other healthcare entities (eg, CVS Health [-10], Cigna [-1], Walgreens [25], Kaiser Healthcare).37 All participants included in this evaluation chose to work with their employer-sponsored care coordinator. This self-selection may have contributed to the excellent reported satisfaction with their experience.

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TABLE 3. ANOVA of Outcomes of Interest

| SUMMARY | | | | |
| --- | --- | --- | --- | |
| Groups | Count | Sum | Average | Variance |
| --- | --- | --- | --- | --- |
| Age | 49 | 2013.9 | 41.1 | 114.8 |
| Total SMS sent to coach | 49 | 1,151 | 23.5 | 403.6 |
| Change in pain | 45 | -76 | -1.7 | 3.4 |
| Change in mood | 21 | -25 | -1.2 | 11.3 |
| Change in physical function | 21 | -18 | -0.9 | 12.6 |
| Change in productivity | 34 | -15 | -0.4 | 4.1 |

ANOVA

Source of Variation | SS | df | MS | F | P-Value | F crit |
| --- | --- | --- | --- | --- | --- | --- |
| Between groups | 68,039.8 | 5 | 13,608.0 | 113.0 | <0.01 | 2.3 |
| Within groups | 25,648.2 | 213 | 120.4 |
| Total | 93,688.0 | 218 |
completing the program. Moreover, the rate of loss to follow-up was relatively high, potentially skewing the results in favor of the coordination service. Although the clinical outcomes were all based on items from validated instruments, the lack of data from complete scales prevented comparisons to outcomes previously reported in the literature. We recommend that a future evaluation of this program use validated instruments in their entirety, at least for a selected population (eg, low back pain patients) using the service. In addition, claims-based analyses might facilitate a more complete understanding of whether participants took the referral recommendations made by this service.

These results suggest that employers with populations in whom musculoskeletal complaints are common might benefit from integrating a musculoskeletal care coordination service in their benefits offering.

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