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The Impact of a Therapy Managed Referral Process on a Work Rehabilitation Program

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Introduction

Managed care has been a term that has been introduced in the healthcare landscape to support better patient health outcomes and decrease overall costs. The goal of a managed care healthcare system is to reduce costs while keeping quality at a premium level [1]. Managed care is typically the referral process in which all aspects of care are kept in the same system to reduce overall costs associated with a patient's diagnosis or overall care [2]. The use of these systems has been found to be beneficial, but controversy exists regarding the overall care management system.

Work rehabilitation is defined as a wide variety of programs and interventions structured to assist an injured worker to return to work in a timely manner. Work rehabilitation programs have varied definitions and structures; however, many have multiple disciplines and emphasize cardiovascular endurance, strengthening, and functional lifting tasks related to the patient's job demands [3]. The use of these programs has been validated and shown to achieve the desired outcome of returning an individual to work with a high level of success [3]. The programs are typically multi- or inter-disciplinary and involve a variety of clinicians to support an effective and efficient return to work for these injured workers.

One of the challenges to achieving success for a patient in a work rehabilitation program is the timing and coordination of the patient starting the program after the outpatient therapy rehabilitation period. Timing is important and lag time versus early intervention in care is important to understand when evaluating factors in the ability of the patient to return to work. For example, a worker who waits more than two weeks to submit an injury to a claims adjuster has a longer disability length than a patient who submits a claim within a few days [4]. Furthermore, disability time is increased by at least two and a half weeks if the patient seeking medical attention waited for greater than two weeks after injury compared to the same patient receiving medical care within the first week of the injury [5]. Hoesfmit, Houkes & Nijhuis found that interventions completed within the first six weeks support patients back to work in a wide variety of groups [6]. In addition, time off from work has also been studied as a predictive component in influencing successful return to work. More specifically, Crook & Moldofsky identified that if a worker has not returned to work by three months, they only have a 50 percent chance of working at 15 months post-injury [7].

Prior studies support the use of a referral process for other aspects of health care. One model emphasizing a multidisciplinary approach to the management of cystic fibrosis found a statistically significant screening rate for comorbidities of endocrine diseases, with automatic referrals being placed when patients met certain criteria [8]. These patients demonstrated improvement in their outcomes for their cystic fibrosis [8]. Another study identified improved costs and a decreased mortality rate when utilizing a multidisciplinary heart failure clinic compared to standard care, as multiple team members were able to collaborate and triage appropriate care [9]. The use of a multidisciplinary clinic for early referrals was also identified in the literature with chronic kidney disease with improved outcomes noted [10]. An automatic referral system utilized in the palliative care system was also believed to have value by numerous healthcare panelists and was identified as a catalyst of change to healthcare policy [11]. Previous literature also suggests patients may not participate in certain types of healthcare programs due to providers not making a referral when appropriate [12,13]. Currently, there is limited research explaining the managed care of the work rehabilitation process including timing of work rehabilitation within the worker's recovery and how timing influences the worker's ability to return to work. In conjunction, there is no evidence supporting a referral process nor the best route to identify patients who would benefit from a work rehabilitation program and generate those referrals. Therefore, the current study aimed to answer the following research questions:

- How does a therapy managed referral process affect the outcomes of a work rehabilitation program?
- How does a therapy managed referral process affect the overall length of care of a work rehabilitation program?
- How does a therapy managed referral process affect the overall patient volume of a work rehabilitation program?

It was predicted that the therapy managed referral process would have a minimal effect on the number of work rehabilitation program visits, return to work status, and percentage of job demands met. It was also hypothesized that the number of acute visits prior to admission in a work rehabilitation program, the number of days between surgery and the work rehabilitation program admission, and the number of days between injury and the work rehabilitation program admission would all decrease. Finally, an increase was expected in the patient volume of a work rehabilitation program after implementing the therapy managed referral process.

Methods

A therapy managed referral process for the work rehabilitation program was implemented at the beginning of 2019. The therapy managed referral process included an interdisciplinary team including physical and occupational therapists in the outpatient clinic, and physical and occupational therapists in the work rehabilitation program, who assisted in identifying patients. The therapy managed process consisted of the work rehabilitation therapists meeting monthly to discuss future potential work rehabilitation program candidates by reviewing patients charts who had initial evaluations from the previous month who had worker’s compensation as the payor source. The first point of contact was with the outpatient physical and occupational therapists to determine the need for work rehabilitation, when appropriate, in the plan of care for the patient. Following this confirmation of the need for work rehabilitation, the patient was added to a database, and follow-up occurred monthly with the treating therapist to determine the ongoing need for care and to facilitate the transition into the work rehabilitation program based on the referring physicians’ protocol in an efficient manner. The collaborative discussions included deciding the appropriateness of the patient transitioning to the program and, if found appropriate to transition, determining the timing of the transition to the work rehabilitation program.

Often, work rehabilitation therapists would also use these collaborative discussions to build relationships with other team members and advocate for the best patient outcomes by describing the benefits of an earlier transition to the program versus no further treatment or delayed work rehabilitation admission. The work rehabilitation team also kept a shared database to review and check in on the initiation process of the work rehabilitation program to ensure accountability, an efficient transition, and improved outcomes for the patient.

This study included a retrospective analysis of 346 patients treated between 2017 through 2020 (2017 = 87 patients, 2018 = 80 patients, 2019 = 96 patients, 2020 = 83 patients) who were admitted to the work rehabilitation program. Patients were referred using the old referral process from 2017-2018 and from 2019-2020, patients were referred using the new therapy-managed referral process. Demographic variables collected included age, gender, and race. Clinical characteristics collected included the following: injury type (upper extremity, lower extremity, and spine), surgery (yes/no), number of visits, number of acute visits, number of days from injury to program entry, number of days from surgery to program entry, return to work status (working vs. not working), and percentage of job demands met upon discharge from the program. Further details of the study population’s demographic and clinical characteristics are summarized in (Table 1).

Characteristic	Total n (%)	Old Process	New Process	P-value
Race		167 (48.3)	179 (51.7)	0.519
Asian	3 (0.9)	2 (1.2)	1 (0.6)	
African American	8 (2.3)	3 (1.8)	5 (2.8)	
Caucasian	282 (81.5)	144 (86.2)	138 (77.1)	
Hispanic / Latino	45 (13.0)	15 (9.0)	30 (16.8)	
Other	8 (2.3)	3 (1.8)	5 (2.8)	
Gender				0.036
Male	236 (68.2)	123 (73.7)	113 (63.1)	
Female	110 (31.8)	44 (26.3)	66 (36.9)	
Injury Type				0.101
Upper Extremity	256 (74.0)	131 (78.4)	125 (69.8)	
Lower Extremity	54 (15.6)	19 (11.4)	35 (19.6)	
Spine	36 (10.4)	17 (10.2)	19 (10.6)	
Surgery	275 (79.5)	138 (82.6)	137 (76.5)	0.16
Age in years, median (IQR)	43.0 (21.0)	43.5 (21.0)	43.0 (21.0)	0.943
Days in Program (# of visits), median (IQR)	11.0 (8.0)	11.0 (7.0)	11.0 (10.0)	0.883
Number of Acute Visits, median (IQR)	18.0 (14.0)	17.0 (14.0)	19.0 (15.0)	0.765
Days from Injury to Program, median (IQR)	187 (175)	200 (167)	172 (184)	0.378
Days from Surgery to Program, median (IQR)	121 (62)	126 (68)	114.5 (64)	0.055
Return to Work Status				0.214
Not Working	40 (11.6)	23 (13.8)	17 (9.5)	
Working	306 (88.4)	144 (86.2)	162 (90.5)	
% Job Demands Met Upon Discharge, median (IQR)	100.0 (0.0)	100.0 (8.3)	100.0 (0.0)	0.199

Table 1: Characteristics of the Study Population (N = 346).

The Shapiro-Wilk test was used to check normality for the distribution of the continuous variables, and all were non-normally distributed. Descriptive and frequency statistics were used to summarize the characteristics of the study population. Median and range are reported for the non-normally distributed variables. A Mann-Whitney U test was used to compare outcomes for the old and new referral processes. A Chi-Square Test was used to determine group differences between the old and new referral processes for categorical variables. Regression analysis was performed to evaluate the relationship between the referral process (old/new), age, gender, race (Caucasian/Other), type of injury, surgery and four outcomes (number of visits, number of acute visits, number of days from injury to program entry, and number of days from surgery to program entry). The surgery variable was removed from the model prior to conducting the regression analysis for days from surgery to program entry (only applicable for surgical cases). A p-value of ≤ 0.05 was considered statistically significant.

Statistical Analysis

The statistical analysis was performed using SPSS statistical software (version 25; IBM Corp., Armonk, NY).

Ethics Statement

The Institutional Review Board at Advocate Aurora Health (AAH) reviewed and determined that this study was intended to improve the quality of care at AAH and did not constitute human subject research; therefore, this study was exempt from approval and did not require IRB oversight.

Results

As predicted, the therapy managed referral process did not have a significant impact on the number of work rehabilitation program visits ($p = 0.883$), return to work status ($p = 0.214$), nor the percentage of job demands met ($p = 0.199$) upon discharge from the program.

Contrary to what was hypothesized, the number of acute therapy visits prior to participation increased from the old referral process (median = 17) to the new therapy process (median = 19); however, this difference was not statistically significant ($p = 0.765$). The number of days from the injury to admission into the work rehabilitation program decreased from the old referral process (median = 200) to the new referral process (median = 172), but the difference was not found to be significant ($p = 0.378$). Similarly, for the patients who had to undergo a surgical procedure, the number of days from surgery to admission into the work rehabilitation program decreased from the old referral process (median = 126) to the new referral process (median = 114.5), but the difference did not quite reach statistical significance ($p = 0.055$).

As expected, (Table 1) shows an increase in patient volume when comparing the old referral process ($n = 167$) to the new referral process ($n = 179$); however, this difference was not statistically significant ($p = 0.519$). Surprisingly, there was an unanticipated statistically significant improvement in gender differences when comparing the old and new referral processes, with a greater percentage of females being referred to the work rehabilitation program after implementing the new referral process (36.9% vs. 26.3%, $p = 0.036$).

A multiple regression was run to predict the number of visits from the referral process (old/new), age, gender, race (Caucasian/Other), type of injury, and surgery (Table 2). The analysis resulted in a significant model, adjusted $R^2 = 0.064$, $F = 4.34$, $p < 0.001$. However, of the predictors investigated, only surgery ($B = 3.855$, $p < 0.001$) and spine injury ($B = 4.794$, $p < 0.001$) had a unique significant relationship with the number of visits. Additionally, a multiple regression was run to predict the number of acute visits from the referral process (old/new), age, gender, race (Caucasian/Other), type of injury, and surgery (Table 3). The analysis resulted in a significant model, adjusted $R^2 = 0.121$, $F = 7.65$, $p < 0.001$. Of the predictors investigated, only surgery ($B = 7.773$, $p < 0.001$), lower extremity injury ($B = 4.263$, $p = 0.019$), and spine injury ($B = -4.736$, $p = 0.031$) had a unique significant relationship with the number of acute visits.

Variable	Unstandardized Coefficient	SE	P-value
Constant	6.504		
New Referral Process	0.399	0.739	0.59
Caucasian [†]	1.512	0.952	0.113
Male	0.948	0.789	0.231
Age	-0.002	0.03	0.946
Surgery	3.855	0.961	<0.001
Lower Extremity Injury	1.975	1.029	0.056
Spine Injury	4.794	1.26	<0.001
Model Summary: $R^2 = 0.083$, Adjusted $R^2 = 0.064$, $F = 4.34$, $p < 0.001$; $n = 345$; [†] 0 = Other, 1 = Caucasian.			

Table 2: Regression Analysis for Number of Visits.

Variable	Unstandardized Coefficient	SE	P-value
Constant	11.379		
New Referral Process	0.543	1.291	0.675
Caucasian [†]	-3.019	1.688	0.075
Male	-0.592	1.381	0.668
Age	0.094	0.052	0.073
Surgery	7.773	1.675	<0.001
Lower Extremity Injury	4.263	1.804	0.019
Spine Injury	-4.736	2.185	0.031
Model Summary: $R^2 = 0.140$, Adjusted $R^2 = 0.121$, $F = 7.65$, $p < 0.001$; $n = 338$, [†] 0 = Other, 1 = Caucasian.			

Table 3: Regression Analysis for Number of Acute Visits.

Furthermore, a multiple regression was run to predict the number of days from injury to program entry from the referral process (old/new), age, gender, race (Caucasian/Other), type of injury, and surgery (Table 4). The analysis resulted in a significant model, adjusted $R^2 = 0.036$, $F = 2.83$, $p = 0.007$. However, of the predictors investigated, only surgery ($B = 191.182$, $p = 0.001$) had a unique significant relationship with the number of days from injury to program entry. Lastly, a multiple regression was run to predict the number of days from surgery to program entry from the referral process (old/new), age, gender, race (Caucasian/Other), and type of injury (Table 5). The model was not statistically significant, adjusted $R^2 = -0.006$, $F = 0.75$, $p = 0.611$, and none of variables were significant predictors of the number of days from surgery to program entry.

Variable	Unstandardized Coefficient	SE	P-value
Constant	-7.887		
New Referral Process	5.254	42.58	0.902
Caucasian [†]	-2.62	54.779	0.962
Male	-71.571	45.436	0.116
Age	3.045	1.736	0.08
Surgery	191.182	55.259	0.001
Lower Extremity Injury	90.875	59.169	0.126
Spine Injury	96.198	72.488	0.185
Model Summary: $R^2 = 0.056$, Adjusted $R^2 = 0.036$, $F = 2.83$, $p = 0.007$; $n = 344$, [†] 0 = Other, 1 = Caucasian.			

Table 4: Regression Analysis for Number of Days from Injury to Program Entry.

Variable	Unstandardized Coefficient	SE	P-value
Constant	126.108		
New Referral Process	-15.057	8.345	0.072
Caucasian [†]	-4.086	10.554	0.699
Male	0.339	9.014	0.97
Age	0.258	0.342	0.451
Lower Extremity Injury	-0.011	11.82	0.999
Spine Injury	-12.604	18.077	0.486
Model Summary: $R^2 = 0.017$, Adjusted $R^2 = -0.006$, $F = 0.75$, $p = 0.611$; $n = 271$, [†] 0 = Other, 1 = Caucasian.			

Table 5: Regression Analysis for Number of Days from Surgery to Program Entry.

Discussion

The results of the therapy managed referral process for the work rehabilitation program did not support most of the study hypotheses. The therapy managed referral process was not associated with a statistically significant increase in patient volume or decrease in the number of acute therapy visits prior to admission into the work rehabilitation program. Contradicting the hypotheses, results revealed the new referral process was not related to a significant decrease in days from injury to admission or days between surgery (if needed) and admission into the work rehabilitation program. One area of significance was identified, with a statistically significant improvement in gender differences when comparing the old and new referral processes; however, this did not have a significant impact on the overall outcomes of the work rehabilitation program.

It is important to consider that there were limitations to the current study. First, there were limitations associated with the overall referral process. Since the referral process focused on identifying potential patients, it may have a limited effect on the overall timing of admission to the program. Much of the admission is still heavily dependent on the therapist treating the injured patient and the physician ordering the work rehabilitation program. Rather than a referral process emphasizing contacting the therapist and physician as needed throughout structured time-lines, a triggered referral approach may be the most suitable for a work rehabilitation program.

A trigger referral is a referral that is placed when certain criteria or prompts have been satisfied. In other situations, a screening process acting as the trigger for the referral has been utilized [14]. While there may be some challenges associated with a system in which unnecessary referrals occur, it may provide an opportunity to capture a greater percentage of patients who otherwise may have been missed [14]. A further development of this type of system could occur with the use of artificial intelligence [15]. A system could be established within the electronic health record and offer an opportunity to identify an appropriate time for referrals based on established guidelines set forth by the work rehabilitation program.

Another study limitation involved the COVID-19 pandemic. There was a decrease in patients in 2020 compared to 2019, which mimicked overall trends nationwide [16]. In 2020, there was a 60 percent decrease in ambulatory visits in April and although visits rebounded to near-normal numbers by the end of 2020, this could have accounted for the decrease in the work rehabilitation program numbers [16]. Another factor that could have affected the therapy managed referral process included the number of people out of work during this time. In April 2020, the number of individuals laid off increased by 16 million [17]. With 16 million people out of work, there were fewer individuals to get injured at work, resulting in fewer referrals to physicians, fewer surgeries, and fewer outpatient therapy visits. This decrease in referrals could have impacted the overall study findings.

Based on the results of this study, further larger-scale interventions and research are warranted. The therapy managed referral process had disadvantages when attempting to transition patients to work rehabilitation. There was occasionally difficulty in obtaining referrals from the referring provider to transition, which delayed the transition to work rehabilitation and prolonged care. There was also occasionally difficulty in receiving prompt feedback from the referring physical and occupational therapists or therapists not identifying the need for the transition to the work rehabilitation program. Future studies should target a specific injured worker population with an automatic referral and subsequent admission. An automatic referral process would help to capture a more accurate representation of the patients. Another potential study could include more years for comparison to appropriately account for the COVID-19 pandemic.

The findings suggest that the therapy managed referral process for the work rehabilitation program did not significantly impact the number of acute visits prior to admission, days between surgery and admission, or the overall patient volume. While the COVID-19 pandemic may have impacted some of the overall outcomes, a more efficient referral system should be created to allow for the appropriate referral of patients to the work rehabilitation program.

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