A STUDY OF SERVICE TRENDS IN PHYSICAL THERAPY PRACTICES

Ruggiero Canizares, Physical Therapy Services, 1310 Coburg Road Suite 5, Eugene OR 97401, 541-345-7532, rugcan@comcast.net

Timothy M. Bergquist, Northwest Christian University, 828 E. 11th Avenue, Eugene, OR 97401, 541-684-7256, tbergquist@northwestchristian.edu

ABSTRACT

Physical Therapy (PT) outpatient private-practice ownership presents risks similar to any business. Despite associated risks of private-practice ownership, the number of PT clinics appears to be on the rise. This study focuses on significant relationships during a five-year period between increasing patient shared-costs and the total number of PT visits for outpatient PT services in a major metropolitan area in the Pacific Northwest.

Keywords: Physical Therapy, Service Operations, Cost Sharing, Linear Regression

INTRODUCTION

"Physical Therapy is an allied health profession which promotes optimal health and function through the application of scientific principles to prevent, identify, assess, correct, or alleviate acute or prolonged dysfunction" [12]. The scope of PT practice specializations include cardiopulmonary, clinical electro-physiologic, geriatric, neurology, orthopedic, pediatric, and sports [1]. PT specializations are practiced in both in-patient and outpatient environments. This paper specifically focuses on outpatient PT services. The practice of outpatient PT can be divided into two general business setting: employer-based and private-ownership.

This study investigated PT practices and trends in a major Pacific Northwest metropolitan area. At the time of this study (2006) there were two employer-based organizations, both major regional hospitals, with a total of seven separate PT clinics. The area has seen significant growth in private-ownership practices, with 15 practices in 1990, 19 practices with 21 clinics in 2000, and 25 practices with 30 clinics in 2006. However, the population in the area only increased by 24% from 1900 to 2000.

The State of Oregon Physical Therapy Practice Act (OPTPA) regulates and determines PT patient-care processes (see Figure 1). The OPTPA allows self-referred patients direct access to PT services, provided rendered duration for services are equal to or less than 30 calendar days [8]. In the event patient care for PT services would be greater than 30 days, the responsible therapist is required to obtain a written order from the patient's primary healthcare provider [9].

This paper examines patient behaviors specific to employer-based practice healthcare utilization over a 5-year time period and investigates if patient behaviors demonstrated a decreased trend in healthcare utilization as noted by number of PT visits and increased patient cost sharing.

LITERATURE REVIEW

A comprehensive review of literature did not yield any research that specifically studied and analyzed actual trends between PT business-practice settings. Available literature articles that specifically examined this trend were merely anecdotal and speculative. However, Weinper [13] proposed six PT "private-practice premonitions" on trends that would impact PT private practice.

A parallel literature search and review for other healthcare disciplines yielded empirical research that investigated patient cost-sharing trends that may potentially influence patient behaviors in healthcare utilization. The results of literature review are grouped in five major overarching components that paralleled and influenced this study's research focus: (a) US healthcare challenges [3], (b) trends in individual healthcare spending [5] [11], (c) trends in health insurance premiums and coverage [2] [6], (d) health insurance reimbursement trends for complementary and alternative medicine [4] [10], and (e) health insurance cost-sharing strategies [7] [14].

METHODOLOGY

Initial attempts to survey and gather raw data elements that could potentially provide qualitative and quantitative analysis of health insurance reimbursement trends from PT clinics in the metropolitan area under study were unsuccessful. Therefore approval was obtained to access the financial database, specifically the patient explanation of benefits (EOB) database, from the major regional hospital system that maintains five local employer-based PT clinics. This major regional healthcare system has invested significant organizational resources to develop and establish a comprehensive and robust electronic data warehouse (EDW), which is used as the data repository system for primary data collection, analysis, and executive report generation. For security and confidentiality reasons, approved data access was without unique patient identifiers.

Two terms are defined which were the focus of quantitative analysis: patient-account number and patient shared-cost. Patient-account number is a complete series of PT visits, from initial PT evaluation to discharge. Patient shared-cost is the dollar value a patient pays out-of-pocket to receive PT services, which may be co-payments, deductibles, or percentages of billed services not covered by insurance. Raw data elements were limited to the five specific rehabilitation services outpatient therapy clinics in the metropolitan area. Account numbers were queried for specified clinics using service end dates to capture the complete series of PT visits per account number. Specified raw data date range for analysis covered five fiscal years, from July 1, 2001, to June 30, 2006. See Table 1 for a complete list of data elements and functional definitions and derivations. A total of 40,299 EDW account numbers were generated for the final query.

DATA ANALYSIS

Distribution and trend analysis resulted in a quantitative description of studied variables using 60 monthly data points. Simple regression analysis investigated relationships between the variables. The demographic variables studied included patient age, patient gender, single versus multiple insurance, estimated insurance payments, and financial classes. Trend and distribution analysis were performed to investigate the relationship between monthly average PT visits and the monthly average total guarantor billed amount.

Patient Age

Ages of all patients were averaged per month and then plotted across a scatter diagram with a calculated regression trend line (see Figure 2). Average monthly ages revealed an increasing trend in aging with an estimated trend line equation of $\hat{y} = 0.0028x - 54.021$ and a high coefficient of determination value ($R^2 = 0.7253$). The average female patient age was 52.2 years while the average male patient age was 48.7 years. A *z-test* with a null hypothesis that there is no statistical difference between monthly average male and female ages yielded a value of 9.84 (p-value < .01), indicating a statistically significant difference between average monthly ages by gender. Patient ages were then distinguished by gender and averaged per month (see Figure 3). The estimated trend-line equation for the female population was $\hat{y} = 0.0029x - 56.352$ with a high R^2 value (0.6596) and for the male population it was $\hat{y} = 0.0024x - 44.255$ with a lower R^2 value (0.4493). Visual interpretation of the gender regression trend lines reveals an increasing trend in aging with both genders appearing to age at approximately the same rate. All studied numbers were grouped into age-range categories (see Figure 4) with the total number of monthly patient visits plotted in a bar graph according to health related age categories (pediatrics [0-18], young adult [19-25], adult [26-45], middle age [46-55], pre-retirement [56-65], and retirement/geriatrics [>65]). The graphs revealed that the majority of the studied population fell between 26-45 age-range and > 65 age-range. Patient ages were then distinguished by gender and categorized into the same age-range categories (refer to Figure 5). The majority of female patients treated are in the 26-45 and > 65 age group, with > 65 age group as the highest served population. The male age range showed that the majority of male patients treated are again in the 26-45 and > 65 age group, but now the 26-45 age group is the highest served population.

Patient Gender

Patient genders were summed and grouped by month resulting in 60 data points representing total number of females versus males. There were approximately 25,000 visits by females versus about 16,000 visits by males. A scatter diagram was constructed with a regression trend line plotted for each gender (see Figure 6). The total monthly sum of female visits revealed an increasing trend in female patients treated with an estimated trend line equation of $\hat{y} = 0.0347x - 901.21$ and a R^2 value (0.1214). The total monthly sum of male visits revealed a slightly decreasing trend in male patients treated with an estimated trend line equation of $\hat{y} = -0.0005x + 274.04$ and a very low R^2 value (5E–05), which was not statistically significant at $p \leq 0.05$. A *z-test* with a null hypothesis that there is no statistical difference between monthly average patient visits between male versus female yielded a value of 19.48 (p-value < .01), indicating a statistically significant difference between average monthly patient visits between genders.

Single versus Multiple Insurance

The average number of monthly visits of account numbers with single insurance was about 420 visits compared to those with multiple insurance of approximately 250 visits. Total numbers of counted visits per month were summed resulting in 60-month data points plotted with two regression trend lines comparing utilization of services with one versus multiple insurance carriers (see Figure 7). The estimated trend line equation for single insurance coverage was $\hat{y} = 0.0301x - 2.5773$ with a low R^2 value (0.0119), which was not statistically significant at $p \leq$

0.05. The estimated trend-line equation for multiple insurance coverage was $\hat{y} = 0.0301x - 874.18$ with a low R^2 value (0.1631). The total volume comparison between the trend-line equations revealed more patients utilizing PT services who have single insurance coverage versus patients with multiple insurance coverage. A *z-test* with a null hypothesis that there is no statistical difference between monthly average patient visits between single versus multiple insurance yielded a value of 17.17 (p-value < .01), thus indicating a statistically significant difference between average monthly patient visits between single versus multiple insurance.

Estimated Insurance Payments

Subtracting the guarantor-billed amount from the account total charge derived estimated insurance payment values which were averaged per month and then plotted with a calculated regression trend line (Figure 8). The average monthly estimated insurance payments revealed an increasing trend in estimated insurance payments for the whole population. The estimated trend-line equation was $\hat{y} = 5.036x + 508.44$ with a high R^2 value (0.8651).

Financial Classes

A final EDW data query identified a total of nine financial classes (see Table 2). Monthly patient visits per identified financial class were counted, summed, and then plotted with an estimated regression trend line. Table 3 summarizes trend line regression equations for all nine financial classes with their R^2 values and p-values. An asterisk (*) in the p-value column indicates values are not significant. Based on these regression values, the scatter diagrams indicate an increasing trend in monthly patient visit counts for Medicare and a decreasing trend in monthly patient visit counts for Providence, both of which had large R^2 values and significant p-values. Blue Cross/Blue Shield had a significant p-value, but a lower R^2 value. The remaining financial classes did not present noteworthy R^2 values, but did reveal significant p-values.

Frequency distribution histograms were constructed for each financial class of summed monthly patient visit counts (see the Appendix). Financial class categories with the highest monthly summed patient visit counts (Commercial, Medicare, and Blue Cross/Blue Shield) presented silhouettes of normal distribution curves. The remaining financial classes presented positive skewed distribution curves, with Providence as an exception, which presented a negative skew. A frequency distribution histogram that combined all financial class monthly patient visit counts was constructed to show a distribution that represents the whole patient population (see Figure 9). This histogram clearly reveals a positively skewed distribution curve.

To identify the majority of financial classes that account for the whole summed patient visit volume, a Pareto Analysis chart was constructed that illustrates monthly total sum of patient visits per financial class (see Figure 10). This chart showed that that (a) Commercial Insurance, (b) Medicare, (c) Blue Cross/Blue Shield, and (d) Providence (arranged from greatest to least) accounted for 80% of all summed patient visits. The remaining five classes accounted for the remaining 20% of all visits. As the size of monthly patient visit counts decrease, the frequency distribution curves begin to reveal silhouettes of a positive skewed distribution (see the Appendix). Similar to its unique feature of a statistically significant p-value and high R^2 value, Providence demonstrates a unique negative skewed frequency distribution curve. Using the

Pareto Analysis results, a frequency distribution histogram that combined the 20% of the financial classes that accounted for 80% of monthly patient visit volume was constructed to show a distribution that represents significant financial classes for the whole population (see Figure 11). Compared to Figure 9, Figure 11 moves toward a silhouette of a normal distribution curve.

Visits versus Billed Amount

PT visits per account number and guarantor billed amount were averaged per month resulting in 60 monthly data points (see Table 4). To determine potential relationships between investigated variables, simple linear regression analysis was utilized with the dependent variable represented by monthly average PT visits and the independent variable represented by monthly average total guarantor billed amount. This resulted in the estimated regression equation of $\hat{y} = 13.347x - 21.974$ with a very low R^2 value (0.0816) (see Figure 12). Additional linear regression analysis between monthly average guarantor billed amount and 60-month time period resulted in the estimated regression equation of $\hat{y} = 0.0068x + 5.6149$ with a low R^2 value (0.1355) (Figure 13). A third linear regression analysis between monthly average PT visits and 60-month time period resulted in the estimated regression equation of $\hat{y} = 0.4898x + 40.777$ with a moderate R^2 value (0.3266) (Figure 14). Close examination of these trend lines regressions depicted a gradual upward trend in patient shared-costs, while PT visits remained fairly level.

SUMMARY

This study focused on PT services and trends in a major metropolitan area in the Pacific Northwest. In this area, there has been rapid growth in private-ownership PT clinics, far exceeding the rise in population. Table 5 outlines and summarizes the trend line regression equations, R^2 values, and p-values for (a) age, (b) gender, (c) estimated insurance payments, (d) single versus multiple insurance, and (e) visits versus billed amount. An asterisk (*) in the p-values column indicates values are not significant.

Trend and distribution analysis and simple regression analysis provided statistical evidence that supports three of Weinper's [18] assertions (1, 2, and 6). This paper provided statistical evidence that undermines Weinper's fifth premonition. However, informal investigation reflected inherent instability within the metropolitan area private-ownership practices. This observation challenges Weinper's third and fourth premonitions. Simple linear regression analysis between PT service utilization and increasing patient shared-costs did not demonstrate any relationship between the two research variables. Thus, growth trends towards PT private-ownership clinics in the study area cannot be quantitatively explained from increased patient shared-costs.

REFERENCES

[1] American Physical Therapy Association. Professional Resources, Specialist Certification. 2007. Retrieved from http://www.apta.org/AM/.

[2] Carrasquillo O., Himmelstein, D.U., Woolhandler, S., & Bor, D.H. *Going Bare: Trends in Health Insurance Coverage, 1989 through 1996*. American Journal of Public Health, 1999, 89(1), 36-42.

[3] Cogan, J.F., Hubbard, R.G., & Kessler, D.P. Healthy, Wealthy, & Wise. Washington, D.C.: AEI Press/Stanford, California: Hoover Institution, 2005.

[4] Eisenberg, D.M., Davis, R.B., Ettner, S.L., Appel, S., Wilkey, S., Rompay, M.V. *Trends in Alternative Medicine Use in the United States, 1991-1997*. Journal of the American Medical Association, 1998, 280(18), 1569-1575.

[5] Meara, E., White, C., & Cutler, D.M. *Trends in Medical Spending by Age, 1963-2000*. Health Affairs, 2004, 23(4), 177-183.

[6] Minnesota Department of Health. *Trends in Private Health Insurance Premiums and Cost Drivers, 2004*. Issue Brief, 2005, 2005-02.

[7] Newhouse, J.P., Manning, W.G., Morris, C.N., Orr, L.L., Duan, N., Keeler, E. *Some Interim Results from a Controlled Trial of Cost Sharing in Health Insurance*. The New England Journal of Medicine, 1981, 305(25), 1501-1507.

[8] Oregon Administrative Rules, OAR 848-040-0117. *Standards for Authorization to Provide Physical Therapy Services*. 2006. Retrieved from http://www. oregon.gov/ PTBrd/docs/Proposed.Rule.Changes/ OAR.Compilation.Version.07.12.06.pdf.

[9] Oregon Revised Statutes, ORS, ORS 688.132. *Duty to Refer Person; Exceptions; When Personal Injury Protection Benefits Available*. 2006. Retrieved from http://www.oregon.gov/ PTBrd/docs/Proposed.Rule.Changes/ ORS.Compilation.Version.04.19.06.pdf.

[10] Pelletier, K.R., Marie, A., Krasner, M., & Haskell, W.L. *Current Trends in the Integration and Reimbursement of Complimentary and Alternative Medicine by Managed Care, Insurance Carriers, and Hospital Providers*. American Journal of Health Promotion, 1997, 12(2), 112-122.

[11] Sharpe, D.L., Fan, J.X., & Hong, G. *Household Out-of-Pocket Health Care Expenditure Trends: 1980-95*. International Journal of Consumer Studies, 2001, 25(2), 114-122.

[12] University of Cincinnati, College of Allied Health Sciences. *What is Physical Therapy?* 2007. Retrieved from http://www.cahs.uc.edu/faq/PT.cfm.

[13] Weinper, M. *Private Practice Premonitions, the Sequel: Revisiting 10 Trends Shaping the Future of Private Practice*. Rehab Management: The Interdisciplinary Journal of Rehabilitation, 2004, 17(1), 48-52, 57.

[14] Wong, M.D., Andersen, R., Sherbourne, C.D., Hays, D.D., & Shapiro, M.F. *Effects of Cost Sharing on Care Seeking and Health Status: Results From the Medical Outcome Study*. American Journal of Public Health, 2001, 91(11), 1889-1894.

(Tables 1 to 5, Figures 1 to 14, and the Appendix are available upon request)