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Cost Analysis of Integrated Behavioral Health in a Large Primary Care Practice

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Abstract

A residency-based Family Medicine outpatient clinic chose to implement an integrated behavioral health care program in a large primary care clinic in the Southeast to improve patient access to behavioral health care. We hypothesized that embedding a BHP in a primary care setting would be a cost neutral intervention. We implemented a prospective cohort design and included expenses from both inpatient and outpatient visits. We implemented a mixed effects linear regression model to evaluate pre- and post-BHP exposure costs. A total of 1256 patients were identified in the post-BHP exposure period that had more than one-year post-exposure. After applying exclusion criteria, there were 926 patients included in analysis. These patient had an average total cost during the one-year pre-BHP exposure period of $5113 (SD = 7712) and one-year post-BHP exposure period of $5462 (SD = 7813). Our analysis shows a relatively cost neutral impact following the introduction of BHPs in a primary care setting. The results of this study provide a gauge for future planning of services.

Keywords Cost analysis · Integrated care · Behavioral health

Introduction

Integrated care, the coordination of physical and behavioral health care by collaborating providers at point of care, is recommended in primary care settings as best practice, especially for patient populations with dual (mental health and substance use) diagnoses [Substance Abuse & Mental Health Services Administration–Health Resources Service Administration (SAMHSA), 2020]. Transforming primary care to address patients' medical and behavioral needs must also account for the financial sustainability of these operational processes. A number of researchers/authors have worked to describe methods of quantifying cost savings/expenses/offsets resulting from the implementation of integrated care into primary care settings and have advocated for payment reform to support these models (Breslau et al., 2019; Hubley & Miller, 2016; Miller et al., 2017; Vogel et al., 2017). Since 2009, on a national level, SAMHSA has funded select primary care clinics seeking to integrated behavioral health services into primary care through the Primary and Behavioral Health Care Integration grants program. This large-scale grant program has also generated considerable data related to financial questions surrounding integrated care sustainability.

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The difficulty of economically quantifying the benefits of integrated care has also been cited (Tsiachristas et al., 2016). Approaches to demonstrating financial sustainability (or lack thereof) include cost-benefit, cost-utility, and cost-effectiveness analyses (Kaplan et al., 2019). For the last two decades, integrated care researchers have debated the theory of medical cost offset, which posits that improved access to behavioral health care decreases more costly medical expenditures, specifically involving emergency department visits and/or inpatient admissions and stays (Cummings et al., 2009; Peterson et al., 2017; Sturm, 2001). Utilization ratios, as a proxy to cost-effectiveness, have shown impressive reduction of emergency and specialty care in some integrated primary care study settings (i.e., 11.3 percent reduction in Emergency Department to primary care visits ratio following the implementation of the Primary Care Behavioral Health model [Serrano et al., 2018]; in Cherokee Health Systems, a "68% reduction in emergency care, 42% reduction in specialty care, and 37% reduction in hospitalizations when compared with other clinicians in the region" [Franko, 2015]). Cherokee Health Systems' behavioral enhanced patient-centered medical home practice also reported an overall reduction of 22% in [total health care] costs over a 3-year period." A RAND report on Primary and Behavioral Health Care Integration grantee clinic data concurred that outcomes "suggest that the program can be successful in two of its primary aims: reducing frequent use of emergency department and inpatient services for PH [Physical Health] care services and reducing total costs of care" (Breslau et al., p. 33). There is also compelling financial data to support integrated care as a time-saving intervention for medical providers who, after handing patients off to behavioral health providers, are able to see more patients in less time (Gouge et al., 2016).

Notably, there is also a growing body of literature on integrated care cost-effectiveness for programs serving specific patient populations, rather than the general primary care population at large. For example, the *Sustaining Healthcare Across Integrated Primary Care Efforts* for diabetes patients showed a reduction in cost on a practice-level ($1.08 million net cost savings across three practices when compared to three practices without this program) (Ross et al., 2018). In contrast, the *Transforming and Expanding Access to Mental Health Care in Urban Pediatrics* demonstrated increased utilization of primary care for low-income children with behavioral health needs, but no overall decreases in cost through emergency visits, inpatient admissions, or otherwise (Cole et al., 2019).

With lack of consensus on both the mechanism of savings and cost effective integrated care models for general primary care populations, this study investigates the value of embedding a Behavioral Health Provider (BHP) in a primary care setting. We hypothesized that embedding a BHP in a primary care setting would be a cost neutral intervention. Our study contributes to the integrated care literature with an analysis that utilizes inpatient/outpatient claims and the cost associated with introducing BHPs into primary care. We will address the value of the BHP in a primary care setting by analyzing the impact following the clinic transformation to include onsite BHPs at the point of care.

Methods

Sample and Design

Enrollment of patients occurred at the point of care upon meeting the BHP for initial consult or at first follow-up. Patients were eligible for participation in the study if they were: (a) a primary care patient of the clinic, and (b) 18 years or older. Eligible patients received an informational sheet regarding the study and contact numbers for further questions/concerns. This information sheet included an explanation of study purpose (i.e., "We are evaluating a health care model that incorporates behavioral health into primary care"), a definition of integrated behavioral health care, and a brief overview on rationale for implementing this model in a primary care setting. Patients were verbally consented if they expressed interest in participating in the study, and this was documented in the electronic health record (EHR).

The Family Medicine Outpatient Clinic is a 55-provider practice consisting of four-modules (10 exam rooms per module) and serving approximately 22,500 individual patients. In order to compare whether there was a change in the cost of care before and after exposure to a BHP, we adopted a pre/post study design and included patients that were active patients at least one-year of record both before and after enrollment into the study. To note, participants had varying enrollment dates when compared with one another, with the intervention start time (demarcating pre- and post-BHP exposure) being defined as the participant's date of enrollment into behavioral health services. This usually occurred during the warm handoff but sometimes during the participant's first behavioral health follow-up visit depending on the acuity of their warm handoff visit. Behavioral health services included warm handoffs (process by which a medical provider introduces a patient to a BHP at point of care) and follow-up care onsite, in the form of approximately 30-minute psychotherapy visits with the BHP.

Our clinic has utilized Epic™ software as its EHR since September 2012. This EHR includes data from the clinic as well as our affiliated medical center (inpatient) and satellite clinics. Enrolled patients came from an "integrated care flowsheet" created specifically for the project and used by the BHP's to document visits. We identified enrollment dates and merged cost data from several sources including Epic™

Reporting Workbench that runs in Epic's™ Hyperspace (an integrated front end for Epic's™ software). Reports are created using templates that pull patient data such as demographics, diagnoses, and medications directly in real time. The relational database (Epic™ Clarity) along with Tableau Software provided the bases to extract raw data into statistical longitudinal analysis.

Patients' records and enrollment dates were extracted and identified by first chargeable visit event encounter for the analysis from Epic™. An "episodic" analysis using retrieved data from the StrataJazz™ Decision Support System was performed that included all care for two-years (one-year pre- and one-year post-BHP exposure) to provide pertinent data for analysis. We compared cost data from patients' charts in a small random sample to the extracted data to ensure data integrity. We designated each line of cost data as pre-enrollment: charges occurring on or before the enrollment date (and exposure to BHP) or post-enrollment: charges occurring after the enrollment date. We summed the charges for each of these two periods. We performed statistical analyses using SAS™ 9 (Cary, NC) and SPSS™ 24 (Armonk, NY). Using 38-month enrolled patient data, we sought to compare annualized health care costs one-year pre- and one-year post-BHP exposure. We included expenses from both inpatient and outpatient visits.

Table 1 Sample characteristics of $N = 926$ patients included into the analysis

Demographic	*N*	Percent
Gender		
Female	727	78.5
Male	199	21.5
Race		
Black	379	40.9
Other	54	5.8
White	493	53.2
Financial coverage		
Managed Care	508	54.9
Medicaid	104	11.2
Medicare	227	24.5
Other	19	2.1
Self-pay	68	7.3
Age group		
Less than 30	195	21.1
30–39	145	15.7
40–49	159	17.2
50–59	192	20.7
60–69	157	17.0
70 and older	78	8.4

Statistical Analysis

We completed cost analysis utilizing expenses classified as *direct cost*. In the StrataJazz™ Cost Accounting system, direct cost is defined as any cost/expense which can be directly attributed to patient care. Direct cost is a summation of both fixed cost and variable cost. Variable cost is defined as those cost/expenses which vary based on patient activity and volume, whereas fixed cost is defined as those cost/expenses directly related to patient activity but not volume (see Table 1). Physician compensation, for example, contains a fixed component for salaries, and a variable component for incentives based on patient volume. Other clinical staff salaries are considered variable and attributable only to patient volume. Pharmaceuticals and medical supplies, since directly related to patient volume, would be considered a variable expense. Direct cost does not include items such as utilities, malpractice insurance, or depreciation on major equipment as these are all considered indirect (not attributable to patient volume) expenses. In order to verify our total cost findings, we also ran the analysis with total charges. Refer to Table 1 for direct cost components included in the total cost analysis. In the case that the cost category included both direct and indirect components, the category was modified to include direct components only.

We reported descriptive statistics for demographic and other patient characteristics. Additionally, we used a mixed effects linear regression model to analyze the difference between pre- and post-BHP annual cost. In the model, we treated two observations from the same patient—pre- and post-BHP exposure costs—as the outcome variable. We included the time period (pre- vs. post-BHP exposure) as the primary independent variable and also included the following covariates in the model as fixed effects: gender, race, age (at time of enrollment), financial category (insurance type), and total number of visits during the entire observational period. We repeated the analysis across patient groups to identify potential differences in findings and modeled the correlation between the two observations (pre and post) within the same patient by a random effects model. We conducted hypothesis testing as two-sided tests and at the .05 significance level.

We also used descriptive statistics to examine the distributions of different variables collected from the extracted EHR data. In examining health care costs, we observed (as expected) a strongly skewed distribution, with a few patients incurring extremely high costs. To assess how a few outliers with extreme cost could influence the results, we plotted the mean and the median of cost of care against different threshold values in annual cost. Eventually, we selected the threshold of $50,000 per year as a cutoff, because the median of the difference between pre- and post-BHP exposure costs tended to stabilize at that point. We applied this cutoff, respectively, to both pre- and post-BHP exposure

Table 2 Direct cost components included in total cost analysis

Cost category	Definition
Clinical and lab supplies	Supply expenses related to Blood/Blood Products, Pharmaceuticals, Implants and Medical Supplies, and Non-Medical Supplies
Employee benefits	Expenses related to employee fringe benefits such as insurance, social security, and retirement
Other operating revenues	Offset to expenses driven by operational revenue streams (parking, rentals, gifts, etc.) and revenue from leased spaces
Other patient revenues	Offset to expenses from cash/invoice sales components based on inter-departmental sales, or commercial sales
Purchased services	Expenses related to items such as contract labor and associated expenses, professional liability insurance, consulting, and oversight services
Salaries and wages	Expenses related to the salary component of clinicians, professionals, staff, and payroll to general ledger reconciliation

annual cost data. By excluding extreme values in cost, we decreased the likelihood that individuals with annual health care costs reflecting random events (rather than a pattern of utilization) would skew study findings.

Results

We found that within the extracted EHR data, there were, respectively, $n = 1{,}310$ patients in the pre-BHP exposure period and $n = 1{,}256$ in the post-BHP exposure period that had more than one-year of exposure. Merging via medical record number of the two samples produced $n = 973$ patients. We excluded 14 patients that were under 18 years of age and applied the cutoff at $50,000 annual health cost to the sample. This resulted in the further exclusion of $n = 33$ (3.5%) high cost patients and, as a result, the final sample size contained $n = 926$ patients. Notably, there were three patient outliers that had total annual costs of > $120,000 in the post-BHP exposure period. These patients were excluded when the > $50,000 cutoff was applied.

Table 2 shows the sample characteristics. Among enrolled patients, there were more women (78.5%) than men patients (21.5%). The study sample had a payor mix of 54.9% Managed Care (e.g., MedCost, Blue Cross Blue Shield), 11.2% Medicaid, 24.5% Medicare, 7.3% self-pay, and 2.1% other. The patient panel was predominantly White (53.2%) and Black (40.9%). The average age was 47.3 years. The average number of visits during the entire two-year period was 4.0 (range 1, 44).

The average total cost per patient during the one-year pre-BHP exposure period was $5,113 (SD = 7712), whereas during the one-year post-BHP exposure period it was $5,462 (SD = 7813), a $349 difference likely attributable to the increased cost of carrying salaried BHPs on the budget of the department hosting this integrated care program (each BHP was moved from grant funds to the departmental budget one to two years from hire date). About two-thirds of patients (68.7%) had one to three BHP visits during the entire two-year period, while the remaining third (31.3%) had four or more BHP visits. Our analysis by different patient groups did not show any significant differences in findings.

In order to measure the potential impact of the maturity of the program on cost, we ran an additional sensitivity analysis that included a variable measuring how long the program was in place using the first date of enrollment as an operational starting point. This result showed that the maturity factor was not significant, with a p value of .41.

Table 3 is a summary of the mixed effects regression analysis results. The primary independent variable indicating pre- and post-BHP exposure was not statistically significant, although the direction is that pre-BHP cost is lower than post-BHP cost. For the other covariates, financial coverage (insurance type) was significant (overall p value = .0002), with the category of Medicare driving the overall small p value. Age at enrollment was also statistically significant. Our results of total charges (Table 1) were confirmatory of our total cost findings: the primary independent variable indicating pre- and post-BHP exposure was not statistically significant but financial coverage and age of enrollment were statistically significant.

Discussion

The patient sample in this study was, as expected, predominantly comprised of women. Women are more likely than men to report behavioral health issues and to seek behavioral health treatment [Health Resources Services Administration (HRSA), 2020a]. The representation within the sample across demographics of race, financial coverage types, and age groups was commensurate with our clinic population, but this particular sample may not be representative of patient population in other clinics and/or US regions.

The results showed no statistically significant differences in pre- and post-BHP costs, although there was a small and statistically non-significant increase in cost from pre- to post-BHP exposure in both costs and charges (see Table 3). Behavioral Health Provider salaries, as well as the role of inflation, patient demographics, and provider coding of

Table 3 Results from mixed effects linear regression analysis of pre- and post-BHP

Variable	Category	Total cost[a]		Total charges	
		Effect (USD)	*p* value	Effect (USD)	*p* value
Period	Post-BHP	348.6	.22	1658.7	.18
Gender	Female	− 137.4	.78	− 1981.1	.35
Race	Black	378.1	.38	2363.1	.20
	Others	− 347.9	.69	− 1490.2	.69
Financial coverage	Medicaid	792.6	.24	3306.8	.26
	Medicare	2573.9	< .0001	8951.0	.0002
	Self-pay	82.6	.92	− 671.9	.84
	Others[b]	2079.8	.14	8197.4	.18
Age at enrollment		89.9	< .0001	382.5	< .001
Number of visits		17.3	.64	12.6	.94

Reference category for period, gender, race, and financial coverage are, respectively, Pre-BHP, male, White, and Managed Care

[a]Total costs comprised of all cost components listed in Table 2

[b]Other insurance type includes Liability Insurance, Tricare, Workers' Compensation, or other government programs

patient visits, may have impacted the results. Medical inflation may also account partially for this difference. As measured by the Consumer Price Index for medical care, there was a 2.8% increase from 2018 to 2019 (HRSA, 2020b). The typical inflation rate for charges at our institution is approximately 4% per year.

We found no statistically significant differences in pre- and post-BHP across gender, race, or number of visits. Medicare patients tended to have a higher cost of $2,574 per year more than patients with Managed Care ($p < .0001$). Given the higher median age (and associated healthcare needs) of Medicare recipients and rate of disability among dual eligible individuals, we expected to see an associated increase in healthcare costs (Joynt et al., 2017). While this was not surprising, the difference was substantial and also clinically important as the amount was approximately half of the cost per year for an average patient and one-third the standard deviation. For age, one-year older was associated with a $90 increase in cost per year, implying a $900 increase with each decade older. Additionally, during the study period, the International Classification of Disease (ICD) codes changed from ICD-9 to ICD-10. The role of how providers coded visits may have affected the results found. ICD-10 code capture and detail was not a straight forward process. Providers may have applied codes with higher charges using ICD-10 (Pilato, 2013).

While our results did not show a cost offset following the introduction of BHPs in a primary care setting, the results align with the literature that argues—in spite of Triple Aim pressures—that it is very difficult to do more of value with less (Institute for Healthcare Improvement, 2020; Strum, 2001; Donahue et al., 2018). Further, it is presumptious and a slippery slope to use cost savings to justify improvements in patient care for vulnerable populations when these changes should (and need to) be made regardless, for the sake of improving patient care. Even with some difference of opinion around the effect of warm handoffs on behavioral health follow-up, introduction to the BHP at point of care affords the patient more immediate access to behavioral health care (Pace et al., 2018).

We recognize that when a health system does more, the administrators of that system must find a way to pay for those additional services. Centers for Medicare & Medicaid Services (CMS) reimbursed the CPT Psychotherapy Code for 16–37 min, 90832, at a rate of $67.05 at the time of this study. The $349 difference we found between pre- and post-BHP exposure for average patient cost could be covered by billing six brief encounters at the point of care or four longer (approximately 38–50 min) encounters if 90834 were billed at the CMS reimbursement rate of $89.27 at the time of this study. This does not account for coverage of BHP salary and fringe benefits when the BHP salary/benefits were funded through the grant (prior to moving this onto the departmental budget, which occurred one to two years after each BHPs hire date).

Although this analysis focuses on cost, it is also important to note that this project resulted in other meaningful outcomes not financial in nature. Our data analysis around patient views on BHPs and their services during this project showed overall satisfaction (Koehler et al., 2019). Further, preliminary data indicates medical provider satisfaction with behavioral health services and a downward trend in Patient Health Questionnaire-9 (PHQ-9) and General Anxiety Disorder-7 (GAD-7) screening scores post-BHP exposure period. We will report and discuss these latter two findings elsewhere.

Strengths and Limitations

Our study has a number of strengths and limitations, both of which warrant discussion. A primary strength of our cost analysis is that this study joins a small group of studies seeking to quantify the cost (i.e., US Dollar amount) of behavioral health intervention in integrated care. Secondly, we used a unique EHR dataset collected in a naturalistic setting for several years on a large cohort of patients before and after exposure to BHPs. This pre/post model allowed patients to serve as their own controls, in the absence of a control clinic site. Thirdly, our EHR, project-specific integrated care flowsheet, and access to Care Everywhere™ allowed for data collection from many different specialists, different departments, and even (in some cases) outside of our institution. Fourthly, we believe our team approach (BHPs, information technology, financial, pharmacy, and medical providers) has afforded us a well-rounded interventive, analytical, and writing process.

The limitations of our study include: lack of a control group; inability to draw data from clinic sites outside of our institution that were not accessible through Care Everywhere™; institutional and clinic changes regarding accounting and charging practice (the clinic underwent a shift from non-provider based to provider-based during the project); and change in reimbursement scheme on the level of CMS and/or private payors during the project. Inflation may have also contributed to the difference in total cost, as well as total charges, over time. Additionally, we did not control for patient diagnosis or other patient outcomes in our cost analysis, and it is possible that our findings may not be easily generalizable beyond our particular Family Practice outpatient clinic and integrated care model.

It has also been suggested that inability to control for impact of the maturity of the integrated care program on effectiveness may have also been a limitation of this study (i.e., with varying enrollment dates, participants' BHP exposure may have been early or later in the five-year grant period, with maturity of program serving as a potential corollary to overall program effectiveness). Our additional sensitivity analysis to explore the maturity factor, however, demonstrated this variable to be not statistically significant.

Conclusion

We implemented a prospective cohort design to analyze changes in total health care pre- and post-BHP exposure among patients who had received behavioral health services at a large primary care clinic in the Southeast. Our analysis did not show a cost reduction. There is a lack of consensus in the integrated behavioral health care literature on cost effective models of integrated care and how to best quantify cost savings and/or offset. We believe our study contributes to the literature in demonstrating absence of cost savings and/or offset following implementation of an integrated care program. While we certainly do not intend to refute the possibility of cost savings and/or offset with other types of integrated care and/or in other settings, we would venture that such results are extremely difficult to achieve and replicate. As such, we would advise health care systems that are interested in implementing a program similar to ours to consider billing and obtaining reimbursement directly for psychotherapy services, rather than relying on cost savings and/or offset in the hosting department or other parts of the healthcare system to fund the program indirectly.

We hope that in sharing financial outcomes associated with one integrated behavioral health care model, other practices may derive insight and areas for improvement related to program sustainability. As we conclude a five-year grant, our focus is presently on implementing billing for behavioral health services and collecting cohort data related to billing and additional operational changes.

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Data Availability All data and materials as well as software application or custom code support our published claims and comply with field standards.

Code Availability All software application or custom code support our published claims and comply with field standards.

Declarations

Conflict of interest Aubry N. Koehler, Edward Ip, Stephen W. Davis, Joseph F. Hilburn, Richard W. Lord Jr., Gail S. Marion and Julienne K. Kirk declare that they have no conflict of interest.

Ethical Approval Protocol and patient informed consent approved by the Wake Forest School of Medicine Institutional Review Board (IRB00034196).

Human and Animal Rights and Informed consent The methodology for this study was approved by the Institutional Review Board of the Wake Forest School of Medicine (IRB00034196).

Consent to Participate All participants verbally consented to participate in the study and were given a printed sheet of information regarding the study and their participation.

Consent for Publication Not applicable; no identifiable data in manuscript.

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