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The Employment of Nurses in Publicly Funded Substance Abuse Treatment Programs

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Abstract

Little is known about the organizational and environmental factors associated with the employment of nurses in substance abuse treatment programs. Using data collected from the administrators of 250 publicly funded substance abuse treatment programs, this study examined the organizational and environmental correlates of nurse employment in these settings. Negative binomial regression models indicated that the number of nurses employed by treatment programs was positively associated with government ownership, location within a health care setting, and the availability of detoxification services. Outpatient-only programs employed fewer nurses than programs with inpatient/residential services. Two environmental factors were associated with nurse employment. Programs that more strongly endorsed a scale of financial barriers employed significantly fewer nurses, while programs indicating that funding from state contracts could be used to pay for health care providers employed significantly more nurses. These findings suggest that organizational decisions about employing nurses may reflect both the characteristics of the program and the funding environment. Future research should continue to examine the employment of nurses in substance abuse treatment settings, particularly given the shifting environment due to the implementation of health care reform.

INTRODUCTION

Descriptions of the substance abuse treatment workforce have largely focused on counselors (Curtis & Eby, 2010; Eby, Burk, & Maher, 2010; Gallon, Gabriel, & Knudsen, 2003; Kerwin, Walker-Smith, & Kirby, 2006; Kirby, Benishek, Dugosh, & Kerwin, 2006; Knudsen, Ducharme, & Roman, 2008; McCarty, et al., 2007), with few studies examining the employment of nurses in these settings. Although nurses comprise a small percentage of the staff working within substance abuse treatment programs (Herbeck, Hser, & Teruya, 2008; McLellan, Carise, & Kleber, 2003), their role in the delivery of high-quality services is significant. First, the number of nurses working in treatment programs is positively associated with the likelihood that programs have adopted medications for treating substance abuse and co-occurring psychiatric conditions (Knudsen, Roman, & Oser, 2010). Second,

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DECLARATION OF INTEREST

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this paper.

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employment of medical professionals is positively associated with the delivery of on-site primary care services (Friedmann, Alexander, & D'Aunno, 1999), which subsequently improve treatment outcomes (Friedmann, Zhang, Hendrickson, Stein, & Gerstein, 2003; Mertens, Flisher, Satre, & Weisner, 2008; Saitz, Horton, Larson, Winter, & Samet, 2005). Finally, research on adolescent substance abuse treatment programs indicates that the number of nurses working in a program is positively associated with treatment quality (Knudsen, 2009a).

While nurses are a vital part of the treatment workforce, little is known about the organizational and environmental factors associated with their employment. Substance abuse treatment programs are highly variable in their organizational characteristics (Broome, Flynn, Knight, & Simpson, 2007; Grella, Polinsky, Hser, & Perry, 1999), and certain characteristics may be associated with patterns of program staffing. Some programs are located within larger health care organizations, while others operate as freestanding clinics (McCarty, et al., 2008). Programs embedded within health care settings may have access to resources from the larger organization to support the costs of employing nurses. Furthermore, the employment of nurses would be normative in health care organizations. Treatment organizations also vary in their levels of care, with some organizations offering only outpatient treatment or round-the-clock care (e.g., inpatient or residential services), while others deliver a mixture of services (Roman, Ducharme, & Knudsen, 2006). Only a minority of programs offer medically-supervised detoxification services (Knudsen, Ducharme, & Roman, 2006), but such services require nursing professionals. Nearly all programs are licensed by the state in which they are located, but only some organizations seek accreditation from national organizations such as the Commission on the Accreditation of Rehabilitation Facilities (CARF) or The Joint Commission (Knight, Edwards, & Flynn, 2010). Accreditation standards may result in programs having a greater bio-medical orientation (Friedmann, Lemon, Durkin, & D'Aunno, 2003), and therefore, accredited programs may employ more nurses. To date, there have been no studies examining the relationships between organizational characteristics and the numbers of nurses working in substance abuse treatment programs.

In addition to organizational characteristics, resource dependence theory suggests that decisions about program staffing may reflect factors associated with the external environment, such as the availability of financial resources, policies of the state, and local labor markets (Pfeffer, 1987, 1997). The employment of nurses depends to some extent on the program's financial resources. Many treatment programs have limited financial resources, which may impede their ability to employ health care providers (Marinelli-Casey, Domier, & Rawson, 2002). In addition, programs may face restrictions about how certain types of state funding may be spent. For example, state contracts with addiction and mental health providers place conditions on how programs can use those funds. The structure of state contracts has been shown to affect other types of organizational decisions, such as the adoption of evidence-based practices (Isett, et al., 2007, 2008; McCarty, Gustafson, Capoccia, & Cotter, 2009; Roman & McCarty, 2009). It may be the case that some states restrict whether their funding can be used to support the employment of health care providers, such as nurses. Finally, substance abuse treatment programs may struggle to find nurses with experience in treating patients with substance use disorders in the local labor market, particularly given the national nursing shortage (Clark, 2010; Parry, 2008; Spetz & Given, 2003). To date, no studies have considered whether these environmental factors are associated with the employment of nurses in substance abuse treatment programs.

For the current study, a sample of 250 administrators of publicly funded treatment substance abuse treatment organizations were recruited to provide data regarding nurse employment, organizational characteristics, and environmental factors. We defined nurse employment as

the number of nurses who were on staff (i.e., on the payroll) of the treatment organization. Two research questions guided this research. First, are organizational characteristics associated with the employment of nurses in substance abuse treatment programs? Second, is nurse employment associated with the financial resources of treatment programs, state funding policies, and the local labor market?

METHODS

Sample

Quantitative data were collected from an existing US sample of publicly funded substance abuse treatment centers that had previously participated in the National Treatment Center Study (NTCS). Programs were originally recruited using a two-stage sampling design that first randomly selected US counties and then randomly sampled organizations within those counties (Knudsen, et al., 2010). Telephone screening was conducted to determine eligibility based on three criteria. First, the organization's treatment services must be open to the public (e.g., not located within the Veterans Health Administration or in correctional facilities). Second, the organization was required to offer a minimum level of treatment at least equivalent to structured outpatient programming for addiction to drugs and/or alcohol (Mee-Lee, Gartner, Miller, Shulman, & Wilford, 1996). Third, the organization was required to meet a definition of publicly funded by either receiving at least 50% of their past-year revenues from government block grants/contracts or having at least 50% of their patients' source of primary payment come from allocated public funds (e.g., block grants and contracts, but not public insurance). When this cohort was established in 2004-2006, face-to-face interviews were conducted with 318 administrators (response rate = 80.0%). This cohort of treatment organizations served as the sample for the current study.

Data Collection

Between August 2009 and June 2010, data were collected via mailed surveys and telephone interviews. Trained interviewers attempted to contact all 318 treatment centers via telephone to determine if they still delivered substance abuse treatment. This process identified 27 programs that had closed, meaning the organization had ceased to exist or it no longer delivered substance abuse treatment. Next, survey packets containing a study description letter, the survey, two informed consent forms, an honorarium payment form, and a postage-paid return envelope were mailed to the administrators of the 291 organizations still open at the time of the study. Non-responding administrators were mailed a second survey packet after 6 weeks of non-response. Administrators who did not respond to either survey were contacted by telephone. After providing informed consent, administrators were interviewed by telephone using the same measures as the mailed survey. Regardless of mode of participation, organizations received a \$50 donation for participating. Of the 291 substance abuse treatment organizations open at the time of the study, data were collected from administrators of 250 organizations (response rate = 86%). The institutional review boards (IRBs) of the University of Georgia and the University of Kentucky approved these research procedures.

Measures

Program administrators were asked to provide information about staffing, organizational characteristics, and the external environment. The dependent variable of nurse employment consisted of the number of nurses—inclusive of registered nurses, licensed practical nurses, and nurse practitioners—employed by the program; in other words, this definition refers to nurses who are on the center's payroll as employees. Given that nurse employment was likely to be greater in larger organizations, the number of counselors on staff served as a proxy for organizational size.

Six organizational factors, measuring structural characteristics, levels of care, and treatment philosophy, were measured. Structural characteristics consisted of ownership (1 = government owned, 0 = privately owned), whether the program was located in a health care setting (1 = located within a community mental health center or hospital, 0 = freestanding), and whether the treatment organization was accredited by an external organization such as The Joint Commission or CARF (1 = accredited; 0 = not accredited). Two levels of care were measured: whether the organization offered medically supervised detoxification (1 = available, 0 = not available) and whether the organization only delivered outpatient treatment (1 = outpatient-only, 0 = not outpatient-only). Three items, combined into a mean scale (Cronbach's $\alpha = .78$), measured the program's consistency with the twelve-step model of recovery (Kasabada, et al., 2001), with responses ranging from 0 representing "strongly inconsistent" and 4 indicating "strongly consistent."

Three indicators of the external environment were measured. First, administrators rated their agreement with three items measuring financial barriers to nursing staff. Specifically, administrators were asked whether having nurses on staff would exceed the center's resources, whether contracting with nurses would exceed the center's resources, and whether the organization's primary funder did not adequately reimburse nursing time. Responses ranged from 0 (strongly disagree) to 4 (strongly agree) and were averaged (Cronbach's $\alpha = .86$). Second, administrators were asked, "Can treatment providers with state contracts to provide addiction treatment services use those state contract funds to pay for physician or nurse time?" We collapsed the "no" and "don't know" responses into a single group because state policies are unlikely to affect staffing decisions if administrators were unaware of such policies. Finally, administrators were asked how difficult it was to find nurses who were experienced in treating substance abuse in the local labor market; responses ranged from 0 representing "very easy" to 4 representing "very difficult."

Statistical Analysis

First, we calculated descriptive statistics for all study variables. Because the measure of nurse employment consisted of a count, models were estimated using negative binomial regression (Long & Freese, 2006). For count data, this type of regression is superior to ordinary least squares (OLS) regression because it avoids the violation of three key assumptions (Beck & Tolnay, 1995). First, counts only exist as whole numbers, meaning they are not truly continuous. Second, negative counts are impossible; the minimum value of a count is zero. Third, count data are often skewed with a large number of cases equaling zero. An additional benefit of negative binomial regression is that relationships between the independent and dependent variables can be expressed as percentage changes in the expected count (Long, 1997). The change in the expected count for a one-unit increase in a particular independent variable can be calculated by the formula: $(100)(e^b - 1)$, where b is the unstandardized coefficient (Long, 1997). Similarly, changes in the expected count can be calculated for a standard deviation increase in a given covariate or at that covariate's maximum value. Initially, we estimated bivariate models of nurse employment, and then we constructed a final multivariate model incorporating all significant bivariate covariates ($p < .05$, two-tailed tests).

Missing data on the covariates were addressed using multiple imputation because listwise deletion would have resulted in the loss of 14.8% ($n = 37$) of cases (Allison, 2002). Based on the recommendation of Allison (2009), we excluded one case with missing data on the dependent variable, leaving 249 cases for analysis. Implementation of the user-written command, "ice," in Stata 12.0 (StataCorp, College Station, TX) resulted in 20 imputed datasets (Royston, 2005a, 2005b). This method of multiple imputation is stronger than other methods of imputation (Ambler, Omar, & Royston, 2007). Then, the "mi estimate"

command was used to produce a single set of results based on the pooling of model estimates from each of the 20 imputed datasets (Barnard & Rubin, 1999; Royston, 2004).

RESULTS

Descriptive Statistics

Descriptive statistics appear in Table 1. The average publicly funded substance abuse treatment center employed 1.6 nurses ($SD = 3.8$), with a range of 0 to 30 nurses. However, about 61.5% of the sample employed no nurses on staff, while 18.1% employed only one nurse and 20.1% employed more than one nurse. About 58.2% of administrators indicated that it was “somewhat difficult” or “very difficult” to find nurses in the local labor market. Financial barriers to employing nurses were also salient, with 47.9% of administrators indicating they “agreed” or “strongly agreed” (i.e., scores on the scale = 3) that insufficient financial resources were a barrier to nurse employment. Nearly half of administrators reported that that state contract funding could be used to pay for health care providers, such as nurses or physicians, but about one-third did not know whether this was allowed in their state.

Negative Binomial Regression Models of Nurse Employment

Bivariate associations between the study variables and nurse employment appear in the first column of Table 2. Most study variables were associated with the employment of nurses within these substance abuse treatment organizations. As expected, organizations employing a greater number of counselors also employed a greater number of nurses. Government-owned treatment organizations employed more nurses than privately owned treatment centers. Treatment programs embedded in health care settings and those that were accredited employed more nurses than freestanding clinics and those that were not accredited. Organizations that only offered outpatient levels of substance abuse treatment employed fewer nurses than organizations that offered inpatient or residential treatment services. Twelve-step orientation was not associated with the number of nurses employed by treatment centers.

Two of the environmental factors were significantly associated at the bivariate-level with the number of nurses on staff. Greater endorsement of the financial barriers scale was negatively associated with the number of nurses working at the center. However, programs reporting that state contract funding could be used to pay for health care providers employed a greater number of nurses. Local labor market conditions were not associated with nurse employment.

A multivariate model of nurse employment is presented in the second column of Table 2. Most variables from the bivariate models of nurse employment remained significant, with the exception of accreditation status. Controlling for the other variables in the model, there were positive associations between nurse employment and organizational size, government ownership, location in a health care setting, the availability of detoxification services, and a state funding policy that allowed contract funding to support the costs of health care providers. A standard deviation increase in the number of counselors ($SD = 19.2$) was associated with a 46.9% increase in the expected number of nurses [$46.9\% = (100)(e^{(.02)(19.2)} - 1)$]. The expected count of nurses in government-owned substance abuse treatment organizations was 127.0% greater than in non-governmental programs [$127.0\% = (100)(e^{(.82)} - 1)$], while the number of nurses was estimated to be 71.6% greater in programs located within health care settings relative to freestanding clinics. The difference based on the availability of detoxification services was quite large; the expected count of nurses was 188.6% greater in organizations offering detoxification than those without this service.

Finally, the difference in the expected count of nurses based on awareness of a state policy allowing the use of contract funding to pay for health care providers was considerable. Programs aware of such a policy had an expected count of nurses that was 80.4% greater than programs unaware of this policy.

Two variables were negatively associated with the employment of nurses in the multivariate model. First, the expected count of nurses was about 54.2% lower in outpatient-only facilities than in organizations offering some inpatient or residential levels of care. Second, a one-unit increase in the scale of financial barriers was associated with a 39.9% decrease in the expected number of nurses. Put another way, compared to programs at the minimum of the financial barriers scale, the expected count of nurses was 86.5% lower in programs that endorsed the maximum of this scale [$-86.5\% = (100)(e^{(-.50)(4)} - 1)$].

DISCUSSION

This study was one of the first to examine the organizational and environmental factors associated with the employment of nurses in publicly funded substance abuse treatment organizations. The majority of these treatment programs did not employ any nurses on staff, a finding similar to prior work on nurse employment in adolescent treatment programs (Knudsen, 2009a, 2009b). The program-level average of 1.6 nurses partly reflects the influence of a small number of programs with a substantial number of nurses.

Several of the organizational correlates of nurse employment reflect a more bio-medical approach to treatment. Given the medical complexities of detoxification from alcohol and other drugs (McCorry, Garnick, Bartlett, Cotter, & Chalk, 2000), it is logical that organizations offering these services also employ more nurses. Conversely, programs that only deliver outpatient treatment may perceive that their patients will receive medical services elsewhere. Programs offering residential or inpatient treatment may serve patients with greater medical needs and more severe addiction (Hser, Evans, Huang, & Anglin, 2004; Simpson, Joe, Fletcher, Hubbard, & Anglin, 1999), which may explain why these programs employ more nurses than outpatient-only facilities. In addition, employing nurses is highly normative if a substance abuse treatment program is embedded within a larger health care organization, so it is not surprising that such programs employed more nurses than freestanding clinics.

Financial limitations were significant barriers to the employment of nurses in this sample of publicly funded substance abuse treatment programs. One barrier was simply a lack of financial resources, with programs reporting that the costs of hiring nurses and limited reimbursement by funding agencies were impediments to nurse employment. This type of barrier is likely to be very difficult to address, particularly in the current economic climate. It remains to be seen how the implementation of health care reform will impact these publicly funded substance abuse treatment programs, and whether these programs will shift their funding strategies to attempt to attract more patients with private insurance and Medicaid as a way to expand their financial resources. However, the pressures to constrain state budgets may reduce financial resources even further, which may worsen the prospects of increasing nurse employment in these settings.

A related, but somewhat different, barrier was how the requirements embedded within state contracts may limit how programs can use such funding. Programs unaware of whether state contract dollars could support health care providers or those in states where such funding could not be used in this manner employed fewer nurses than programs aware of a supportive state policy. A substantial proportion of programs did not know if state funding

could be used to support the employment of health care providers, suggesting a need in some states for greater dissemination about these policies.

Several limitations related to the research design should be noted. First, these analyses are based on cross-sectional data, so causality cannot be established based on these results. Second, this sample was restricted to the publicly funded treatment sector. These findings may not generalize to other types of substance abuse treatment programs, such as programs dependent on private funding (e.g., insurance and self-paying clients) and those located within the Veterans Administration system, opioid treatment programs, or correctional facilities.

Third, administrators were the sole source of data, and self-reported data may be influenced by social desirability and recall bias. For example, our measure of the state's funding policy regarding health care providers represents the perception of the administrator; we could not validate whether respondents were accurate in their perceptions. In a previous paper, we attempted to validate another state policy measure, specifically administrators' perceptions regarding whether their state's Medicaid formulary included at least one substance abuse treatment medication. Our comparison of administrators' responses to a publicly available report on Medicaid formularies indicated that the vast majority of these administrators were accurate, providing some evidence for the validity of their perceptions of the policy environment (Knudsen & Abraham, 2012). Future research on the employment of nurses should consider obtaining measures of the policy environment from key informants who work for the state, such directors of the Single State Agencies, and then linking that data to program-level measures.

In addition, future studies of addiction treatment programs might provide greater detail regarding how program managers make decisions about nursing staff. Such research could address the role of organizational culture in program-level decisions about employing nurses. In particular, data is needed regarding how program managers view the role of the nursing profession in the delivery of substance abuse treatment. Attention to organizational culture might yield important knowledge about whether managers of programs that currently lack nurses would hire them in the absence of funding barriers.

Although our research was conducted at the level of treatment organizations, it should be noted that there have been few studies of the addiction nursing workforce at the individual-level (Knudsen, Abraham, Roman, & Studts, 2011). Little is known about the demographics of this segment of the nursing workforce, so it is unclear how broader trends in the aging of the US population will impact the availability of nurses to work in substance abuse treatment. Furthermore, there are scant data regarding the processes that attract nurses into employment within substance abuse treatment programs or how nurses are prepared to care for patients with addictions. Finally, it is unclear whether the processes of turnover for nurses working in substance abuse treatment are similar to the antecedents identified in the large, well-established literature on nurse turnover within mainstream health care settings (Flinkman, Leino-Kilpi, & Salanterä, 2010; Hayes, et al., 2006; Simon, Muller, & Hasselhorn, 2010).

Previous research on the substance abuse treatment workforce has not examined the employment of nurses within treatment settings. These data indicate that only a minority of publicly funded treatment programs employ nurses on staff, which may pose challenges for the implementation of certain evidence-based practices, such as medications and primary care services. The multivariate model of nurse employment suggests that both organizational and environmental factors are related to program-level decisions about the inclusion of nurses as part of their workforce. There are many unanswered empirical questions about the

roles of nurses in the delivery of substance abuse treatment, leaving ample directions for future research at the levels of both organizations and individual nurses.

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TABLE 1

Descriptive statistics of publicly funded addiction treatment organizations

	Mean (SD) or % (N)
Number of nurses on staff	1.57 (3.76)
Organizational size (number of counselors on staff)	12.13 (19.24)
Center is owned by state or local government	17.4% (43)
Located in a health care setting (hospital or community mental health center)	17.7% (44)
Center is accredited (e.g., The Joint Commission, CARF)	51.0% (125)
Detoxification is available	20.0% (49)
Center only offers outpatient treatment	46.4% (115)
Twelve-step orientation (ranges from 0 to 4)	2.31 (1.01)
Difficulty in finding nurses experienced in treating patients with substance abuse (ranges from 0 to 4)	2.65 (1.06)
Financial barriers to employing nurses (ranges from 0 to 4)	2.57 (1.22)
State contract funding can be used to pay for health care providers	
Yes	49.6% (122)
No	16.3% (40)
Don't know	34.1% (84)

Note: Available data prior to multiple imputation are presented. Sample sizes for each variable ranged from 234 to 249 organizations.

TABLE 2

Negative binomial regression models of number of nurses on staff in publicly funded SUD treatment organizations

	Unadjusted b (95% CI)	Adjusted b (95% CI)
Organizational size	.03 [*] (.00; .05)	.02 [*] (.00; .03)
Government ownership (vs. privately owned)	.99 ^{**} (.30; 1.69)	.82 ^{**} (.30; 1.34)
Location in a health care setting (vs. non-health care setting)	1.18 ^{**} (.51; 1.86)	.54 [*] (.01; 1.08)
Accredited (vs. not accredited)	.78 ^{**} (.23; 1.33)	-.02 (-.50; .47)
Detoxification is available (vs. not available)	2.12 ^{***} (1.58; 2.65)	1.06 ^{***} (.55; 1.57)
Outpatient-only treatment (vs. not outpatient-only)	-1.45 ^{***} (-1.99; -.91)	-.78 ^{**} (-1.25; -.30)
12-step orientation	-.10 (-.38; .18)	---
Difficulty in finding nurses experienced in treating patients with substance abuse	.21 (-.03; .46)	---
Financial barriers to employing nurses	-.79 ^{***} (-1.05; -.54)	-.50 ^{***} (-.72; -.28)
State contract funding can be used to pay for health care providers	1.38 ^{***} (.85; 1.92)	.59 [*] (.11; .96)

Note: b = unstandardized coefficient; CI = confidence interval;

*
p < .05

**
p < .01

p < .001 (two-tailed tests).