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The Impact of Caseload on Case Closure Rates for Clients with Intellectual and Developmental Disabilities

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Abstract. The vocational rehabilitation (VR) counselor who treats individuals with intellectual or developmental disabilities (IDD) is presented with notable challenges, frequently including a heavy caseload. Counselors with a heavy caseload risk burnout, which can compromise service quality. This research investigates the correlation between a counselor's caseload and case closure rates by analyzing client records linked with counselor survey data sourced from four US states. Employing multilevel logistic models within the potential outcome framework, the study addresses the intricate dynamics at play. Among a cohort of 5,840 IDD clients associated with 177 counselors, the overall case closure rate (CR) stood at approximately 36%, with a high-quality case closure rate (HQCR) of 21%. An examination of the relationship between counselors' caseloads and case closure rates for IDD clients revealed a non-linear pattern. Notably, those with a moderate caseload (36-50 cases per year) exhibited higher CR and HQCR compared to both lower and higher caseload groups. Adjusting for client and counselor characteristics, the analysis demonstrated that the 51-75 caseload group had lower overall CR and HQCR than the 36-50 caseload group (rate difference for CR: -6.6%, $p=0.004$, and for HQCR: -4.1%, $p=0.04$). Similarly, the lowest caseload group (1-35 cases per year) exhibited lower overall CR (rate difference: -10.0%, $p=0.006$) and lower HQCR (rate difference: -7.1%, $p=0.01$). Furthermore, for IDD clients with less severe disabilities, substantial rate differences in overall CR were observed in the lowest caseload group (-13.5%, $p=0.001$) and the 51-75 caseload group (-6.6%, $p=0.008$) compared to the moderate caseload group. This pattern persisted among counselors with over six years of working experience or those holding a master's degree in rehabilitation counseling. The observed closure rate differences bear significant clinical implications, suggesting that both lower and higher caseloads detrimentally affect service quality. Consequently, VR agencies are urged to furnish VR counselors with additional resources and comprehensive caseload management training to optimize their professional performance.

Introduction

Intellectual or developmental disabilities (IDD) affect about 1% of the world's population, and males are more likely to be diagnosed with IDD (American Psychiatric Association, 2021). Domestically in the US, IDD affects about 2–3% of the general population, with a male subset in excess estimated at around 30% (Van der Werf et al., 2020.) It also makes up the majority of young people with disabilities. The exact causes for IDD remain elusive and include genetic/hereditary factors, complications post-major illnesses, environmental influences, and maternal behaviors. Although IDD is a life-long condition, efforts such as early intervention, vocational

rehabilitation, and ongoing case management should be provided to help IDD clients to become autonomous. Nevertheless, disparities persist in the delivery of services and the quality of care in the treatment and rehabilitation of individuals with IDD (Siperstein et al., 2014; Cimera, 2010; Park, 2010.; Awsumb et al., 2016).

Vocational counseling for individuals with IDD is challenging, as IDD can interfere with an individual's general mental faculties, including basic self-sufficiency and basic independent thinking. The overarching goal of the vocational rehabilitation program, jointly funded by federal and state, is to help clients, including

IDD clients, to obtain the necessary skills to enter the labor market (Leahy et al., 2019; Commission on Rehabilitation Counselor Certification [CRCC], 2022; Rehabilitation Services Administration [RSA], 2022). Typically, vocational training is highly regimented and structured, and clients carry out pre-scheduled activities under the supervision of a multi-disciplinary team that may consist of a social worker, occupational therapist, teacher, counselor, psychologist, and other associated paraprofessionals (Goettl et al., 2020). At a minimum, clients learn to keep themselves clean, wear appropriate clothes, carry out their responsibilities, and meet both pre-established academic and occupational expectations. There is consistent evidence indicating that individuals who underwent vocational training demonstrated decreased reliance on support compared to their counterparts and attained independent living at an earlier stage (Migliore et al., 2007; Cheng, 2018; Smith, 2013).

Many factors have been linked with VR counselors' case closure rates (Wehman et al., 2014; Sulewskiet et al., 2012; Sevak et al., 2019). For example, clients with lower socioeconomic status were more likely to have unsuccessful and poor case closure outcomes (Wheaton et al., 1996; Hollard et al., 2008; Yamamoto et al., 2013; Bates-Maves et al., 2017; Sherman et al., 2017). Employment outcomes among VR clients can be influenced by various factors, both personal and contextual, including those related to employers. Furthermore, prior research, including our own, has indicated that counselors possessing a master's degree in rehabilitation counseling exhibit higher rates of case closure compared to those with alternative training (Wheaton et al., 1994;

McKay et al., 2018a; 2018b; Yu et al., 2022; Sevak et al., 2019).

Unfortunately, scant attention is directed toward a tailored VR approach to IDD clients and their interaction with VR counselors. As reviewed in our previous study, caseload management has become an important factor in providing quality services to clients (Yu et al., 2022). An excessive caseload can increase the risk of work-related stress and reduce the quality of services among counselors (Maslach et al., 1988; Kierpiec et al., 2010; O'Sullivan & Bates, 2014; Tabaj et al., 2015). High caseloads may also impede the establishment of a counselor-client working alliance which is critical to a client's success in obtaining employment (Payne, 1989; Cain, 1994; Main, 2002; Layne et al., 2004; Templeton et al., 2007; Kierpiec et al., 2010; Bates-Maves et al., 2017). Finally, overwhelming stress and compassion fatigue may lead to burnout and high turnover rates among counselors (Chan, 2003; Park et al., 2010; Tabaj et al., 2015). We have conducted a prior study exploring the caseloads of the VR counselors and case closure rates of clients with disabilities and found that there was a non-linear relationship between counselors' caseloads and the clients' case closure outcomes. We found that a moderate caseload yielded the best case-closure outcomes among clients. However, questions remained, such as whether non-linear association persists among the IDD population, as VR counseling is more challenging in such cases. While it is logical to assume that disability types should not affect the counselors' case closure rates in terms of caseload management, different types of disabilities could either adversely impede or

facilitate desirable case closure rates differently.

Furthermore, as pointed out in previous studies (MacKay et al., 2018a; Yu et al., 2022), in addition to obtaining employment, i.e., achieving a successful case closure, it is more important to obtain a high-quality employment outcome, i.e., obtaining a full-time job and/or earning a living wage income. For clients with disabilities, a high-quality employment outcome may indicate a better career path and is more likely to lead to independent living due to economic independence.

In this study, we will conduct an empirical analysis to explore the association between counselors' caseloads and case closure rates in an IDD population using VR client records linked to a survey of counselors from four states. Specifically, we will address the following three research questions (RQ):

RQ1: Are counselors' high caseloads associated with higher overall case closure rate (CR) and high-quality case closure rate (HQCR) among clients?

We hypothesized that high caseloads will result in lower overall CR and HQCR. HQCR includes full-time jobs (30 hours/week) and living wage jobs (wage \geq \$11.25 per hour).

RQ2: Can the client's demographic and clinical characteristics modify the above association?

We hypothesize that the observed patterns will persist even after adjusting for the client's characteristics and the severity of the disability.

RQ3: Can a counselor's working experience and educational training modify the above association in addition to clients' characteristics?

We hypothesized that more working experience and training in rehabilitation counseling may increase the CR and HQCR and reduce the effects of caseloads on the CR and HQCR.

Our study will provide strong evidence regarding the appropriate level of caseload for VR counselors in providing quality services to IDD clients and help state agencies and policymakers optimally allocate resources and caseloads among VR counselors.

Methods

The current study was approved by the Institution Review Board (IRB) of the primary authors' institution before its initiation, as well as rehabilitation agencies of the participating states: Connecticut (CT), Florida (FL), Idaho (ID), and Utah (UT) provided support to this study.

Measurements and Procedures

The survey instruments were developed and tested previously at the primary authors' institution and implemented using the Qualtrics® online survey system (Mackay MM et al., 2018a). There were 23 items included in the survey questionnaire, including counselors' demographics, year of graduation, highest education and discipline, years of experience as a rehabilitation counselor, perceived preparedness for work as a rehabilitation counselor, and knowledge and concerns about rehabilitation counseling.

The counselor's survey records were lined with their case service records and were also used by state rehabilitation agencies for generating RSA-911 reports for the years 2014 to 2017. These individual case records included clients' demographics, case closure status (employed or not), and if employed, job title, working hours per week, and hourly wage. The client's disability type and severity were also included. The final analytic data were cleaned and anonymized by the study investigators.

Counselors

All VR counselors employed by the participating state vocational rehabilitation agencies as of 2017 were invited through emails with links to the online survey. The counselor's participation was voluntary, with no incentives. Only those counselors who had completed all survey questions and had at least 1 IDD case were included in the final analysis (N=177) (Table 1).

Clients

All IDD clients who had received services from the above VR counselors were included in the analysis. However, we excluded those who were employed before the counseling, died before the exit, were aged 60 or above, were not impaired or not eligible at the time of the exit, and had disabilities that were too severe to receive employment or continue the counseling at the exit. There were 5,840 IDD clients included in the final analysis (Table 2).

Data Analysis

The main outcomes were the counselor's overall case closure rate (employed or not)

and high-quality case closure rate (working for 30 or more hours per week, i.e., full-time job, the full-time case closure rate [FTCR], or earning a minimum of US \$11.25 per hour, i.e., living wage job, or living wage case closure rate [LWCR]). The threshold of \$11.25 per hour was derived from the US President's Executive Order 13658, which set a minimum wage to \$11.25 per hour for federal contractors, effective on Jan 1, 2022. The main predictor was the counselor's annual caseload for all clients (including those non-IDD clients and those excluded from the final analysis). We categorized the caseload into four groups based on quartiles of caseloads: 1 – 35, 36 – 50, 51-75, and 75-180 cases per year. The 26-50 group is considered a moderate caseload group and served as the reference group in the analysis. The distribution of the caseload for all clients and IDD clients was presented in Figures 1a and 1b. We chose quartiles of caseloads to be more empirically objective while maintaining a sufficient sample size in each group.

The important covariables included the counselor's characteristics such as age, years of experience (less than 6 years vs. 6 years or more), having a master's degree in rehabilitation counseling or other master's degrees, and the client's characteristics such as age, education, and the severity of disability (less severe vs. more severe). The state information is also included to account for geographic and policy variations (Tables 1 and 2).

The characteristics of counselors and their IDD clients were described using means or medians for continuous variables and frequencies for categorical variables. Both unadjusted and adjusted rate differences in

overall CR and HQCR were compared by the levels of caseloads. In addition, since clients were clustered within counselors, multilevel logistic regressions with robust variance were used to obtain adjusted rate differences and proper standard error of the estimates. The adjusted rate differences were marginal probabilities calculated from the predicted probabilities from the models assuming all counselors fell into one of the caseload levels, as suggested by the potential outcomes framework (Imbens & Rubin, 2015). Additional stratified analyses were conducted with separate multivariate models to explore the different impacts of clients' and counselors' characteristics on both overall CR and HQCR outcomes.

All analyses were conducted with Stata 16.1 (Stata LLC, College Station, Texas), and a p-value of less than 0.05 was considered statistically significant. However, no formal multiple comparisons were adjusted.

Results

Counselor's and Client's Characteristics

The analysis included 177 counselors from four states; about 44% of them were recruited from UT (Table 1). The average age was 43 years old, and about 69% of counselors were females. Those with an annual overall caseload of 75-180 had an average age of 45, older than those of other caseload groups, and they also had more years of experience (mean: 10 years compared with 7-9 years of experience in other groups). About half of the counselors had more than six years of experience, and about 86% of counselors had a Master's degree, with half of them being in rehabilitation counseling. Although the average caseload for all types of cases was

53, on average, a counselor had about 8 IDD cases per year (IQR: 5-13). The distributions of caseloads for all types and IDD cases were highly skewed, with some counselors having significantly higher caseloads (Figure 1a and 1b).

This study included 5,840 IDD cases who were linked with the above counselors, with 37% of them in UT (Table 2). The average age for all clients was 27.7 years old, and 86% of them are white. About 33% of them had no high school diploma, and 35% of them had a high school diploma. There were no significant differences in the distribution of age, race/ethnicity, and education across caseload groups of counselors. In addition, about 53% of IDD clients had more severe disabilities in the highest caseload group, higher than those with other groups.

The overall case closure rate (CR) was 36% for all IDD clients, while the High-Quality Case closure Rate (HQCR) was only 21%. Those in the 36-50 caseload group had the highest CR (42.9%) and HQCR (30.3%), while those in the 75-180 caseload group had a lower CR (27.1%) and HQCR (16.4%) (both comparisons $p < 0.01$, Table 2). Similarly, only 19% of IDD clients obtained a full-time job CR, and only 9% had a living wage job CR.

RQ1: Are counselors' high caseloads associated with a higher overall case closure rate (CR) and high-quality case closure rate (HQCR)?

Counselors in the second caseload group (36-50 cases per year) had the highest over CR (47.4%) and HQCR (29.3%) (Table 3). Using this second group as the reference, counselors in both the lowest caseload group (1-35 cases per year) and the third (51-75

cases per year) or the highest (76-180 cases per year) groups had much lower case-closure rates than the second group (unadjusted rate difference, -14.4%, $p=0.007$; -9.5%, $p=0.02$; and -22.4%, $p<0.0001$ for the first, third, and fourth groups, respectively). Similar patterns existed for HQCR (unadjusted rate differences: -9.2% $p=0.04$; -7.3%, $p=0.03$; and -13.7%, $p<0.0001$ for first, third, and fourth groups, respectively). The general patterns of differences between full-time jobs and living wage jobs persisted but to a lesser degree.

RQ2: Can the client's demographic and clinical characteristics modify the above association?

As shown in Table 3, the rate differences between the fourth and second caseload groups were reduced after adjusting for the client's demographic and clinical characteristics. However, those differences became more statistically significant. Compared with the second group, those within the caseload group of first, third, and fourth groups had statistically significantly lower overall CR (-9.9%, $p=0.006$; -6.2%, $p=0.006$; and -7.7%, $p=0.007$, respectively). In addition, among clients with less severe disabilities, similar patterns persisted, and counselors of lower or higher caseload groups had lower CR and HQCR, including FTCTCR and LWCR.

RQ3: Can a counselor's working experience and educational training modify the above association in addition to clients' characteristics?

Further adjustment for the counselor's characteristics also reduced the rate differences between caseload groups (Table

3). Compared with counselors with second group (36-50 cases per year), those counselors with lowest, third, and fourth caseload groups had significantly low overall CR (adjusted rate difference: -10.0%, $p=0.006$; -6.6%, $p=0.004$; and -8.3%, $p=0.005$, respectively), and also had low HQCR (adjusted rate difference: -7.1%, $p=0.01$; -4.1%, $p=0.02$ for the first and third group, respectively). In addition, among those IDD clients with less severe disabilities, after full adjustment, the overall CRs were lower in the first, third, and fourth caseload groups (-13.5%, $p=0.001$; -6.6%, $p=0.008$; and -8.4%, $p=0.01$), compared with those in the caseload group of 36-50. Table 4 presented findings from separate analyses of the counselor's working experience and educational training. The general patterns in rate differences persisted, and for counselors with more than six years of experience, counselors with the highest caseload groups had statistically significantly lower case-closure rates than those in the group 36-50 cases per year (adjusted rate difference: -18.8% $p<0.0001$, and -13.9%, $p=0.001$ for overall CR and HQCR, respectively). Among those with a master's degree in rehabilitation counseling, those with either lower or higher caseloads also had lower case closure rates than the moderate caseload group (adjusted rate differences: -12.4%, $p=0.002$; -8.3%, $p=0.008$, and -11.2%, $p=0.006$ for first, third and fourth group, respectively).

Discussion

This study found a non-linear association between counselors' caseloads and case closure rates for their IDD clients. Those with a moderate caseload (36-50 cases per year) had the highest overall case closure rates (CR) and high-quality case closure

rates (HQCR) compared to both lower or higher caseload groups, based on the statistical significance of the finding. After adjusting for both client's and counselor's characteristics, compared with those in the 36-50 caseload group, the rate differences were about 6-10% lower for the overall CR and 3-7% lower for HQCR in the lowest caseload group (1-35 cases per year) or higher caseload groups (51-75 cases or 76-180 cases per year). Furthermore, the above differences were more evident among IDD clients with less severe disabilities. This pattern persisted among those with more than six years of working experience or with a master's degree in rehabilitation counseling. Given that the overall CR was only about 36% and the HQCR was 21% for all the IDD clients, the above rate differences were substantial and clinically meaningful.

VR counseling for IDD clients during the information age is challenging, and IDD clients frequently encounter challenges in acquiring the skill sets demanded by the current job market. Therefore, in addition to experience and training, VR counselors may need to spend more time with their clients with IDD. Caseload management is one key component of VR counseling (Grubbs, LA et al. 2006).

However, the caseload may be affected by the demand for VR services in the community, the counselor's ability to handle cases, and regulatory and reimbursement policies. As shown in our study, those with higher caseloads tended to have more experience and were older. On the other hand, clients of counselors with higher caseloads were also more likely to have more severe disabilities. Finally, there might be self-selection bias because clients might

leave counselors who provided lower-quality services, leading to lower caseloads and lower CR. In this study, we found significantly lower CR and HQCR among the clients of counselors with an annual caseload of 1-35 cases, even after adjusting for both clients' and counselors' characteristics and among those clients with less severe disabilities, indicating that lower caseload leads to lower quality of services.

Unexpectedly, higher caseloads led to lower CR, although counselors with higher caseloads tended to be more experienced. On the other hand, it is well known that counselors may experience burnout with a high caseload, and they also spend less attention on each client (Yang & Hayes, 2020). Therefore, the counseling may be less effective, and the quality of services may be lower, leading to lower CR and HQCR. Previous research has shown that a heavy caseload could increase work-related stress, cause burnout and high turnover, and lead to lower quality of services (Chan, 2003; Yang & Hayes, 2020). This is more relevant for human services providers, including VR counselors who are working with vulnerable populations. Recent studies have also shown that counselors ought to form a working alliance with their clients to enhance their ability to secure employment in a competitive job market (Kierpiec et al., 2010). A higher caseload, potentially resulting in work-related burnout among counselors, including unbearable emotional exhaustion, depersonalization, preconceived prejudices, and alienation from the case, is likely to lead to a significant decrease in closure rates (O'Sullivan & Bates, 2014). Insufficient attention to clients resulting from large caseloads may hinder counselors from establishing a working alliance with their clients. As stated previously, skills in

caseload management are critical for VR counselors (Froehlich et al., 2002; Grubbs et al., 2006; Neubert et al., 2018). Finally, other factors, such as the severity of the client's disability, employment availability in the community, and compliance with treatment, are also related to lower case closure rates (Cooper, 1980; Rogers, 2011; Wang & Ethridge, 2022).

We also specifically examined the case closure rates for high-quality jobs, as the ultimate goal of VR counseling is to help clients get a job in a competitive employment environment. Recent research has pointed to the importance of earning a fair/living wage for people with disabilities (Friedman et al., 2020). We have previously proposed measures of high-quality case closure rates, including both full-time jobs and living wage jobs (Mackay et al., 2018a). Unfortunately, the HQCR was generally low (21%), with only about 19% of IDD clients obtaining a full-time job, and 9% of clients a living wage job. Even more disturbing is that IDD clients in both the lowest and higher caseload groups had lower HQCR than those in the moderate caseload group (36-50 cases per year). Even after accounting for clients' and counselors' characteristics and conducting a stratified analysis based on clients' disabilities, counselors' experience, and education, this pattern endured. To facilitate clients in securing high-quality employment, counselors may require enhanced knowledge, skills, stronger work alliances, and increased attention to their clients. The likelihood of delivering such services may be compromised by high caseloads.

Finally, years of working experience did not ensure counselors could take more cases. In our study, counselors with more than six

years of experience had a higher overall CR and HQCR if the caseload was moderate (overall CR was 48.2% vs. 42.5% for counselors with six or few years of experience and 36% for all counselors). However, for experienced counselors with lower or higher caseloads, their overall CR and HQCR were significantly lower than those with a moderate caseload.

In addition, those with a master's degree in rehabilitation counseling also showed similar non-linear patterns. The underlying mechanisms may be complicated. Experienced counselors and counselors with rehabilitation training may be more willing to take complicated cases. They may also be responsible for taking more patients, as required by state VR agencies. In addition, our study is observational, and there were many unmeasured or unknown factors that influenced the clients' CR. More targeted training is needed, and we are developing outcome-based modules for VR counselors (Yu et al., 2022).

Strength and Weaknesses

One main strength was multiple states with large sample sizes of counselors and IDD clients included in the analyses. Thus, our findings were more generalizable than smaller studies within a single region. In addition, we adopted a modern causal inference framework to account for the confounding issues of both client's and counselor's characteristics. The clustering structure between clients and counselors was explicitly modeled after multilevel models. We calculated the adjusted rate differences based on predictive margins according to a rigorous causal inference framework (Imbens & Rubin, 2015). More importantly, we explored the impact of the client's

disease severity, socio-demographic and clinical characteristics, and the counselor's working experience and academic training on the clients' CR (Sherman et al., 2017). The detailed examinations of HQCR also provided more insights into the need for VR counseling in the current job market.

There were some limitations in our study. The number of counselors included in the analyses was still small (N=177), and the response rates were lower among certain states such as CT and ID. State-level comparisons were thus not conducted. In addition, we did not collect detailed clinical information regarding the client's disease severity and counseling processes. Practice patterns for counselors and VR counseling needs in the community were also not available. There might be unknown factors that have not caught the attention of VR researchers. Therefore, residual confounding exists. In addition, the average caseload and the overall case closure rate in our study were also lower than the national average (RSA, 2022). Selection bias due to non-

response in the counselor's survey might exist. Finally, mechanisms leading to lower CR in lower and higher caseloads were unclear. We were also not able to quantitatively establish a specific optimal caseload for counselors. Our research group is expanding the current research into other states and with a larger and more diverse sample size of counselors.

Conclusions and Implications

In this study, we found that IDD clients' highest client case closure rates occurred among counselors with a moderate caseload (36-50 cases per year). Both lower and higher caseloads will result in poor client case closure outcomes. Therefore, VR counselors may benefit from training in caseload management, more resources, and more training. On the other hand, state VR agencies should actively monitor counselors' caseloads but not push for higher caseloads to ensure the best services are provided by the counselors.

Table 1: Counselor's characteristics of clients by annual caseload groups

	Caseload				Total	
	1 - 35	36 - 50	51 - 75	75 - 180	N	%
Counselors' characteristics						
Total	22.0%	24.3%	30.5%	23.2%	177	100.0%
State						
CT	5.1%	18.6%	25.9%	0.0%	24	13.6%
FL	30.8%	14.0%	14.8%	31.7%	39	22.0%
ID	5.1%	9.3%	13.0%	56.1%	36	20.3%
UT	59.0%	58.1%	46.3%	12.2%	78	44.1%
Sex						
Female	79.5%	58.1%	68.5%	73.2%	123	69.5%
Male	20.5%	41.9%	31.5%	26.8%	54	30.5%
Age (mean, SD)	43.3 (10.7)	42.8 (10.4)	42.3 (10.8)	44.9 (10.6)	43.2 (10.6)	
Years of experience (mean, SD)	7.4 (6.0)	7.8 (5.8)	8.8 (6.6)	10.2 (9.3)	8.6 (7.1)	

More than six years of working experience						
No	53.8%	51.2%	48.1%	53.7%	91	51.4%
Yes	46.2%	48.8%	51.9%	46.3%	86	48.6%
caseload (median and IQR)	19 (14 - 28)	46 (42 - 49)	58 (54 - 66)	90 (80 - 110)	53 (40-72)	
IDD caseload (median and IQR)	3 (2 - 6)	9 (6 - 13)	11 (7 - 15)	12 (7 - 19)	8 (5-13)	
Having a Master's degree						
No	17.9%	14.0%	7.4%	19.5%	25	14.1%
Yes	82.1%	86.0%	92.6%	80.5%	152	85.9%
Master's degree in Rehabilitation Counseling						
No	38.5%	46.5%	37.0%	41.5%	72	40.7%
Yes	61.5%	53.5%	63.0%	58.5%	105	59.3%

Table 2: Characteristics of clients by counselors' annual caseload groups

	Caseload				Total N	%
	1 - 35	36 - 50	51 - 75	75 - 180		
Clients' characteristics						
Total	5.2%	23.0%	34.9%	36.9%	5,840	100.0%
State						
CT	16.5%	20.4%	24.5%	0.0%	824	14.1%
FL	23.1%	5.4%	8.0%	29.5%	942	16.1%
ID	3.3%	23.3%	23.0%	52.3%	1,919	32.9%
UT	57.1%	50.9%	44.5%	18.2%	2,155	36.9%
Age (mean, SD)	28.7 (10.9)	27.1 (10.8)	28.0 (11.0)	27.7 (11.1)	27.7 (11.0)	
Race						
American Indian or Alaska Native	3.3%	1.9%	2.1%	1.0%	100	1.7%
Asian	1.3%	1.1%	1.4%	1.1%	70	1.2%
Black or African American	14.2%	11.0%	8.7%	7.0%	519	8.9%
Multiracial	1.7%	1.4%	1.5%	1.9%	95	1.6%
Unknown	1.0%	0.4%	5.4%	0.1%	22	0.4%
White	78.5%	84.1%	85.8%	89.0%	5,034	86.2%
Education at application						
Elementary education	2.3%	1.9%	3.6%	6.1%	238	4.1%
Secondary education, no HS degree	26.7%	31.4%	22.3%	33.3%	1,675	28.7%
HS degree or equivalent	38.3%	31.0%	36.0%	36.6%	2,054	35.2%

Post-secondary, no degree	12.5%	8.3%	8.6%	4.9%	430	7.4%
Associate degree or vocation/tech	2.3%	3.0%	3.1%	2.5%	165	2.8%
Special education	13.9%	15.9%	18.2%	7.0%	778	13.3%
Bachelor or above	3.6%	6.5%	6.1%	4.7%	326	5.6%
Other or missing	0.3%	1.9%	2.1%	4.8%	174	3.0%
Current student at application						
No	83.5%	81.8%	86.0%	86.8%	4,974	85.2%
Yes	16.5%	18.2%	14.0%	13.2%	866	14.8%
Severe disability status						
Less severe	51.5%	56.1%	46.8%	39.4%	2,714	46.5%
More severe	48.5%	43.9%	53.2%	60.6%	3,126	53.5%
Employed at case closure						
No	65.3%	53.6%	61.2%	72.9%	3,736	64.0%
Yes	34.7%	46.4%	38.8%	27.1%	2,104	36.0%
Weekly hour working if employed (mean SD)	26.3 (11.9)	28.2 (11.1)	27.6 (11.5)	26.4 (13.1)	27.4 (11.9)	
Hourly wage if working (mean, SD)	10.9 (4.1)	10.4 (4.3)	10.6 (5.1)	9.6 (3.7)	10.3 (4.5)	
High-quality employment						
Full-time job	20.5%	26.9%	22.1%	16.4%	1,229	21.0%
Living wage job	17.2%	24.2%	19.9%	15.7%	19.2%	19%
	9.9%	10.8%	9.1%	6.4%	8.5%	9%

Table 3: Overall case closure rates and high-quality case closure rates by counselor's annual caseload groups

Outcome variable	Caseloads	Unadjusted model			Adjusted for clients' characteristics			Adjusted for both clients' and counselors' characteristics		
		Case closure rate	Rate difference (vs. 36-50)	p-value	Adjusted case closure rate	Rate difference (vs. 36-50)	p-value	Adjusted case closure rate	Rate difference (vs. 36-50)	p-value
Overall CR for all clients										
	1 - 35	33.0%	-14.40%	0.007	31.1%	-9.9%	0.006	31.4%	-10.0%	0.006
	36 - 50	47.4%			41.0%			41.4%		
	51-75	37.9%	-9.5%	0.02	34.8%	-6.2%	0.006	34.8%	-6.6%	0.004
	75-180	25.1%	-22.4%	<0.0001	33.3%	-7.7%	0.007	33.1%	-8.3%	0.005
Overall CR for clients with less severe disabilities										
	1 - 35	32.5%	-14.9%	0.01	31.6%	-12.8%	0.002	31.6%	-13.5%	0.001
	36 - 50	47.4%			44.4%			45.0%		
	51-75	35.5%	-11.9%	0.02	38.6%	-5.8%	0.02	38.4%	-6.6%	0.008

75-180	22.3%	-25.2%	<0.0001	36.9%	-7.5%	0.02	36.7%	-8.4%	0.01
HQCR for all clients									
1 - 35	20.4%	-9.20%	0.04	16.6%	-6.9%	0.02	16.9%	-7.1%	0.01
36 - 50	29.6%			23.8%			24.0%		
51-75	22.3%	-7.3%	0.02	20.3%	-3.5%	0.04	20.0%	-4.1%	0.02
75-180	15.9%	-13.7%	<0.0001	20.8%	-2.4%	0.18	20.6%	-3.4%	0.13
HQCR for clients with less severe disabilities									
1 - 35	25.2%	-9.6%	0.07	23.2%	-9.3%	0.03	23.8%	-9.2%	0.02
36 - 50	34.8%			32.5%			33.0%		
51-75	27.6%	-7.2%	0.06	28.2%	-4.3%	0.07	27.9%	-5.1%	0.02
75-180	22.1%	-12.7%	0.002	31.2%	-1.3%	0.64	30.9%	-2.1%	0.5
FTCR for all clients									
1 - 35	17.3%	-9.00%	0.03	14.1%	-7.1%	0.01	14.3%	-7.1%	0.006
36 - 50	26.3%			21.2%			21.5%		
51-75	19.8%	-6.5%	0.02	18.2%	-3.0%	0.07	18.0%	-3.4%	0.03
75-180	15.3%	-11.0%	0.0001	19.6%	-1.6%	0.43	19.4%	-2.1%	0.3
FTCR for clients with less severe disabilities									
1 - 35	22.9%	-8.9%	0.07	20.8%	-9.0%	0.03	21.3%	-8.9%	0.02
36 - 50	31.8%			29.8%			30.2%		
51-75	25.5%	-6.4%	0.08	26.2%	-3.6%	0.11	26.0%	-4.2%	0.04
75-180	21.4%	-10.4%	0.009	29.8%	0.0%	0.99	29.7%	-0.5%	0.85
LWCR for all clients									
1 - 35	9.5%	-3.10%	0.25	7.7%	-2.1%	0.25	7.9%	-2.0%	0.27
36 - 50	12.6%			9.8%			9.9%		
51-75	10.0%	-2.5%	0.17	8.4%	-1.4%	0.25	8.3%	-1.6%	0.19
75-180	6.2%	-6.3%	0.0003	8.7%	-1.1%	0.48	8.6%	-1.3%	0.38
LWCR for clients with less severe disabilities									
1 - 35	12.0%	-3.0%	0.4	10.7%	-3.0%	0.3	11.2%	-2.9%	0.34
36 - 50	15.0%			13.7%			14.0%		
51-75	13.1%	-1.9%	0.4	12.4%	-1.4%	0.42	12.2%	-1.8%	0.3
75-180	10.5%	-4.5%	0.06	13.8%	0.0%	0.98	13.5%	-0.4%	0.84

Note:

CR: case closure rate, HQCR: high-quality case closure rates, including both FTFCR: full-time case closure rates (30 or more hrs/week), LWCR: living wage case closure rates (hourly wage >=\$11.25 /hr). All models are based on the generalized estimation equation method in which the clients are assumed to be clustered within the counselors. The estimated rates are marginal probabilities based on the model predictions (called marginal prediction in statistics)

Model 1: Unadjusted

Model 2: adjusted for clients' age, race, education, disease severity, and state

Model 3: adjusted for clients' age, race, education, disease severity, state, and counselors' age, sex, working years, and rehabilitation training.

Table 4: Overall case closure rates and high-quality case closure rates by counselor’s characteristics

	Overall case closure rates			High-quality case closure rates		
	Adjusted case closure rate	Rate difference (vs. 36-50)	p-value	Adjusted case closure rate	Rate difference (vs. 36-50)	p-value
Six or fewer years of working experience						
All clients						
1 - 35	32.0%	-8.9%	0.15	12.2%	-10.8%	0.002
36 – 50	40.9%			23.0%		
51-75	35.8%	-5.1%	0.13	19.0%	-4.0%	0.06
75-180	36.0%	-4.9%	0.11	22.8%	-0.2%	0.93
Clients with less severe disabilities						
1 - 35	27.2%	-19.2%	0.0002	19.0%	-14.9%	0.01
36 – 50	46.4%			22.9%		
51-75	38.7%	-7.7%	0.07	28.6%	-5.3%	0.09
75-180	39.6%	-6.8%	0.07	33.0%	-0.9%	0.8
More than six years of working experience						
All clients						
1 - 35	32.8%	-11.9%	0.01	22.4%	-6.0%	0.14
36 - 50	44.7%			28.4%		
51-75	35.7%	-9.1%	0.01	23.0%	-5.4%	0.06
75-180	25.9%	-18.8%	<0.001	14.4%	-13.9%	0.001
Clients with less severe disabilities						
1 - 35	35.0%	-11.7%	0.01	27.8%	-4.6%	0.35
36 - 50	46.7%			32.4%		
51-75	38.4%	-8.3%	0.02	28.1%	-4.3%	0.26
75-180	26.2%	-20.5%	<0.001	24.4%	-8.0%	0.13
With MRC						
All clients						
1 - 35	35.0%	-12.4%	0.002	20.7%	-6.2%	0.07
36 - 50	47.4%			26.9%		
51-75	39.1%	-8.3%	0.008	21.7%	-5.2%	0.01
75-180	36.2%	-11.2%	0.006	23.5%	-3.4%	0.22
Clients with less severe disabilities						
1 - 35	39.6%	-12.3%	0.006	30.8%	-7.5%	9.12
36 - 50	52.0%			38.3%		
51-75	43.5%	-8.4%	0.01	31.2%	-7.1%	0.005
75-180	40.1%	-11.8%	0.002	32.3%	-6.00%	0.07
With RM						
All clients						

1 - 35	25.3%	-7.0%	0.4	9.9%	-8.2%	0.05
36 - 50	32.3%			18.1%		
51-75	29.6%	-2.7%	0.41	18.6%	-0.5%	0.86
75-180	28.9%	-3.4%	0.34	16.3%	-1.8%	0.56
Clients with less severe disabilities						
1 - 35	16.5%	-16.5%	0.007	10.3%	-12.0%	0.003
36 - 50	33.1%			22.3%		
51-75	27.9%	-5.2%	0.21	22.1%	-2.4%	0.94
75-180	29.8%	-3.3%	0.49	27.6%	-5.3%	0.22

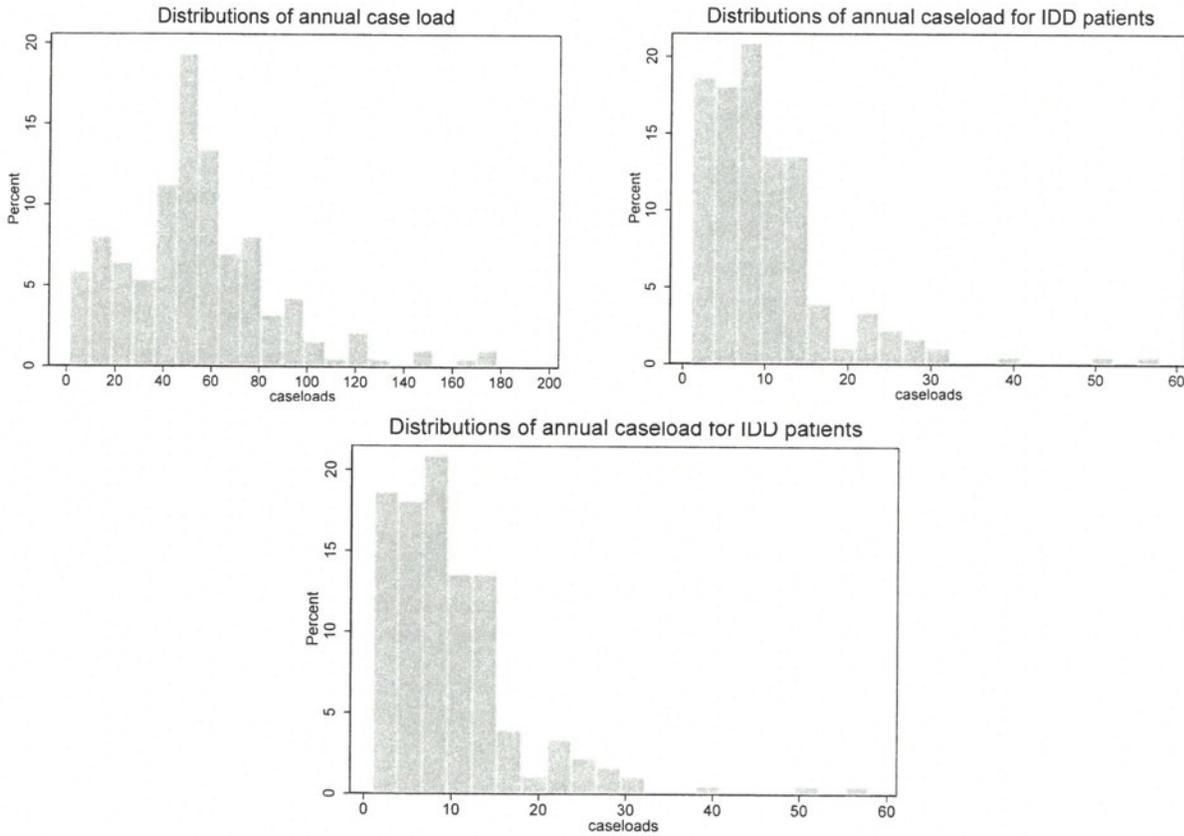
Note:

CR: case closure rates; HQCR: high-quality case closure rates, including both full-time case closure rates (30 or more hrs/week) and living wage case closure rates (hourly wage >=11.25)

MRC: master's degree in rehabilitation counseling; RM: related master's degree

All models are based on the generalized estimation equation method in which the clients are assumed to be clustered within the counselors. The estimated rates are marginal probabilities based on the model predictions (called marginal prediction in statistics).

Figure 1: Distributions of caseloads (a: all types and b: IDD cases)



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