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Permalink

<https://escholarship.org/uc/item/0gk510f6>

Journal

Journal of Eating Disorders, 12(1)

ISSN

2050-2974

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Publication Date

2024-11-18

DOI

10.1186/s40337-024-01150-5

Peer reviewed

RESEARCH

Open Access



Does 24/7 care result in better outcomes for adults with eating disorders? A comparison of inpatient/residential care to partial hospitalization/intensive outpatient care for patients at low BMIs

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Abstract

Background Higher level of care (HLOC) treatment for eating disorders (EDs) is sometimes necessary, but research is lacking on whether HLOCs are actually more effective than less structured, lower levels of care. The purpose of the current study was to compare outcomes for patients with EDs at low weights who entered 24/7 care (inpatient and residential) to those entering non-24/7 care (partial hospitalization programming and intensive outpatient programming).

Methods Participants were 1104 adults with body mass indices (BMI) between 14 and 17 receiving treatment for an ED at a large multisite treatment facility offering HLOCs between August 2019 and February 2024. The Eating Disorder Examination-Questionnaire (EDE-Q), assessing ED psychopathology, was completed at admission and discharge. Weight was taken throughout treatment.

Results In unadjusted analyses, there was a significant difference between those receiving 24/7 care (3.79) versus non-24/7 care (2.17) in BMI increase during treatment. In adjusted analyses controlling for ED diagnosis, length of stay, and admission BMI, results remained the same. Weight gain per week was significantly greater for patients in 24/7 care. Changes in ED psychopathology, as measured by the EDE-Q, were not significantly associated with 24/7 care.

Conclusions The current study suggests that patients with EDs at low BMIs gain more weight at a faster rate when participating in 24/7 care compared to non-24/7 care. Entering treatment at an appropriate level may result in shorter overall lengths of stay and may increase the chances of a positive long-term outcome.

Plain English summary

Patients with eating disorders, particularly anorexia nervosa, are known to be ambivalent about receiving treatment. Because of this, they may be reluctant to enter higher level of care treatment, such as inpatient or

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residential care (24/7 care), because of the highly structured environment and the inability to engage in eating disordered behavior. Inpatient or residential treatment may be the best for them from a clinical standpoint, but there has been no evidence to show that 24/7 care is actually more effective than lower levels of treatment such as partial hospitalization or intensive outpatient programs (non-24/7 care). This study examined outcomes for 1104 adults with body mass indices (BMI) between 14 and 17, representing a fairly severe presentation, receiving either 24/7 or non-24/7 care for an eating disorder. We found that those receiving 24/7 care gained more weight than those in non-24/7 care (3.79 increase in BMI versus 2.17), and gained weight faster. Rate of weight gain has been found to be a significant predictor of good outcome after one year. There were no differences between groups on the Eating Disorder Examination-Questionnaire Global Score or subscales from admission to discharge. The findings from this study could be used as a guide for patients when helping them to make decisions about which level of care is most appropriate.

Keywords Eating disorders, Inpatient, Residential, Partial hospitalization, Intensive outpatient, Weight gain, Outcomes

Background

Eating disorders (EDs) are serious mental illnesses, with high rates of morbidity and premature mortality [1, 2]. EDs are associated with 1.3 million disability adjusted life years (DALYs) per year in the United States, and the economic costs of EDs have been estimated to be over \$64 billion United States Dollars (USD) per year, which equates to over \$11,000 per person with an ED per year [3]. In comparison, the economic burden of serious mental illness in general in the US has been estimated to be \$317 billion, or about \$1000 per person per year [4]. EDs are thus associated with significant social and economic burden.

Individuals with EDs, particularly those with anorexia nervosa (AN), tend to experience their illness as ego-syntonic and are often highly ambivalent about entering treatment. Guarda [5] described some of the barriers to patients with AN receiving effective treatment, suggesting that while patients might say that they need to change their behaviors, “they seek treatment on their own terms” (p. 114). This may be especially problematic when insight into one’s disorder is limited, as it often is with AN [6], and when patients have moderate to severe forms of the illness that require a higher level of care (HLOC). In addition, HLOCs can be experienced as traumatic and hostile [7], which could understandably contribute to reluctance to enter treatment.

HLOCs are often necessary when individuals with EDs have not made improvements in traditional outpatient settings, or if they are too compromised medically or too low-weighted to be able to be seen in weekly outpatient treatment. Guidelines for the treatment of AN recommend weight restoration as a key goal [e.g., 8, 9]. Weight gain is necessary not only to reduce medical instability but also to enable psychological improvement in ED symptoms [10]. Further, rate of weight gain has been found to be associated with good outcomes for patients with AN. Lund et al. [11] found that inpatients with AN who gained more than 0.8 kg./week (approximately 1.76 lbs.) were less likely to experience clinical deterioration

one year after treatment started. In this study, clinical deterioration was defined as worsening on the Clinical Global Impression-Severity score [12]. HLOCs, which may be necessary to bring about necessary weight gain, include inpatient (IP) and residential (RES) ED treatment facilities, both of which offer 24/7 care. The primary difference between the two is that IP includes a higher degree of daily psychiatric oversight for those patients who are medically unstable. In contrast, partial hospitalization program (PHPs), or day programs, are more variable in the time spent in treatment during the week, which is generally from 6 to 12 h per day, 4–7 days per week [13]. Intensive outpatient programs (IOPs) are typically three hours a day, three days per week.

A systematic review of the outcomes of RES programs for EDs found that of the 19 studies included in the review, all reported a significant improvement on at least one outcome measure between admission and discharge [14]. Improvements were reported for ED psychopathology, body weight, depression, anxiety, and quality of life. Eight studies included follow-up data ranging from one month to ten years post-discharge, all of which reported good outcomes. Another review of both RES programs and PHPs [13] found that for adults, all studies reported significant improvements in body mass index (BMI) for those with AN, and/or significant reductions in binge eating/purging for those with bulimia nervosa (BN). A study of 1,421 adolescent and adult patients in RES found that for those who needed to weight restore, both age groups gained about 2 lbs. per week, and of patients who were purging at admission, 89.1% were able to stop purging while in treatment [15]. Another study of PHP and IOP treatment for 1,200 adolescents and adults with EDs reported improvements in ED psychopathology, impairment, quality of life, depression, and increases in BMI for adults with AN [16]. Thus, there seems to be a clear role for HLOCs in the treatment of EDs.

However, what seems to be largely lacking in the literature are comparisons between different levels of ED care. One study of adults with BN, which randomized patients

to either IP or day clinic treatment (PHP), found generally equivalent findings between the two treatment arms in terms of ED psychopathology, general psychopathology, binge eating, or purging [17]. An older review of IP compared to outpatient care for AN found few differences between the two levels, but this review was based on only two randomized controlled trials (RCTs) and seven case series [18]. One RCT comparing a day hospital program (PHP) to outpatient treatment for adults with AN, BN, or eating disorder not otherwise specified (EDNOS) found that the day treatment program resulted in significantly greater improvements in ED psychopathology, binge eating and purging, changes in BMI, depression, and self-esteem [19]. There is a need for more recent and comprehensive RCTs in this area. However, these are difficult to conduct, as the scientific need to randomize patients to different LOCs is understandably superseded by the clinical need to match patients to the LOC most appropriate for addressing their symptoms. It is also likely that moderators such as age, diagnosis, or baseline symptom severity play a role in who responds to which LOC.

The onset of the COVID-19 pandemic resulted in the proliferation and promotion of PHP and IOP alternatives to HLOC, many of them virtual offerings. However, for patients at low weights, they may be less effective, although these less restrictive options may seem more convenient and less daunting to patients and their families. Receiving in-person care at the IP and RES levels can be challenging. It requires patients to be away from home, sometimes for weeks or months at a time. In addition, it is more difficult to engage in ED behaviors, such as binge eating, purging, and surreptitious exercise, in these more structured environments, compared to PHP and IOP. Given the ambivalence associated with EDs, it is not surprising that patients may not immediately opt for recommended IP or RES treatment. Not disrupting one's daily life can be a tempting choice when choosing one's LOC. This has been made easier since the onset of the COVID-19 pandemic, which swiftly led to many virtual options for treatment of EDs. While these options may be attractive for patients who want to minimize disruption to their daily lives, they may not be the most clinically appropriate option for some patients, particularly those with low BMIs and those with higher baseline symptom severity.

It would be helpful if there were empirical evidence to support those with worse baseline symptoms entering higher LOCs rather than choosing to enter treatment at less restrictive levels, which may not be appropriate for their clinical needs, and may just prolong the inevitable step up to HLOCs, thus drawing out treatment even longer and driving up treatment costs. The purpose of the current study was to compare outcomes for adult patients

with EDs at low weights who entered 24/7 care (IP and RES) to those entering non-24/7 care (PHP and IOP). The sample was restricted to those with BMIs between 14 and 17, representing patients with a fairly severe presentation. Because 24/7 care provides greater structure, more intensive treatment, and increased staff supervision and monitoring, it was hypothesized that those entering 24/7 care would show greater improvements in weight gain and ED symptomatology than those entering non-24/7 care.

We acknowledge the limitations of using BMI as an indicator of diagnostic severity [20]. However, LOC recommendations in the current study were guided by an adaptation of The American Psychiatric Association Practice Guideline for the Treatment of Eating Disorders, Third Edition [21] and Fourth Edition [8], which outline criteria for each LOC, including weight guidelines.

Methods

Participants and procedure

Participants were 1104 adults at low weights receiving treatment for an ED at a large multisite national treatment facility offering HLOCs between August 2019 and February 2024. Masters-level clinicians used clinical interviews based on DSM-5 criteria [22] to assign ED diagnoses. Self-report questionnaires were completed at intake and discharge, weight was assessed throughout treatment, and patients provided informed consent for their information to be used for research purposes. All patients are invited to share their data for research studies, but some decline participation. Generally, 80% of admitting patients consent to participate in research. This study was approved by Salus Institutional Review Board.

Treatment

Treatment at the IP and RES levels involves 24-hour a day care, seven days a week. At the PHP level, treatment is 8–10 h a day, seven days a week. Treatment for all three levels is in a hospital setting and includes twice weekly (daily for IP) psychiatry visits, up to daily medical provider visits if indicated, individual psychotherapy sessions twice weekly, weekly family therapy, twice weekly sessions with a dietitian, internal/family medicine care as needed, and 3–4 h of evidence-based skills groups per day. Patients have three supervised meals and 2–3 supervised snacks per day. At the IOP level, patients receive treatment three days per week, 3–4 h per day, and receive three, 3-hour group therapy sessions weekly, one hour of individual or family therapy weekly, appointments with a dietitian biweekly, and weekly medical monitoring. Patients in PHP and IOP go home or to facility apartments after programming and thus have no staff supervision during those times. Groups are conducted on a

rolling basis with no set duration. Patients at the IP level receive the highest degree of medical and psychiatric monitoring and oversight, followed closely by RES.

LOC recommendations are based on the medical and psychological severity of a patient's condition, and guided by an adaptation of The American Psychiatric Association Practice Guideline for the Treatment of Eating Disorders, Third Edition [21] and Fourth Edition [8], which outline criteria for each LOC. Guidelines are based on the medical status of the patient, weight, severity of ED behaviors including purging and compulsive exercise, suicidality, motivation to recover, comorbidities, the patient's need for structure, environmental stressors, and geographic availability of the treatment program. However, not all patients agree to the recommended LOC and some prefer a less structured and less time-intensive treatment, or are limited in their choice of LOC due to insurance or employment restrictions. Rather than insist that patients follow this treatment facility's recommendations every time, compromises are occasionally made, if patients are deemed safe enough to engage in a lower LOC, in order to get patients into much-needed treatment, particularly if the patient may avoid treatment altogether rather than engage in a HLOC. Although exceptions may be made, patients generally admit to the most appropriate LOC for their medical and behavioral needs and then step-down to each subsequent lower LOC until they are ready for discharge to outpatient treatment. Some patients may develop a complication that requires a brief step-up to a higher level before returning to the downward trajectory of treatment. Length of stay is calculated based on calendar days from admission to discharge from treatment, rather than treatment days attended.

Measures

The *Eating Disorder Examination-Questionnaire (EDE-Q)* [23, 24] is a widely-used, 28-item self-report measure of the behavioral and cognitive psychopathology of EDs. It has four subscales: Restraint, Eating Concern, Shape Concern, and Weight Concern. These subscales can be averaged to create a Global Score. The EDE-Q Global Score (admission $\alpha=0.97$; discharge $\alpha=0.97$), Restraint (admission $\alpha=0.84$; discharge $\alpha=0.92$), Eating Concern (admission $\alpha=0.80$; discharge $\alpha=0.74$), Shape Concern (admission $\alpha=0.93$; discharge $\alpha=0.96$), and Weight Concern (admission $\alpha=0.87$; discharge $\alpha=0.92$) subscales all had excellent internal consistency at admission and discharge.

Body Mass Index (BMI) was calculated based on height taken at admission and weight taken throughout treatment. Weights were taken by treatment providers and were not shared with the patient, i.e., "blind" or "concealed" weighing.

Statistical analyses

All between-groups comparisons were conducted with generalized linear models. When predicting a continuous outcome, linear regressions were used with eta-squared (η^2) effect sizes and 95% confidence intervals (95% CI). When predicting dichotomous outcomes, logistic regressions were used with odds ratio (OR) effect sizes and 95% CI. Within-group change scores were examined via paired-samples Welch's *t*-tests. All analyses are robust to unequal sample sizes. R version 4.4.0 was used for all analyses [25].

Results

Participants had a mean age overall of 27.6 ($SD=11.1$, range: 18–72) and were primarily female (90.8%) and White (78.6%) (see Table 1). Among variables listed in Table 1, ED diagnosis (anorexia nervosa – binge/purge type [AN-BP] $b=0.60$, $t=2.14$, $p=.03$, OR=1.82, 95% CI [1.08, 3.25]; other specified feeding or eating disorder [OSFED] $b=-0.75$, $t=-2.22$, $p=.03$, OR=0.47, 95% CI [0.25, 0.95]), length of stay ($b=0.01$, $t=2.52$, $p=.01$, OR=1.01, 95% CI [1.001, 1.01]), and admission BMI ($b=-1.22$, $t=-7.10$, $p<.001$, OR=0.29, 95% CI [0.21, 0.41]) were significantly associated with receipt of 24/7 care.

BMI increases were statistically significant ($p<.001$) and large in both 24/7 care ($d=1.69$, 95% CI [1.59, 1.79]) and non-24/7 care ($d=1.41$, 95% CI [0.93, 1.41]). In unadjusted analyses, there was a significant difference between those receiving 24/7 care (3.79) versus non-24/7 care (2.17) in BMI increase during treatment ($b=1.62$, $t=7.41$, $p<.001$, $\eta^2=0.05$, 95% CI [0.03, 0.07]). In addition, those in 24/7 care gained significantly more weight per week (2.46 lbs.) ($b=1.12$, $t=7.42$, $p<.001$, $\eta^2=0.05$, 95% CI [0.03, 0.07]) compared to those in non-24/7 care (1.34 lbs.). In adjusted analyses controlling for ED diagnosis, length of stay, admission EDE-Q, and admission BMI, BMI increases remained significantly greater for patients in 24/7 versus non-24/7 care ($b=0.88$, $t=4.10$, $p<.001$, $\eta^2=0.06$, 95% CI [0.03, 0.09]). In adjusted analyses controlling for ED diagnosis, length of stay, admission EDE-Q, and admission BMI, weight gain per week remained significantly greater for patients in 24/7 versus non-24/7 care ($b=0.99$, $t=5.14$, $p<.001$, $\eta^2=0.03$, 95% CI [0.01, 0.06]).

Table 2 presents admission and discharge values for EDE-Q scores, including all subscales, along with effect sizes. EDE-Q scores (Global and all subscales) improved significantly from admission to discharge for both treatment groups (all changes were statistically significant at $p<.001$). Changes ranged from small-to-medium effect sizes to large effect sizes. Among patients completing the EDE-Q, higher admission scores on EDE-Q Global Score ($b=0.01$, $t=2.02$, $p=.04$; OR=1.01, 95% CI [1.0004, 1.02]), EDE-Q Restraint ($b=0.01$, $t=2.37$, $p=.02$;

Table 1 Demographic and clinical characteristics

	Overall (N = 1104)	24/7 (N = 990)	Non-24/7 (N = 114)
Age (M, SD)	27.6 (11.1)	27.8 (11.1)	25.8 (10.4)
Female (N,%)	1002 (90.8%)	896 (90.5%)	106 (93.0%)
Gender (N,%)			
Female	841 (76.2%)	754 (76.2%)	87 (76.3%)
Male	42 (3.8%)	41 (4.1%)	1 (0.9%)
Transgender Female	3 (0.3%)	3 (0.3%)	0 (0%)
Transgender Male	8 (0.7%)	7 (0.7%)	1 (0.9%)
Genderqueer/Non-Binary/Other	61 (5.5%)	54 (5.5%)	7 (6.1%)
Chose Not to Disclose/Missing	149 (13.5%)	131 (13.2%)	18 (15.8%)
Race (N, %)			
Asian	31 (2.8%)	29 (2.9%)	2 (1.7%)
Hispanic or Latino	48 (4.3%)	39 (3.9%)	9 (7.9%)
White	868 (78.6%)	787 (79.5%)	81 (71.1%)
Black or African American	10 (0.9%)	9 (0.9%)	1 (0.9%)
American Indian/Alaska Native	3 (0.3%)	3 (0.3%)	0 (0%)
Other	31 (2.9%)	26 (2.6%)	5 (4.4%)
Missing	113 (10.2%)	97 (9.9%)	16 (14.0%)
Level of Care at Admission (N,%)			
IOP	18 (1.6%)	0 (0%)	18 (15.8%)
PHP	96 (8.7%)	0 (0%)	96 (84.2%)
RES	366 (33.2%)	366 (37.0%)	0 (0%)
IP	624 (56.5%)	624 (63.0%)	0 (0%)
Primary Diagnosis (N,%)			
AN-R	649 (58.8%)	579 (58.5%)	70 (61.4%)
AN-BP	273 (24.7%)	256 (25.9%)	17 (14.9%)
ARFID	118 (10.7%)	104 (10.5%)	14 (12.3%)
OSFED	64 (5.8%)	51 (5.2%)	13 (11.4%)
Length of Stay in Days (M, SD)	77.0 (56.9)	78.4 (57.7)	64.2 (48.5)
Admission BMI (M, SD)	15.80 (0.81)	15.73 (0.81)	16.34 (0.57)
Discharge BMI (M, SD)	19.42 (2.27)	19.52 (2.29)	18.51 (1.89)
Weight Gain/Week (lbs.) (M, SD)	2.34 (1.5)	2.46 (1.5)	1.34 (1.8)

Note IOP=Intensive outpatient program; PHP=Partial hospitalization program; RES=Residential; IP=Inpatient; AN-R=Anorexia nervosa – restricting subtype; AN-BP=Anorexia nervosa – binge/purge subtype; ARFID=Avoidant/restrictive food intake disorder; OSFED=Other specified feeding or eating disorder. BMI=Body Mass Index

Table 2 EDE-Q scores and change

	Overall (N = 562)		24/7 (N = 518)		Change Cohen's d (95% CI)	Not 24/7 (N = 44)		Change Cohen's d (95% CI)
	Admission M (SD)	Discharge M (SD)	Admission M (SD)	Discharge M (SD)		Admission M (SD)	Discharge M (SD)	
EDE-Q Global	3.06 (1.8)	1.88 (1.5)	3.11 (1.9)	1.93 (1.5)	0.93 [0.82, 1.03]	2.59 (1.6)	1.36 (1.3)	0.89 [0.54, 1.25]
Restraint	2.74 (2.3)	0.92 (1.3)	2.81 (2.3)	0.94 (1.4)	0.96 [0.86, 1.07]	2.09 (2.0)	0.70 (1.1)	0.79 [0.45, 1.14]
Eating Concern	2.66 (1.7)	1.36 (1.3)	2.69 (1.7)	1.38 (1.3)	0.99 [0.88, 1.09]	2.36 (1.6)	1.07 (1.2)	0.77 [0.43, 1.11]
Shape Concern	3.57 (2.0)	2.86 (2.1)	3.63 (2.0)	2.94 (2.1)	0.47 [0.38, 0.56]	3.05 (1.8)	2.01 (1.8)	0.61 [0.28, 0.93]
Weight Concern	3.28 (1.9)	2.37 (2.0)	3.32 (2.0)	2.44 (2.0)	0.61 [0.51, 0.70]	2.87 (1.6)	1.65 (1.6)	0.82 [0.48, 1.17]

Note All admission-discharge changes are significant at $p < .001$

OR=1.01, 95% CI [1.002, 1.02]), and EDE-Q Shape Concern ($b=0.01$, $t=2.19$, $p=.03$; OR=1.01, 95% CI [1.002, 1.02]) were significantly associated with receipt of 24/7 care. In unadjusted and adjusted analyses (controlling for ED diagnosis, length of stay, admission BMI, and admission EDE-Q), changes in EDE-Q Global Score and all subscales were not significantly associated with receipt of 24/7 care.

Discussion

The current study compared outcomes of weight and ED symptomatology for adult patients at low BMIs for those receiving 24/7 care versus non-24/7 care. The hypothesis that those entering 24/7 care would show greater improvements on both outcomes was partially supported. Those in 24/7 care showed significantly more weight gain during treatment than those in non-24/7 care. They scored higher on the EDE-Q Global Score and several subscales at admission, but there were no differences between treatment groups on change in EDE-Q scores from admission to discharge.

24/7 care was not only associated with increased weight gain but faster weight gain compared to non-24/7 care. Those receiving 24/7 care in the current study exceeded the 1.76 lbs./week threshold that was found by Lund et al. [11] to be associated with a lower likelihood of clinical deterioration at one-year follow-up, whereas those receiving non-24/7 care did not, possibly situating those individuals in 24/7 care to be in a better position to achieve long-term recovery. A follow-up study of patients with AN who received treatment at the RES level found that discharge BMI was the best predictor of full recovery an average of 4.6 years after treatment [26].

Findings from the current study suggest that for those with BMIs between 14 and 17 kg/m², 24/7 care may be the most appropriate, rapid, and effective level. Although it is important to note that BMI did improve in non-24/7 care, and changes in EDE-Q scores did not differ between the two groups, the more rapid weight gain in 24/7 care could possibly reduce the overall length of treatment, not necessarily at the 24/7 care level as seen in the current study, but the entire spectrum of therapy services received. Early weight gain has been shown to be a predictor of good outcome (defined as reaching a BMI of 17.5 within a certain time frame) for adults receiving inpatient treatment for AN [27]. The authors found that the odds of achieving a positive outcome were 18 times higher for those who achieved a certain amount of weight gain in the first six weeks of treatment. Although similar research is still limited on patients with ARFID, early weight gain has been shown to be a predictor of good outcome, defined as reaching 95% of expected body weight after 20 weeks of treatment, for a group of children, adolescents, and adults with ARFID [28].

Beginning treatment in 24/7 care could also reduce the overall cost spent on treatment. While the treatment facility in this study may at times allow patients with low BMIs into non-24/7 care, it seems that these patients do not do as well at lower LOCs. It is important to note that avoidance of 24/7 care could represent conscious or unconscious treatment resistance on the part of the patient, and allowing patients with significant weight loss and low BMIs to enter at non-24/7 care could be considered as colluding with the illness and resistance, allowing the perpetuation of the disorder. Care should be taken, if potential patients do not accept a recommendation for 24/7 care, to discuss their preference and understand the reasons behind their decision. Although those who have received 24/7 care may acknowledge that it was necessary and helpful, IP treatment has been described as “miserable,” “traumatic,” and “terrifying” by some [7], and patients may understandably be reluctant to repeat this difficult experience if they need treatment again in the future. An open and honest conversation about treatment recommendations and preferences is important to enable the patient to feel as comfortable as possible reengaging in treatment. Patients with low BMIs at lower LOCs should be monitored carefully with a low threshold to move to HLOC if weight gain is slow or nonexistent.

It is perhaps not surprising that patients entering 24/7 care scored higher on two EDE-Q subscales (Restraint and Shape Concern) and the Global Score at admission than those in non-24/7 care, if we expect those receiving 24/7 care to have more severe ED symptomatology. It is, however, somewhat unexpected that there were no significant differences in changes on EDE-Q subscale scores from admission to discharge for the two patient groups. It is possible that the relatively intensive nature of PHP at this treatment facility (8–10 h per day, 7 days per week, versus 6 h per day, 5 days per week in many other programs) mitigated some of the differences that would have otherwise been found between 24/7 and non-24/7 care. It is also possible that both sets of patients were too early in their treatment journey to show significant cognitive changes, as the cognitive aspects of ED psychopathology tend to take longer to improve than the behavioral aspects [29], such as changes in eating and weight gain.

When examining effect sizes on the EDE-Q, 24/7 care had descriptively larger effects for Restraint & Eating Concern, while non-24/7 care had descriptively larger effects for Shape Concern and Weight Concern. The Restraint and Eating Concern subscales are somewhat more behavioral in nature than the more cognitive subscales of Shape Concern and Weight Concern. Being in the more structured environment of 24/7 care would make it more difficult to engage in restriction and other eating disordered behaviors compared to non-24/7 care, resulting in larger effect sizes. However, it is unclear

why Shape Concern and Weight Concern showed larger effect sizes among those receiving non-24/7 care. These findings may be expected if the non-24/7 care group had been in treatment longer, with more time to make cognitive improvements. Although information on treatment history was not available, this scenario is unlikely given the patients' low BMIs, which would have been expected to improve with more time in treatment. Although these differences were not statistically significant, there is reason to consider exploring them further in future studies. It is possible that lower levels of weight gain for the non-24/7 group resulted in larger effect sizes for these two EDE-Q subscales, as more weight gain can temporarily exacerbate shape and weight concerns.

Additionally, the medical problems commonly associated with EDs call into question the efficacy and safety of lower LOCs at the onset of treatment. Patients in the current study in 24/7 care had frequent episodes of medical oversight, whereas those who opt to begin treatment at lower LOCs, including weekly outpatient treatment, may not have this degree of medical monitoring, which is often necessary to ensure their physical safety. A limitation of the current study is that specific medical variables were not available, such as, for example, the incidence of refeeding hypophosphatemia, hypoglycemia, or edema formation, but future studies may want to compare measures of physiological outcomes between 24/7 and non-24/7 care. An additional limitation is that long-term follow-up data were not available, which is a common challenge in "real world" HLOC settings. The current study also did not include a measure of motivation for change. It is possible that those who agree to commit to 24/7 care are more highly motivated for recovery than those who choose a lower LOC, which could impact their treatment outcomes. Although based on the authors' clinical experiences we know that many patients refuse to enroll in 24/7 care, information was not available for the current study on which patients willingly enrolled in 24/7 care and which patients refused a 24/7 care recommendation, resulting in a lower LOC. We also did not distinguish between IP and RES and between PHP and IOP. Finally, we did not have information on duration of illness, treatment history, or quality of life/level of functioning. Strengths of the study include the large sample size and the significant clinical implications of the findings, which could be used to guide patients when they are making decisions about the most appropriate, and possibly most effective, LOC. Making a decision about the right LOC is multifactorial and complex. Based on the current study's findings, it cannot definitively be concluded that all patients at low BMIs should start at the IP or RES level of treatment. However, these findings could be shared with potential patients to provide rationale for a 24/7 care recommendation, and particularly if they are

motivated for treatment, show that starting at 24/7 care may improve their overall outcomes. Further research is needed to determine whether starting at 24/7 care and stepping down through PHP to IOP results in better outcomes than going from 24/7 care to outpatient treatment. Future research could also examine factors that influence LOC decision making, including patient (e.g., motivation), clinician (e.g., clinical judgment), and system-level (e.g., insurance; ability to take leave from work) variables.

Conclusions

The current study suggests that patients with EDs at low BMIs gain more weight at a faster rate when participating in 24/7 care (IP and RES) compared to non-24/7 care (PHP and IOP). 24/7 care was not associated with larger improvements on the EDE-Q. However, more and faster weight gain may result in shorter overall lengths of stay. Moreover, given the clear importance of early weight gain for recovery, it may increase the chances of a positive long-term outcome and sustained recovery.

Abbreviations

AN	Anorexia nervosa
AN-BP	Anorexia nervosa, binge/purge type
AN-R	Anorexia nervosa, restricting type
ARFID	Avoidant/restrictive food intake disorder
BMI	Body mass index
BN	Bulimia nervosa
CI	Confidence interval
DALY	Disability adjusted life year
ED	Eating disorder
EDE-Q	Eating Disorder Examination-Questionnaire
EDNOS	Eating disorder not otherwise specified
HLOC	Higher level of care
IOP	Intensive outpatient program
IP	Inpatient
LOC	Level of care
OR	Odds ratio
OSFED	Other specified feeding or eating disorder
PHP	Partial hospitalization program
RCT	Randomized controlled trial
RES	Residential
USD	United States dollars

Author contributions

RDR and DVB were responsible for writing the manuscript. DVB was responsible for statistical analyses. HAB developed the initial idea for the paper. AD contributed to data management and cleaning. All authors contributed to the conceptualization of the paper, edited it for content, and read and approved the final manuscript.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. Dr. Blalock was supported by Career Development Award 19-035 (IK2HX003085-01A2) from the United States Department of Veterans Affairs Health Services Research and Development (HSR&D) Service.

Data availability

The dataset used and analyzed for the current study is available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

Patients provided informed consent at baseline. This study was approved by Salus Institutional Review Board.

Consent for publication

Not applicable.

Competing interests

RDR receives consulting fees from the Training Institute for Child and Adolescent Eating Disorders, LLC, and receives royalties from Routledge. DLG receives royalties from Guilford Press and Routledge, is Co-Director of the Training Institute for Child and Adolescent Eating Disorders, LLC, and a Member of the Clinical Advisory Board at Equip Health. DVB and DLG consult for Eating Recovery Center. All other authors declare no conflict of interest.

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Received: 24 September 2024 / Accepted: 6 November 2024

Published online: 18 November 2024

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