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ORIGINAL PAPER

Cost Savings from Integrating Behavioral Health in Primary Care: A Pragmatic Randomized Control Trial with Karen Refugees

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Abstract

Many refugees experience exposure to chronic and traumatic stressors that can lead to complex mental health and other health care needs. The integration of behavioral health into primary care is a promising approach for addressing complex health needs; however, it has been understudied with refugee and immigrant populations. Using a pragmatic randomized control trial design, this study examined inpatient and outpatient health service utilization and associated costs of a primary care-based intensive psychotherapy and case management intervention for 214 Karen refugees with major depression compared to care as usual over time. Results indicated the addition of the behavioral health intervention was associated with reduced inpatient healthcare costs vs. care as usual, shorter hospital stays, and improved patient status at discharge. The average inpatient cost saving exceeded $8,000 per patient among the intervention group. After controlling for key patient characteristics, patients who received the intervention accrued lower outpatient costs as compared to care as usual over 18 months. Findings suggested the integrated behavioral health intervention resulted in lower healthcare costs among refugees with complex health needs engaged in primary health care. Future research is needed to better understand long-term effects and further optimize care for refugees.

Trial Registration clinicaltrials.gov Identifier NCT03788408. Registered 20 Dec 2018. Retrospectively registered.

Keywords Mental health · Health services · Integrated behavioral health care · Refugee health · Cost effective interventions · Randomized control trial

Background

Prior to resettlement, refugees may endure traumatic events that have lasting effects on their physical health, mental health, and social functioning [1–10]. Despite substantial healthcare needs, refugees experience barriers to accessing and remaining engaged in services [9–11]. Barriers exist at multiple levels, including individual factors (e.g., language, trauma history, and transportation), structural factors (e.g., affordability of care, provider knowledge gaps, inadequate referral systems, and insufficient language assistance), and societal factors (e.g., systemic racism, cross-cultural

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dynamics, stigma, and lack of social support) [12, 13]. Inadequate access to preventive and routine care can contribute to overuse or misuse of urgent care and emergency room services [14]. Integrated behavioral healthcare models have shown promise in improving health and service utilization for the general adult population [15, 16]. However, few integrated care randomized control trials have included cost outcomes [17] and evidence with refugees is particularly limited [18–22]. Prior studies have focused primarily on inpatient costs and hospitalization days and overlooked outpatient costs associated with routine health management and prevention [23, 24]. Understanding how interventions can optimize outpatient service utilization and reduce associated costs is crucial to enhancing the health of refugee populations.

Study Aims

The current study aimed to address critical evidence gaps in understanding the impact of integrated behavioral health in primary care on inpatient and outpatient costs with resettled refugees. The first aim was to examine health service utilization and associated costs over time with Karen resettled refugees engaged in primary care. The second aim was to investigate whether treatment group and patient-level characteristics explained potential differences in health service utilization and associated costs over time.

Methods

Study Design and Sample

A pragmatic, parallel group, randomized controlled trial (RCT) was conducted at two primary care clinics serving large populations of Karen refugees from 2013 to 2018 [25]. Potential participants were referred by their primary care providers on a rolling basis. After obtaining informed consent, participants were randomized using simple allocation to receive one year of either treatment group: (1) intervention of intensive psychotherapy and case management added to care as usual (CAU) or (2) CAU only control group. Eligibility criteria included: diagnosis of Major Depressive Disorder (MDD), Karen refugee status, and age between 18 and 65. Exclusion criteria included: current enrollment in individual psychotherapy or targeted case management, active psychosis, chemical dependency, and other acute needs requiring a higher level of care.

Of the 288 Karen refugee patients screened for eligibility, 58 did not meet inclusion criteria and 16 eligible patients declined to participate. 33 did not meet criteria for MDD; 19 were already receiving individual psychotherapy or case management; 4 were unable to participate in psychotherapy due to cognitive impairment; 1 required inpatient psychiatric care not available through the intervention; and 1 patient moved to another state. A total of 214 participants enrolled in the study. The intervention group ($n=112$) received 12 months of psychotherapy and mental health case management onsite in addition to CAU in primary care clinics, coordinated between psychotherapist, case manager, and primary care providers. Behavioral health services for participants enrolled in the intervention group were billed per usual and captured in outpatient cost claims. The CAU only group ($n=102$) received care as usual from their primary care providers, including a range of non-specialized behavioral health interventions and referrals were available through the primary care clinics.

Intervention

The intervention consisted of two 45–60-minute weekly or bi-weekly sessions with psychotherapists and case managers fluent in Karen or with Karen professional language interpreters over 12 months. The intervention integrated trauma-informed and culturally responsive psychotherapy with targeted case management to address the complex health needs of resettled Karen refugees. Participants were encouraged to dialogue about their own historical, cultural and religious traditions of health and healing, and these were incorporated into treatment. Psychotherapy focused on psychoeducation, skill-building (e.g., relaxation techniques, coping mechanisms), and evidence-based treatments for PTSD and depression, such as Narrative Exposure Therapy and Cognitive Behavioral Therapy. Case management facilitated access to essential services, communication with healthcare providers, and navigation of community systems [26]. Factors related to the lived experiences of Karen refugee patients, such as current safety and stability, past health care experiences, level of education and literacy, current immigration status and family separation, identity-related oppression, cultural norms, and exposure to direct harm, torture, and trauma were assessed by providers and incorporated into case management and psychological interventions. A Karen project coordinator provided care coordination, scheduling, and transportation.

Ethical Approval

A partnership and data sharing agreement was established with the State of Minnesota to examine inpatient and outpatient health service utilization and cost claims of all enrolled participants. The study protocols were approved by the State of Minnesota Department of Health IRB (#338); Healtheast

Institutional Review Board (#1212002); and, University of Minnesota Twin Cities IRB (#1405S50449).

Data Collection and Measures

Inpatient service outcomes were specified as: (i) total cost of inpatient claims (i.e., the costs billed by the hospital for inpatient services delivered to participants during each time period of the study); (ii) total number of inpatient days incurred by participants during each time period; and (iii) patient status at discharge related to health risks (See Table 1). Inpatient services included all procedures, treatments, diagnoses, and associated facility charges delivered after hospital admission determined to be medically necessary by an admitting physician. An aggregate outpatient service outcome variable was created based on total health services incurred per patient in outpatient settings and related cost outcome variable of aggregate billed health services per patient. Piecewise growth curves over 4 time points including baseline, 6, 12, and 18 months were specified to examine individual level growth trends across treatment groups. Outpatient service cost outcomes included aggregating all procedures, treatments, and diagnoses charges (including the intervention services) delivered without an overnight hospital admission.

Several patient demographic variables were gathered at baseline including age, years living in the U.S., and torture history. Age was calculated using date of birth. Years living in the U.S. was calculated based on the length of time since resettlement to the United States. History of torture was measured using a standardized validated screening tool for assessing type, duration and associated suffering as defined by the United Nations Convention Against Torture [27]. Patient records and health service utilization data were utilized to identify and create variables for key patient level characteristics. Chronic health conditions variables were created using ICD-9-CM codes; and an aggregate variable using aggregated chronic condition diagnoses by patient was generated to include in the analyses. Imaging and surgical procedures variables were constructed using ICD-9-CM codes and aggregated the number of each type of imaging or surgical procedure received by each patient. R statistical software was used to perform all statistical analyses [28].

Table 1 Study groups have similar relevant patient descriptive characteristics at baseline suggesting highly comparable randomly assigned groups.*Source*: authors' analyses of the state department of human service' health utilization Data, 2013–2019

	Intervention (Treatment)	CAU (Control)	Total Sample
Total sample Number (%)	112 (52.3%)	102 (47.7%)	214 (100%)
Women	92 (82.1%)	79 (77.5%)	171 (79.9%)
Experienced Torture	41(36.6%)	36 (35.3%)	77 (35.9%)
Age mean ± sd	43.84 ± 3.13	41.77 ± 3.91	42.76 ± 3.28
Years living in US	4.11 ± 2.5	4.60 ± 2.10	4.29 ± 2.34
Chronic conditions	12.62 ± 4.37	13.20 ± 4.56	12.87 ± 4.43
Imaging procedures	11.30 ± 3.59	10.98 ± 3.37	11.12 ± 3.46
Surgery procedures	4.24 ± 3.66	5.04 ± 3.91	4.85 ± 3.78

Notes: Residual imbalances between groups in years living in the US found in the raw data were adjusted for using propensity score matching with weighted regression. Dummy variable was created to re-score and aggregate data into chronic vs. non-chronic conditions ICD-10 diagnosis chronic condition indicator codes, imaging vs. non-imaging data ICD-10 procedure codes, and surgical vs. non-surgical data based on CPT procedure codes

Analyses

Characteristics of participants in intervention and CAU groups were examined for normalcy and equivalence. All dependent variables met the statistical assumptions of normality, independence, homoscedasticity and sphericity. Potential differences between groups in inpatient services and costs were examined through means, standard deviations, frequencies, and range prior to examining the primary dependent variables of interest: outpatient health service (OHS) utilization and associated costs. T-tests for continuous, and chi square tests for categorical data were performed to evaluate potential mean differences between groups in aggregate inpatient health services received, days admitted in inpatient care, and patient status at discharge. Propensity score matching was performed using weighted regression to adjust for residual imbalances in length of resettlement between treatment groups. Non-significant differences were found after propensity score matching. In RCTs, propensity score analyses can ensure balance between groups and account for imbalances that may occur by chance in randomized data [29].

Multilevel modeling (MLM) analyses were performed to examine the following: 1. potential changes in OHS costs over time between the intervention and CAU groups, and 2) the extent to which treatment group assignment and patient-level characteristics explained variation in OHS costs over time. MLM was chosen over alternative models due to several strengths associated with MLM, including: appropriate for handling missing data, variation in time points across individual cases, correlations of observations across time, and examination of variability arising from distinct levels within data. MLM also allowed for determination of how patient characteristics affected changes in OHS costs over time [30].

Three linear mixed-effects models were specified and included the following:

I. Model 1 was a baseline model with OHS costs only and no multilevel structure.
II. Model 2 added treatment to Level 1 as the primary variable of interest to examine potential differences between intervention and CAU groups.
III. Model 3 added age, torture status, years living in the USA, chronic conditions, imaging procedure and surgical procedure into Level 2 with treatment as Level 1 predictor.

After specification, the following statistical assumptions were examined in the models to ensure normal distributions of random components and the dependent variable (i.e. OHS costs) [30]. Treatment (Level 1 predictor) and age, chronic condition, imaging procedure, surgical procedure, years spent living in the US, and torture status (Level 2 predictors) were independent from level-1 random errors; Treatment (Level 1 predictor) and age, chronic condition, imaging procedure, surgical procedure, years spent living in the US, and torture status (Level 2 predictors) were independent from level-2 random errors; Treatment (Level 1 predictor) and age, chronic condition, imaging procedure, surgical procedure, years spent living in the US, and torture status (Level 2 predictors) were not correlated with random errors; Random error was independent and normally distributed, and variance for σ^2 for level 1 is within level-2; Multivariate normality was met in random errors as well as tau variance and covariance; and, Treatment (Level 1 predictor) random error was independent of age, chronic condition, imaging procedure, surgical procedure, years spent living in the US, and torture status (Level 2 predictors) random errors.

Results

Participant Characteristics

Baseline participant characteristics by treatment group are described in Table 1. All differences in participant characteristics at baseline were non-significant between treatment groups. On average, intervention participants received 41.27 + 16.70 psychotherapy sessions and 38.31 + 15.29 case management sessions during the study.

Inpatient Health Service Utilization and Costs

Mean differences between the intervention and CAU groups in billed inpatient services and associated costs, covered inpatient days, and patient status at discharge are reported in Table 1. Effect sizes (Cohen's d) observed between groups were moderate, ranging from d = 0.51 to d = 0.60 [31]. Inpatient claims costs were significantly higher (p = 0.006, d = 0.60) for the CAU group (M = $29,235.75, SD = 11,633.90) compared to the intervention group (M = $21,179.53, SD = 14,976.80). These mean differences in inpatient costs translated to an average savings of over $8,000 per patient who received the intervention. The number of covered days in inpatient care was also significantly greater (p = 0.014, d = 0.51) for CAU (M = 4.84, SD = 3.79) compared to intervention (M = 3.28, SD = 2.11). Among participants who received inpatient services, an average of 1.5 fewer days in the hospital was billed by intervention vs. CAU. Patient status at discharge was significantly better (p = 0.010, d = 0.57) for the intervention group (M = 2.14, SD = 2.23) compared to CAU (M = 3.85, SD = 3.64). Nearly all [97.8%, 88 of 90] inpatient discharges among intervention participants resulted in returning to home-based care. A greater proportion of CAU inpatient discharges (11.8%, 12 of 102) were released to other short- or long-term inpatient care facilities. (Table 2).

Outpatient Health Service Utilization and Costs

In the unconditional model, the fixed effect of the grand mean of OHS costs, γ_{00} = 2482, p < 0.001, was found to be statistically significant and indicated OHS costs were not zero across patients. However, 76% of the within group variance in OHS costs was unexplained over time in Model 1. After treatment was added as a level 1 predictor, the intercept and slope as outcomes model revealed a statistically significant fixed effect, γ_{00} = 2540, p = < 0.001. Thus, the grand mean of OHS costs significantly differed from zero over time. The fixed effect of treatment, γ_{01} = 1074, p = < 0.001 indicated the pooled slope of time estimating OHS costs was significantly explained by the treatment group. The fixed effects of age, γ_{10} = −755, p = 0.004; torture status, γ_{20} = 435, p = 0.019; years since resettlement, γ_{30} = −353, p = 0.023 were all found to be statistically significant predictors of OHS costs within patients over time. Additionally, chronic conditions γ_{50} = 1082, p = < 0.001; imaging procedures γ_{60} = 987, p = < 0.001; surgical procedures γ_{70} = 812, p = < 0.001 were all statistically significant predictors of higher OHS costs among patients across intervention groups. Negative gamma coefficients revealed patients ≤ 45 years old had lower OHS costs than patients > 45 years; and, patients living in the U.S. for < 9 years had fewer OHS costs than patients who had lived in the U.S. for ≥ 10 years. Patients who survived torture had greater OHS costs than patients who experienced direct harm without torture. Patients who were diagnosed with chronic health conditions used more outpatient health services with greater costs. Patients who received imaging outpatient services and surgical outpatient services incurred greater OHS costs. Importantly, OHS costs were lower for patients who received the

Table 2 The treatment group receiving the intervention in addition to care as usual, showed better cost and health outcomes related to inpatient care. *Source*: authors' analysis of the state department of human service' health utilization Data, 2013–2019

	Intervention	CAU (Control)	*p*-value	Effect Size	Key Finding
Inpatient Services billed	8,682 ($n=90$)	9,575 ($n=102$)	–	–	Intervention: fewer inpatient billed services
Inpatient claims costs	$21,180	$29,236	0.006**	0.60	Intervention: inpatient claims costs lower
Covered days in inpatient care	3.28 days	4.84 days	0.014*	0.51	Intervention: fewer days in inpatient care
Patient status at discharge	2.14	3.85	0.01**	0.57	Intervention: status better at discharge
Discharge Destination	97.8% (88 of 90) to home-based care	88.2% (90 of 102) to home-based care	–	–	Intervention: higher rate returning to home-based care after discharge

Note:p value significance levels: *0.05, **0.01, ***0.001). Patient status at discharge was calculated based on patient discharge facility type, including long-term hospital care, short-term hospital care, nursing home, organized home health, left against medical advice, deceased, or transferred home to outpatient care. Lower patient statuses represented better health and reduced risk at discharge vs. higher patient statuses which represented worse health and greater risk at discharge

intervention vs. CAU after controlling for the key patient characteristics found to be predictors of differential OHS costs. Overall, results indicated patients who received intervention had lower OHS costs as compared to patients who received CAU at both 12 months and 18 months after trial enrollment (see Table 3, Fig. 1).

The unconditional model (Model 1) indicated 24% of variance in OHS costs over time was explained between patients. The addition of treatment as a level 1 predictor in Model 2 resulted in an increase of 8% in explained variance of OHS costs between patients over time for a total of 32% explained variance. The ICC increased by 14% to a total of 46% explained variance after all key variables of interest were included in Model 3 as Level 1 (treatment) and Level 2 predictors (age, torture status, years living in U.S., chronic conditions, imaging procedures and surgical procedures).

Table 3 Fixed and random effects of multilevel models 1–3

Fixed effects	Estimate	St. error	p-value
Model 1 Unconditional model			
Intercept (00)	2482	0.085	<0.001
Random effects	Estimate	SD	
Residual ()	2648	378.9	
Intercept (0)	826	231.5	
Fixed effects	Estimate	St. error	p-value
Model 2 with treatment as predictor at level 1			
Intercept	2540	0.10	<0.001
Treatment	1074	0.039	<0.001
Random effects	Estimate	SD	p value
Residual	2873	398.4	<0.001
Intercept	1343	275.6	<0.001
Treatment	1267	259.0	<0.001
Fixed effects	Estimate	St. error	p-value
Model 3 with all variables added			
Intercept	2612	0.103	<0.001
Treatment	1456	0.047	<0.001
Age	−755	0.027	0.004
Torture status	435	0.023	0.019
Years living in US	−353	0.018	0.023
Chronic condition	1082	0.037	<0.001
Imaging procedures	987	0.032	<0.001
Surgical procedures	812	0.029	<0.001
Random effects	Estimate	SD	p value
Residual	3349	522.9	<0.001
Intercept	2874	313.3	<0.001
Treatment	1826	265.2	<0.001

Model fit statistics indicated superior fit for Model 3 with all level 1 and 2 predictors included as compared to the Models 1 and 2.

Discussion

Contributions To the Literature

Findings are consistent with literature highlighting cost savings associated with preventative and integrated behavioral healthcare [15, 16, 18, 19, 32]. As the first RCT to examine service utilization and associated costs of integrated behavioral healthcare in primary care with refugees, the study made novel and important contributions to the nascent body of research [15, 16, 18–21, 32, 33]. Overall, results demonstrated statistically significant cost savings for refugees who received intervention compared to CAU only. Potential mechanisms underlying cost savings may be related to the focus of psychotherapy on coping skills and overall well-being combined with the benefits of case management in addressing basic needs, social determinants of health, and logistical barriers to preventative care [34].

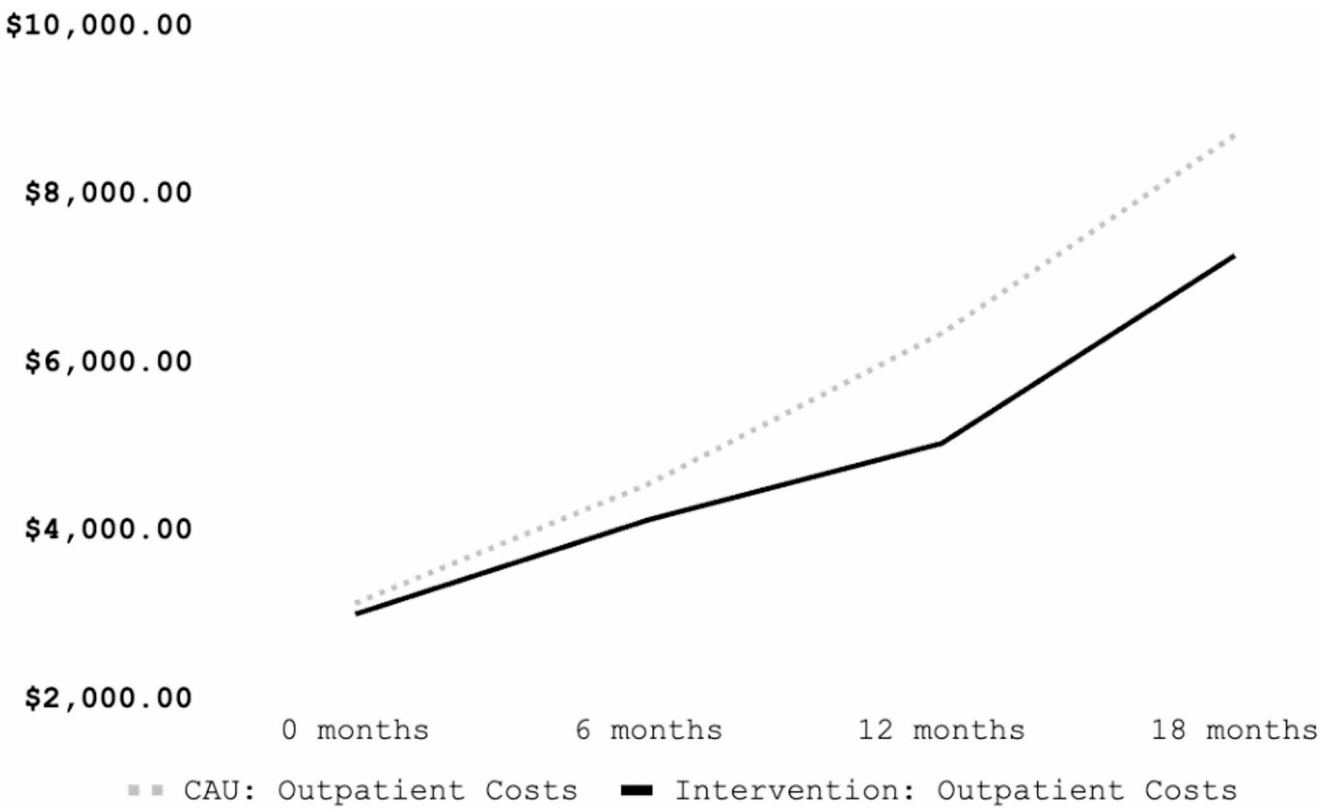

Fig. 1 Outpatient costs are significantly lower in the intervention group, including intervention treatment costs. *Source: Authors' analysis of the State Department of Human Service' Health Utilization Data, 2013–2019*

In line with prior research [16, 18, 19], intervention participants experienced significantly shorter hospital stays and were more likely to be discharged to outpatient and home settings compared to CAU. Additionally, the inclusion of both inpatient and outpatient costs investigated over the span of 18 months provided critical contributions to the broader field. The lasting impacts suggested engaging in the intervention may better equip refugees with skills and resources for ongoing health management and wellbeing compared to primary care alone. Moreover, findings contradicted the assumption that addressing refugees' barriers to care inevitably increases costs.

The study also contributed to a clearer understanding of what may drive health care utilization and costs among refugees. The intervention explained a substantial 24% of patient-level variance in OHS costs. Inclusion of patient demographics and care characteristics accounted for an additional 23%, explaining a total of 46% of the variance in OHS costs. Over 50% remained unexplained, which suggested additional drivers of healthcare service costs exist beyond what was investigated in the current study. Notably, participants who experienced torture incurred significantly greater OHS costs compared to other experiences of direct harm. Age, time spent in the U.S., chronic conditions, surgery and imaging procedures, also significantly explained OHS costs. Importantly, the intervention was associated with lower OHS costs after controlling for these variables.

Limitations

Despite its strengths and contributions, this study has several limitations. First, the sample of Karen refugees from two primary care clinics limit the generalizability of findings. The unique cultural background of the sample and the localized practices and resources of the two clinics may not be representative of other refugee populations or healthcare settings. Future research should replicate this study in other contexts and populations [35, 36]. The second limitation is that although team members involved in data collection were blinded to the treatment condition, participants and providers were not. This may have influenced participants' usage of healthcare services. Third, a larger sample would have allowed for more nuanced subgroup analyses within multilevel models and potentially explained additional variation in OHS costs. Fourth, the absence of data on psychotropic medication means alternative hypotheses cannot be ruled out. For example, those receiving the intervention may have been more likely to access psychotropic medication and this may have contributed to cost savings. A fifth limitation was the 18-month follow-up period. Given the

chronic and complex needs often present in refugee populations, this timeframe may not fully capture the long-term effects of the intervention. Future research should evaluate longer-term cost outcomes (e.g., 2–5 + years) for similar integrated behavioral healthcare approaches. Sixth, the intervention was tailored to individual needs based on provider expertise. This may pose challenges for replicability [35]. Its intensive nature, encompassing psychotherapy, case management, interpretation, bilingual staff, and cultural adaptation, may present scalability issues in resource-constrained settings. Finally, rolling enrollment throughout the study may have introduced time-related confounders, such as shifts in clinic practices, policies, staffing, or other contextual factors.

Conclusion

Overall, the study demonstrated several promising findings that can inform and advance healthcare approaches for refugees in the United States. Results underscored the value of integrated behavioral health approaches in primary care for saving costs while simultaneously improving service utilization and addressing complex healthcare needs.

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Author Contributions MV– adapted study design, implementation of study, supervision of research team, oversaw data collection, analyses, interpretation of results, dissemination, preparation and review of manuscriptJE– implementation of study, interpretation of results, dissemination, preparation and review of manuscriptAB – project management, supervision of providers, implementation of study, interpretation of results, dissemination, review of manuscriptAN – original study design, implementation of study, supervision of providers, interpretation of results, review of manuscriptGV– original study design, early implementation of study, review of manuscriptJL – Clinic partner in design, implementation, supervision, and dissemination of study, review of manuscriptCD - Clinic partner in design, implementation, supervision, and dissemination of study, review of manuscript.

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Data Availability No datasets were generated or analysed during the current study.

Declarations

Competing interests The authors declare no competing interests.

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