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Short communication

Recruitment and retention of families interested in a parent-based pediatric obesity intervention

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ABSTRACT

Recruitment and retention in pediatric obesity treatment remains challenging, especially for groups at highest risk of this condition, including African Americans. However, most investigations examine attrition during intervention or follow-up. Little is known about those who refuse enrollment, or drop out at baseline. Thus, the trajectory of recruitment, enrollment, and retention, especially at these early stages, is not well understood, limiting knowledge of treatment access. This study examined enrollment in a pediatric weight management intervention. We provide demographic information on nested consort flow groups. We compared non-overlapping interest/enrollment groups to examine differences between those who progressed to the next consort flow group and those who did not; specifically the four groups examined were: (1) eligible at screening, did not attend baseline ($n_{children} = 261$), (2) attended baseline, did not enroll ($n_{children} = 46$), (3) enrolled, did not complete posttesting ($n_{children} = 81$), and (4) completed posttesting ($n_{children} = 284$). Of enrolled families, >70% were African American; >78% completed posttesting. No differences emerged across groups on sex, ethnicity, or race ($ps > .05$). Attrition was unrelated to initial child BMI. In this trial, the goal of enrolling diverse parents of children with obesity was achieved, and most enrollees completed treatment.

1. Introduction

Effective, accessible pediatric obesity treatments are urgently needed given the prevalence of this condition and the severity of adverse outcomes associated with it [1–3]. Recruitment and retention in pediatric obesity interventions is notoriously difficult, especially for groups at highest obesity risk, including African Americans and families from economically disadvantaged backgrounds [3–7]. This is concerning given that those who persist in pediatric weight management manifest decreases in their body mass index (BMI) [8,9]. Thus, understanding factors influencing enrollment and retention is vital to enhance treatment impact.

Most studies investigating attrition from pediatric obesity interventions examine this phenomenon during intervention or follow-up [4–8]. Few studies have examined specific components of what Nobles and colleagues have defined as, "the enrollment pathway," such as recruitment, treatment initiation, baseline attrition, and retention [10]. Thus, it is unclear what factors influence attrition at each of these stages. Also, the trajectory of recruitment, enrollment, and retention, is not well understood, limiting knowledge of treatment access over time.

This study describes characteristics of families in which a primary caregiver expressed interest in a parent-targeted pediatric weight management program, and evaluates child characteristics among four interest/enrollment groups: (1) eligible at phone screen, not attending baseline, (2) attending baseline, not enrolling, (3) enrolling, not completing posttesting, and (4) completing posttesting. Based on prior literature which has identified an association between child BMI and attendance, we hypothesized that enrollment and retention (at all

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timepoints measured) would be linked with this variable [6]. No specific hypotheses were made about the other demographics measured (race, ethnicity, age and sex) given the paucity of available data on this topic. This study addresses an important gap in the literature as understanding characteristics of families who initiate and persist in pediatric obesity treatment will inform recruitment and retention efforts, and enhance treatment access for this challenging condition.

2. Methods

2.1. Design

Nourishing **O**ur **U**nderstanding of **R**ole modeling to **I**mprove **S**upport and **H**ealth (NOURISH+) was a randomized clinical trial evaluating a parent-focused, culturally-relevant, pediatric obesity intervention [11,12]. The Institutional Review Board of Virginia Commonwealth University approved this study, which was also registered with clinicaltrials.gov (NCT01361243), and was conducted in Richmond, Virginia between 2013 and 2018.

Participants were randomized to either NOURISH + or a control group. NOURISH + consisted of six weekly sessions described elsewhere [11,12]. Some key changes made to the pilot version of NOURISH + outlined in prior work [11,12] were the addition of a cooking class, two in-person sessions with a registered dietician for each family, and a group grocery store tour. Families randomized to the control condition attended a Family Wellness Night during the first week of the intervention period. This Wellness Night involved a health fair, with multiple stations at which families could pick up publicly available information regarding pediatric overweight. Material available at the Wellness Fair did not overlap with that presented in NOURISH+. In addition, the control group was mailed publicly available brochures on pediatric overweight on five occasions during the study. This number of mailings was selected to match the number of additional in-person sessions in which the intervention group participated. These mailings consisted of publicly available materials on healthy lifestyle behaviors.

2.2. Eligibility and recruitment

Caregivers living with a child ages 5–11 years, with a BMI ≥85th percentile were eligible. Participants needed to speak English, be able to follow basic instructions, and perform simple physical exercises. Caregivers were ineligible if they were pregnant, or had a diagnosis affecting their ability to exercise, complete assessments, or participate in a group. Children were ineligible if they had a diagnosis precluding weight loss.

Participants were recruited primarily through schools, health care providers, and mailing lists. Other recruitment avenues included community groups, churches, and local advertisements. Recruitment materials did not specify that children must be overweight to qualify, as parents often misclassify their offsprings' weight [13,14]. Materials simply asked if parents were "concerned about [their] child's eating and weight." Recruitment occurred in waves, with approximately 15–30 families per wave. Participants received gift cards to compensate them for their time at assessments only. No monetary incentives were offered for session attendance. Childcare was provided at all sessions, which were held in a central, downtown location, accessible by public transportation.

2.3. Screening and baseline

Staff conducted phone screening interviews with caregivers, who were asked the date of birth, sex, race/ethnicity, height, and weight of potentially eligible children. Staff computed age-adjusted BMI percentile to determine eligibility [15]. Potentially eligible caregivers then reported their own date of birth and any medical problems. Eligible, interested caregivers were scheduled for baseline assessment or were added to a waitlist for the next wave.

At baseline, caregivers and children had their height and weight measured by staff using a stadiometer and digital scale. Staff calculated child BMI% to ensure eligibility. Randomization occurred once all participants in a wave completed baseline.

2.4. Analysis

Analyses were conducted using SAS v9.3. For caregivers and children, frequencies were calculated for sex, ethnicity, and race categories for the following nested consort flow groups (see Fig. 1): those who called to enroll ($n_{caregivers} = 978$, $n_{children} = 1111$), those who were eligible at phone screen ($n_{caregivers} = 578$, $n_{children} = 672$), those who attended baseline ($n_{caregivers} = 369$, $n_{children} = 411$), those who were eligible and enrolled at baseline ($n_{caregivers} = 340$, $n_{children} = 365$), and those who completed post-testing ($n_{caregivers} = 268$, $n_{children} = 284$). Means and standard deviations for age (of both caregivers and children) and BMI%ile of children were also computed. We then assigned each family to a non-overlapping interest/enrollment group (based on eligibility and completion information) to examine differences between those that progressed to the next consort flow group and those who did not: (1) eligible at phone screen, not attending baseline ($n_{children} = 261$), (2) attending baseline, not enrolling ($n_{children} = 46$), (3) enrolling, not completing posttesting ($n_{children} = 81$), and (4) completing posttesting ($n_{children} = 284$). These interest/enrollment groups were compared on child sex, ethnicity, and race using χ^2 tests, and BMI%ile using analysis of variance. Because randomization occured at baseline and not at phone screen, differences between the NOURISH+ and wellness group were not evaluated.

3. Results and discussion

Tables 1 and 2 present demographics of caregivers and children, respectively, in the consort flow groups at each step of the enrollment process; (also see Fig. 1). Although 60% (n = 591) of families interested in NOURISH + identified as African American, almost 70% (n = 398) of families eligible at phone screen, and >70% (n = 237) of those enrolled (those who are eligible and enrolled at baseline) were African American, suggesting we achieved our aim of recruiting a high proportion of African American families. It also suggests that African American families were more likely to meet eligibility criteria, specifically having a child with a BMI%ile high enough for study inclusion. Indeed, the mean BMI%ile for enrolled children was 97.0, which is clinically indicative of obesity (defined, in children, as a BMI ≥95%ile [15]). Most enrolled caregivers were women (94.4%, n = 321); 58.6% (n = 237) of enrolled children were girls.

Among the 362 ineligible children at phone screen, ~80% (n = 294) did not meet the study's BMI criterion (including many who were underweight). Other reasons for child ineligibility included age or disability/medical issue precluding participation. The other 77 excluded children were from families where caregivers were ineligible because of a medical issue or incomplete phone screens. A few caregivers indicated that NOURISH + did not fit their schedules. Thus, 578 families with 672 children (59.1% and 60.5%, respectively, of those who called in) were invited to participate, with 369 families with 411 children (63.8% of families invited to participate) attending baseline and 340 of those families with 365 children (92.1% of families attending baseline) eligible for NOURISH+. Further, 78.8% (n = 268) of enrolled families completed posttesting. These results indicate that the greatest recruitment/retention challenge in this study was getting families to attend baseline. From enrollment at baseline to posttesting, we observed a relatively low level of attrition for a pediatric obesity intervention [4,5]. Prior research has indicated that attrition from pediatric obesity treatment is disproportionately high among African American families [16,17], highlighting the significance of this group's recruitment and retention in NOURISH+.

Next, we examined demographics in non-overlapping interest/

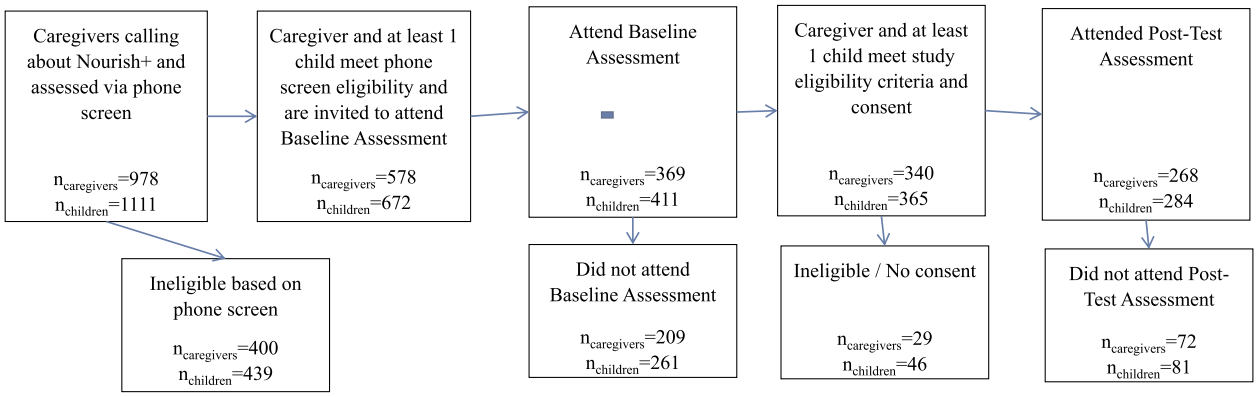

Fig. 1. Flow of families through NOURISH+.

Table 1
Demographic information for the primary caregivers in nested consort flow groups: those who call to enroll; those who are eligible at phone screen; those who attended baseline; those who are eligible and enrolled at baseline; and those who completed post-testing.

		Calling to Enroll	Eligible at Phone Screen	Attended Baseline	Eligible and Enrolled	Completed Post-test
		N = 978	N = 578	N = 369	N = 340	N = 268
		N (%)	N (%)	N (%)	N (%)	N (%)
Sex	Female	892 (91.2)	551 (95.3)	349 (94.6)	321 (94.4)	252 (94.0)
	Male	58 (5.9)	27 (4.7)	20 (5.4)	19 (5.6)	16 (6.0)
	Missing	28 (2.9)	0	0	0	0
Ethnicity	Non-Hispanic	754 (77.1)	447 (90.8)	254 (68.8)	227 (66.8)	181 (67.5)
	Hispanic	36 (3.7)	25 (4.5)	17 (4.6)	15 (4.4)	12 (4.5)
	Missing	188 (19.2)	106 (4.7)	98 (26.6)	98 (28.8)	75 (28.0)
Race	White	248 (25.4)	146 (25.3)	94 (25.5)	85 (25.0)	67 (25.0)
	African American	591 (60.4)	398 (68.9)	256 (69.4)	237 (69.7)	192 (71.6)
	Hispanic	14 (1.4)	8 (1.4)	1 (0.3)	1 (0.3)	0
	Asian	10 (1.0)	3 (0.5)	0	0	0
	Native American	8 (0.8)	4 (0.7)	2 (0.5)	2 (0.6)	0
	Multiracial	29 (3.0)	17 (2.9)	16 (4.3)	15 (4.4)	9 (3.4)
	Missing	78 (8.0)	2 (0.4)	0	0	0
		Mean (std |n)	**Mean (std |n)**	**Mean (std |n)**	**Mean (std |n)**	
Age		38.6 (8.1 | 592)	38.8 (8.1 | 563)	38.9 (7.8 | 360)	39.2 (7.7 | 331)	39.3 (7.7 | 259)

Table 2
Demographic information for the children in families in nested consort flow groups: those who call to enroll; those who are eligible at phone screen; those who attended baseline; those who are eligible and enrolled at baseline; and those who completed post-testing.

		Calling to Enroll	Eligible at Phone Screen	Attended Baseline	Eligible and Enrolled	Completed Post-test
		N = 1111	N = 672	N = 411	N = 365	N = 284
		N (%)	N (%)	N (%)	N (%)	N (%)
Sex	Female	545 (49.0)	383 (57.0)	237 (57.7)	214 (58.6)	164 (57.8)
	Male	473 (42.6)	287 (42.7)	173 (42.1)	151 (41.4)	120 (42.2)
	Missing	93 (8.4)	2 (0.3)	1 (0.2)	0	0
Ethnicity	Non-Hispanic	860 (77.4)	577 (85.9)	354 (86.1)	309 (84.7)	241 (84.9)
	Hispanic	56 (5.0)	39 (5.8)	20 (4.9)	19 (5.2)	16 (5.6)
	Missing	195 (17.6)	56 (8.3)	37 (9.0)	37 (10.1)	27 (9.5)
Race	White	237 (21.3)	152 (22.6)	92 (22.4)	83 (21.8)	63 (22.2)
	African American	664 (59.8)	459 (68.3)	291 (70.8)	257 (69.2)	204 (71.8)
	Hispanic	11 (1.0)	8 (1.2)	0	0	0
	Asian	9 (0.8)	3 (0.4)	1 (0.2)	0	0
	Native American	6 (0.5)	4 (0.6)	2 (0.5)	2 (0.6)	0
	Multiracial	54 (4.9)	34 (5.1)	23 (5.6)	21 (5.8)	16 (5.6)
	Missing	130 (11.7)	12 (1.8)	2 (0.5)	2 (0.6)	1 (0.4)
		Mean (std |n)	**Mean (std |n)**	**Mean (std |n)**	**Mean (std |n)**	
Age		8.6 (2.1 | 996)	8.9 (1.9 | 665)	9.0 (1.9 | 411)	9.1 (1.9 | 365)	9.1 (2.0 | 284)
BMI		81.8 (28.8 | 939)	96.4 (3.9 | 669)	96.6 (3.9 | 411)	97.0 (3.3 | 365)	96.9 (3.4 | 284)

enrollment groups to examine potential differences between those who progressed to the next consort flow group and those who did not. When analyzing sex differences, we excluded children with unreported sex as it was required for enrollment. Due to small cell sizes for race, we evaluated differences among African Americans, Whites, and all other races aggregated. No differences were found among interest/enrollment

groups for sex, ethnicity, or race (*ps* > .05). However, differences were found among interest/enrollment groups for child BMI%ile ($p < .0001$). Post hoc tests revealed that those eligible at phone screen, not attending baseline, differed from all other groups as did those attending baseline, not enrolling (all p's < 0.05). However, those enrolling, not completing posttesting did not differ from those who completed posttesting (p = .29, Cohen's D = 0.16), suggesting that attrition among enrollees was unrelated to initial child BMI. These results are similar to those of Shaffer and colleagues [6], who also found that higher child BMI was positively related to initial attendance in a pediatric obesity intervention. However, their study also identified a relation between child sex and attendance at first visit, with females being more likely to attend. A parallel link was not found in the current study. However, Shaffer et al.'s study included older children (64.2% were >11 years). In contrast, the oldest children in the current study were 11, and the mean age of children whom caregivers called to enroll was 8.6 years. Thus, it is possible sex differences influencing attrition become more pronounced with age. Shaffer and colleagues' study did not explore racial differences; (race was not reported in their results). However, as in the current study, there was no link identified between Hispanic ethnicity and attendance. (Of note, their ethnicity statistics were derived from census block data and were not measured at the patient level). Current findings extend their work and suggest targeting younger children in pediatric obesity interventions might offer promise in reducing sex disparities in attendance.

Overall, a high proportion of families completed NOURISH + through posttesting. This result might be at least partially attributable to the use of several retention strategies. These include the fact that the length and content of NOURISH+ was informed by participants' feedback in a pilot trial [12]. Also, childcare was provided at all sessions and the location was accessible via public transportation.

One limitation of the current study is that parents had to make the initial effort to contact the researchers. Thus, parents self-selected into the study (although many were referred by healthcare providers), and likely were motivated to make changes in their family's eating and exercise behaviors. Prior work suggests parents who self-refer their child to family-based pediatric obesity treatment are more likely to attend sessions [7]. An additional limitation of this study includes the fact that the baseline screening did not assess family socioeconomic status. Furthermore, the intervention was free; (thus insurance status was not relevant). Future studies in clinical settings might want to assess these issues as well.

Over sixty percent of families (61.2%) who expressed interest in NOURISH+ and were eligible ultimately enrolled. Results suggest that targeting parents of children with obesity (particularly African Americans) is feasible; most families stayed in the intervention. Future research will investigate NOURISH + outcomes.

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