

Research paper

Evaluation of the Group Lifestyle Balance programme for diabetes prevention in a Hispanic Women, Infants and Children (WIC) Programme population in the USA

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What is known on this subject

- Diabetes is a serious condition that disproportionately affects Hispanic individuals in the USA. Approximately 11.8% of Hispanic adults have diabetes, compared with around 7.1% of non-Hispanic whites.
- There is evidence that lifestyle intervention lowers the risk of developing diabetes, but this has not been widely evaluated in the Hispanic community.
- The Group Lifestyle Balance (GLB) programme, which is an adaptation of the Diabetes Prevention Programme (DPP) lifestyle intervention, has been shown to lower risk factors for diabetes and cardiovascular disease, but to date it has only been evaluated in English-speaking populations.

What this paper adds

- A Spanish-translated version of the 12-session GLB programme was delivered to 27 Hispanic women who were overweight or obese. Those who attended three or more sessions demonstrated significant weight loss.
- Barriers to participation included new employment, participants' and children's health problems, relocation and lack of transportation.
- There is a lack of up-to-date behavioural lifestyle intervention materials for diabetes prevention available in Spanish. This project was an important step toward initiating widespread diabetes prevention efforts in high-risk and vulnerable Hispanic communities.

ABSTRACT

In the USA, Hispanic people are disproportionately affected by diabetes. Approximately 11.8% of Hispanic adults have diabetes, compared with around 7.1% of non-Hispanic whites. The Group Lifestyle Balance (GLB) programme (www.diabetesprevention.pitt.edu), which is adapted from the Diabetes Prevention Programme (DPP) (www.bsc.gwu.edu/dpp) lifestyle intervention, has been shown to lower risk factors for diabetes and cardiovascular disease, but has only been evaluated in English-speaking populations. The objective of this pilot project was to evaluate the effectiveness of a Spanish-translated version of the GLB programme in enabling members of a high-risk Hispanic population to reduce their weight.

Non-diabetic, overweight adults with a body mass index (BMI) of ≥ 26 kg/m² who were taking part in the City of Dallas Women, Infants and Children (WIC) programme were eligible to enrol in this non-randomised, prospective evaluation. Bilingual GLB-trained health professionals delivered the programme over a period of 12–15 weeks, with measures collected at baseline and post intervention. A total of 27 overweight or obese Hispanic women participated in the study, of whom 18 individuals (66.7%) reported that they did not

graduate from high school and 22 individuals (81.5%) were unemployed or homemakers. Those who attended at least half of the sessions ($n = 12$) demonstrated a mean weight loss of 6.8 pounds (3.9%), with 4 women (33%) and 3 women (25%) achieving a 5% and 7% weight loss, respectively. Five individuals in this group (41.2%) achieved the physical activity goal of 150 minutes per week. The number of sessions attended was positively correlated with weight loss ($P = 0.01$). Barriers to participation included new employment, participants' and children's health problems, relocation and lack of transportation.

In conclusion, the Spanish-translated version of the 12-session GLB programme was successfully delivered within the City of Dallas WIC Program. The women who took part demonstrated significant weight loss. There is a lack of up-to-date health material available in Spanish. This project is an important step towards initiating widespread diabetes prevention efforts in high-risk and vulnerable minority populations.

Keywords: behavioural lifestyle intervention, community translation, diabetes prevention, group lifestyle balance, Spanish curriculum

Introduction

It is estimated that almost 26 million adults in the USA have diabetes and that, of these, 90–95% have type 2 diabetes (Centers for Disease Control and Prevention, 2011). Diabetes is strongly related to cardiovascular disease (Thom *et al*, 2006), and is the leading cause of adult-onset kidney failure and blindness, as well as a major cause of lower limb amputation (National Institute of Diabetes and Digestive and Kidney Diseases, 2007). In the USA, Hispanic people are disproportionately affected by diabetes; approximately 11.8% of Hispanic adults have this condition, compared with approximately 7.1% of non-Hispanic whites (Centers for Disease Control and Prevention, 2011). The prevalence of diagnosed diabetes increased from 9.6% to 12.6% in the adult Hispanic population between 1994–1998 and 2005–2006, and it is estimated that approximately 32% of Hispanic adults have pre-diabetes, which increases their risk of developing the condition at a later date (Cowie *et al*, 2009).

The state of Texas has the second largest Hispanic population in the USA, estimated to be around 8 385 139 people (United States Census, 2010). It is antici-

pated that this population will more than double by the year 2025 (United States Census Bureau, 2012). Like the rest of the USA, Texas has seen a steady increase in diabetes over time, with an estimated overall diabetes prevalence of 9.7% in 2008, compared with 8.8% for the whole country (Texas Diabetes Council, 2008). This projected increase, together with considerable growth in the Hispanic population, is likely to create a major healthcare burden not only in Texas, but across the USA as a whole.

Evidence that lifestyle intervention can prevent or delay the development of type 2 diabetes has been provided by several studies (Pan *et al*, 1997; Tuomilehto *et al*, 2001; Ramachandran *et al*, 2006), including a large multi-centre clinical trial in the USA, namely the Diabetes Prevention Program (DPP) (Knowler *et al*, 2002). Several studies have focused on evaluating adaptations of the DPP lifestyle intervention in the general population (Whittemore *et al*, 2009; Ackermann *et al*, 2008; Amundson *et al*, 2009; Davis-Smith *et al*, 2007). A group-based adaptation of the DPP lifestyle intervention, namely the Group Lifestyle Balance (GLB) programme, has been shown to be effective in several community settings (Seidel *et al*, 2008; McTigue *et al*, 2009; Kramer *et al*, 2009, 2010, 2011, 2012; Ma

et al, 2013). Although the original DPP materials were available in Spanish, a recent meta-analysis of studies implementing adapted versions of the DPP lifestyle intervention demonstrated that most of the participants were white non-Hispanics (70.9% across all studies) (Ali *et al*, 2012). There have been very few studies of interventions with the Hispanic population as the main focus (Merriam *et al*, 2009; Ruggiero *et al*, 2011; Ockene *et al*, 2011; Parikh *et al*, 2010).

In the USA, the Centers for Disease Control and Prevention (CDC) recently launched the National Diabetes Prevention Recognition Program, a national programme designed to recognise organisations which have shown that they can effectively deliver a lifestyle change intervention programme for prevention of type 2 diabetes (Centers for Disease Control and Prevention, 2012). One of the requirements for CDC recognition is the utilisation of a curriculum that contains key elements of the original DPP curriculum. Although the GLB programme is a CDC-approved curriculum, the programme materials were only available in English, thus limiting their implementation with Hispanic populations.

The aims of the project reported here were first to translate the GLB programme materials for Spanish speakers, and secondly to conduct an initial pilot evaluation of the effectiveness and appropriateness of the translated materials in a Women, Infants and Children (WIC) programme in Texas (www.dallascityhall.com/housing/WomenInfantsandChildrenWIC/index.html). We anticipated that the results of this project would provide information about the options for Spanish-translated DPP adaptations, especially those seeking CDC recognition.

Methods

In an effort to promote diabetes prevention efforts, the Diabetes Prevention Support Center (DPSC) of the University of Pittsburgh was established by the faculty who developed the original DPP lifestyle intervention materials and subsequently adapted them to the GLB programme for use in translation. The mission of the DPSC is to prevent or delay diabetes and improve cardiovascular health by providing education, training and programme support services to healthcare providers, employers and the community at large, as well as to conduct ongoing evaluation of implementation of the GLB programme.

Setting

The City of Dallas Women, Infants and Children (WIC) Program in Texas was selected to pilot the

GLB Spanish-translated materials, as staff have experience of providing the GLB programme in English and Spanish to their clients (using the outdated and modified original DPP Spanish materials), and serve a substantial Hispanic population who are in need of diabetes prevention intervention. The City of Dallas WIC Program provides nutrition education, nutrition counselling, nutritious foods and help in accessing healthcare to low-income pregnant, postpartum and breastfeeding women, infants and children under the age of 5 years (Texas Department of State Health Services, undated). The City of Dallas WIC Program served an average of 110 399 participants each month during the fiscal year 2009–2010 (C Wachtler, RD LD, personal communication, Texas Department of State Health Services, November 2010). Approximately 65% of City of Dallas WIC clients are Spanish-speaking. The GLB programme has been offered within several City of Dallas WIC clinics for at-risk mothers of enrolled children participating in this programme. However, as a large proportion of the population speak only Spanish, the lack of up-to-date materials in the appropriate language limited the effectiveness of the interventions.

Study design

This was a non-randomised, prospective pilot study completed at two urban City of Dallas WIC sites in Texas. Participants enrolled in the GLB programme and completed the initial 12 Spanish-translated core sessions, as well as pre- and post-intervention assessments. The goal was to develop a programme that enabled participants to maintain a 7% weight loss and to safely and progressively increase their physical activity to 150 minutes per week of moderately intense physical activity equivalent to a brisk walk. The project was approved by the University of Pittsburgh Institutional Review Board and the Texas Department of State Health Services Institutional Review. Funding was provided by the Department of Epidemiology, Graduate School of Public Health, University of Pittsburgh.

Sites and training

The Diabetes Prevention Support Center faculty worked closely with the City of Dallas WIC Field Support Coordinator to identify the delivery sites and the health professionals to provide the Spanish GLB programme. Two WIC sites were selected because they served a large number of Spanish-speaking clients. The lifestyle coaches were bilingual in Spanish and English. They were registered dietitians who had both completed the GLB training and had prior experience of delivering the GLB programme. The

coaches received training from the DPSC investigators regarding the study protocol, consent procedures and the translated GLB materials.

Participant eligibility and recruitment

The eligibility requirements for this project were intentionally broad, to allow for widespread recruitment of high-risk, Spanish-speaking individuals, namely non-diabetic mothers, fathers and other family members, aged 18 years or older, with a BMI of $\geq 26 \text{ kg/m}^2$, who indicated that Spanish was their primary language and who could read Spanish, and who were related to City of Dallas WIC participants. Individuals who were unable to attend at least 75% of the sessions, women who were pregnant or who had given birth within the previous 6 weeks, and any individuals with a medical condition that might be affected by a lifestyle change programme were excluded.

Study recruitment began in July 2011. Study participants were recruited through the use of posters and flyers, and during one-on-one Value Enhance Nutrition Assessment (VENA), the US Department of Agriculture mandated method of nutrition assessment, counselling and motivational interviewing. We aimed to enrol a total of 30 participants into the programme. A total of 28 women were screened, of whom 27 individuals were enrolled in the project (one individual was not eligible, due to having a BMI of $< 26 \text{ kg/m}^2$). All of the study participants gave their informed consent, which was provided in Spanish.

Intervention

One of the initial tasks of the DPSC was to adapt the DPP lifestyle intervention for delivery in the general population. Members of the original DPP lifestyle core team collaborated to adapt the individual intervention to a group-based programme, update the materials, and condense the core programme from 16 individual sessions delivered over 24 weeks to 12 core group sessions delivered over 12–15 weeks (Kramer *et al*, 2009), followed by bi-weekly and monthly sessions. This created a total of 22 sessions delivered over the course of 1 year.

The 12 core GLB participant sessions were translated into Spanish by the same translator who was employed by the DPP Outcomes Study. Some minor modifications were required, such as alterations to the recipes to make them more appropriate for Hispanic people. These 12 sessions focused on nutrition and healthy eating, physical activity and safety when exercising, and behavioural issues such as problem solving, getting back on track after a lapse, and staying motivated over a long period. Each session was designed to last for 1 hour and adopted an interactive

approach. Three series of the 12-session Spanish GLB programme were offered, with the goal of enrolling approximately 10 individuals in each group. One group was held in the evening and two groups were conducted during the day. Groups were completed over a period of 12–15 weeks.

All of the participants were given the tools necessary to complete the programme. These included all of the Spanish GLB handouts, a Spanish calorie and fat counting book obtained from the National Diabetes Education Programme (Centers for Disease Control and Prevention, 2012), Spanish self-monitoring booklets for recording food, activity and weight, a bathroom scale and a pedometer. Participants were contacted prior to each session with a reminder call; those who missed sessions received materials either by post or by email.

Retention

Throughout the recruitment and intervention phases, weekly to bi-weekly contact via phone or email occurred between the lead researcher and the lead lifestyle coach to address problems and treatment issues. A small amount of funding allowed for the provision of incentives and enabling tools, such as physical activity DVDs, measuring cups and spoons, and taste testing during the sessions. These incentives and enabling tools were similar to those offered in other GLB programmes to facilitate participant engagement and retention (Kramer *et al*, 2009).

Outcome measures

The primary outcome for this project was a change in weight between enrolment and completion of the 12 core GLB sessions at approximately 4 months. Secondary outcomes included achievement of the physical activity goal and participant satisfaction with the programme. The participants completed assessments at enrolment and again at the end of the 12 core sessions. The lifestyle coaches received instruction in the collection of these outcome measures, and they or their supervised staff completed all of the measures for this project.

Weight was measured without shoes on a scale placed on a hard, flat surface. Each participant was asked to stand in the middle of the scale without touching any surface, with their eyes facing straight ahead. Weight was measured at the pre- and post-intervention assessments and at every GLB session. Height was measured at enrolment. Each participant was asked to stand erect under the stadiometer with their eyes facing straight ahead. BMI was calculated as the average weight divided by the average height squared (kg/m^2).

The participants were asked to complete a number of questionnaires in Spanish. Demographic data, including age, gender, ethnicity and level of education, were collected at enrolment using a brief self-completed questionnaire. Information about health and lifestyle was collected by means of a second questionnaire at the beginning of the programme. This questionnaire included the CDC Prediabetes Screening Test, as well as several questions about self-monitoring habits relating to weight, eating and physical activity. Finally, information about participant satisfaction was collected by means of a third questionnaire, which assessed understanding of and satisfaction with the programme, confidence about the sustainability of the healthy lifestyle changes made, and barriers to the long-term maintenance of physical activity and healthy eating habits.

Sample size and data analysis

Each participant's weight was monitored throughout the programme. Taking into account the weight loss seen in previous GLB studies, at least 20 subjects were needed to provide approximately 96% power to detect a 3.5% weight loss and > 99% power to detect a weight loss of 7% with $\alpha = 0.05$. In order to ensure that enough individuals were enrolled to allow for attrition, the goal for enrolment in this pilot project was 30 subjects.

Data from the enrolment and final sessions were used as the basis for evaluating weight loss. Participants' weight was included if they had attended at least 25% of the sessions ($n = 18$); secondary subgroup (per protocol) analyses were also performed for those who attended at least 50% of the 12 sessions ($n = 12$). Two measures were evaluated, namely the mean weight loss in pounds, and the percentage of participants who reached the ideal 7% weight loss goal and of those who achieved a 5% weight loss. The mean difference between pre- and post-intervention measures was analysed using the paired Student's *t*-test, and chi-square tests were used to compare dichotomous variables. Correlations were calculated using Pearson's or Spearman's correlation coefficient *r*. Analyses were performed using PASW Statistics 18 by SPSS Inc. Qualitative data from the satisfaction survey and the assessment of barriers to goal achievement were also evaluated.

Results

The average age of the participants was 32.2 years, with a range of 20–56 years. Only 14.8% of the group were employed full-time, and only one-third reported

graduating from high school (33.3%). The mean BMI for the group was 32.4 kg/m²; over 50% of the group had a BMI of ≥ 30 kg/m². None of the participants reported a family history of heart disease, but 26% reported a family history of diabetes ($n = 7$), and 29.6% ($n = 8$) reported a history of gestational diabetes. Only one participant (3.7%) smoked (see Table 1). Diabetes risk based on the CDC Prediabetes Screening Test ranged from 1 to 11, with an average score of 6.1 (a score of ≥ 9 indicates a high risk for prediabetes).

With regard to weekly self-monitoring habits, only 4 participants (14.8%) reported weighing themselves at least once a week, 2 participants (7.4%) reported recording their food intake at least once a week, and 7 participants (26%) reported recording their physical activity at least once a week.

In total, 18 participants (67%) attended three or more sessions, with an average rate of attendance of 7.1 of the 12 sessions for this group; 12 participants (44%) attended at least half of the sessions (the mean number of sessions for this group was 8.5). Among the 11 participants who attended less than three sessions, reasons for dropping out included starting a new job ($n = 4$), problems relating to their children's health

Table 1 Baseline characteristics

Variable	$n = 27$
Mean age at baseline, range (years)	32.7, 20–56 100%, 27
Race (Hispanic) (%), n	
• Mexican	74%, 20
• Other unknown	26%, 7
Employment (%), n	
• Full-time	14.8%, 4
• Part-time	3.7%, 1
• Unemployed	18.5%, 5
• Homemaker	63.0%, 17
Education (%), n	
• 8th grade or less	51.9%, 14
• Some high school	14.8%, 4
• High school graduate or GED	22.2%, 6
• Some college or technical school	11.1%, 3
BMI (%), n	
• 25–29.9 kg/m ²	37%, 10
• ≥ 30 kg/m ²	63%, 17
Parent and/or sibling with diabetes (%), n	26%, 7
History of gestational diabetes (%), n	29.6%, 8

($n = 2$), and moving out of the area ($n = 1$). In the group that attended three or more sessions, other barriers to attendance included similar responses, namely new employment, participants' and children's health problems, and lack of transport. The number of sessions attended was positively correlated with weight loss ($P = 0.01$). Attendance was not related to age, employment or unemployment, or level of education.

The overall mean weight loss for those who attended at least three sessions ($n = 18$) was 4.5 pounds (2.8%). Those who attended at least half of the sessions ($n = 12$) showed a mean weight loss of 6.8 pounds (3.9%); 4 participants (33%) achieved a weight loss of 5%, and 3 participants (25%) achieved a weight loss of 7% (see Table 2). Five individuals in this group (41.2%) achieved the physical activity goal of 150 minutes per week.

A total of 17 individuals completed the third questionnaire. They all reported that they had a better understanding of pre-diabetes as well as the risks associated with the development of diabetes. They were all satisfied with the group leader and the learning environment. They reported that the Spanish lifestyle intervention materials were easy to understand and follow, and that they had learned useful skills from the programme. The majority ($n = 14$; 82.4%) felt that the programme was of the right length, while 3 participants (6%) felt that it was too short. All of the respondents indicated that they would recommend the programme to someone else. Seven participants reported no barriers to maintaining weight loss and physical activity. Work schedules, lack of support from family and/or friends, family demands and lack of access to gym or workout equipment were reported as the main barriers to maintaining long-term weight loss and physical activity (see Table 3).

Discussion

The Spanish-translated version of the 12-session GLB programme was successfully delivered in the City of Dallas WIC Program setting. The overweight and obese Hispanic women who took part experienced significant weight loss, with an overall mean weight loss of 4.5 pounds. In total, 33% of those who attended at least half of the sessions achieved a 7% weight loss. Although the results for weight loss are lower than those seen in studies implementing the GLB programme in English (Kramer *et al*, 2009, 2010, 2011, 2012), they are similar to the findings of other DPP adaptation studies in Hispanic communities (Ruggiero *et al*, 2011; Ockene *et al*, 2011). Specifically, Ruggiero *et al* (2011) reported a mean weight loss of 4.8 pounds (-2.8%) in a Latino group of 69 participants, with

20% and 29% of the study group achieving 7% and 5% weight loss, respectively. More recently, results from the Lawrence Latino Diabetes Prevention Project demonstrated a median weight loss of 2.5 pounds (-1.3%) in the lifestyle intervention group (Ockene *et al*, 2011). Although the weight loss in the Lawrence Latino DPP was modest, a significant decrease in HbA1c, similar to that found in the original DPP, was noted. It will be important for future studies with Hispanic individuals to examine more closely the association of weight change with metabolic function.

In our project, there were concerns about attendance at group sessions. This reflects other studies focusing on lifestyle interventions in Hispanic communities (Ruggiero *et al*, 2011; Ockene *et al*, 2011). The demographic characteristics of our sample are similar to those of other studies; less than 50% of the participants graduated from high school and most were unemployed. These demographics are representative of an underserved, high-risk group that may need specialised, tailored intervention strategies to achieve better results. In the Lawrence Latino DPP, although retention in the study at the end of 1 year was high, attendance at group intervention sessions was low, dropping from 60% at the first session to 20% at the last session. The Lawrence Latino DPP intervention was culturally tailored for a Hispanic population based on focus group feedback, which seems to have had an effect on retention but not necessarily on group attendance (Ockene *et al*, 2011). Thus it remains unclear how to best retain individuals in this high-risk community, but certainly efforts to understand the specific barriers to group attendance are needed.

Our participants provided some important information with regard to this issue. Feedback about the Spanish materials and translated programme was very positive, suggesting that these materials were appropriate and useful. In addition, all of the participants who completed the post-intervention questionnaire indicated that they would recommend the programme to someone else. Lack of attendance at the sessions was attributable to many reasons unrelated to the programme or materials; for many, for example, poor attendance was due to finding a new job. Other barriers to participation included participants' and children's health problems, and lack of transport. Although this was a small pilot study, these appear to be important issues to consider when moving forward with implementation of lifestyle intervention programmes for young mothers who are economically challenged. The lifestyle coaches for this project provided materials via email or postal mail to those who missed a session. However, in future research it may be important to consider offering the programme at a variety of times to facilitate attendance, adding alternative delivery modes (e.g. individual or Internet-based options), providing transport, or searching for

Table 2 Body weight and BMI before and after intervention

	Participants attending at least 3 sessions (<i>n</i> = 18)					Participants attending at least 6 sessions (<i>n</i> = 12)				
	Before	After	Mean change	Mean change (%)	<i>P</i> -value	Before	After	Mean change	Mean change (%)	<i>P</i> -value
Body weight (pounds) Mean (SD)	166.6 (21.9)	162.1 (24.5)	-4.5 (4.4)	2.7%	< 0.001	161.5 (17.9)	155.2 (20.1)	-6.3 (4.0)	3.9%	< 0.001
BMI (kg/m ²) Mean (SD)	31.4 (4.6)	30.5 (5.1)	-0.94 (0.83)	2.9%	< 0.001	30.3 (3.9)	29.1 (4.3)	-1.2 (0.77)	4.0%	< 0.001

Table 3 Barriers to maintaining weight loss and physical activity goals

Weight loss survey question	Frequency	Percentage
Work schedule	5	29.4
Family demands	1	5.9
Lack of support from family and/or friends	3	17.6
Lack of support from healthcare provider	0	0
Limited availability of healthy food choices	1	5.9
Lack of motivation	0	0
No barriers to success	7	41.2
	17	100.0
Physical activity survey question	Frequency	Percentage
Work schedule	3	17.6
Lack of access to gym or other workout equipment	3	17.6
Family demands	3	17.6
Lack of support from family and/or friends	1	5.9
Lack of support from healthcare provider	0	0
Lack of safe areas for physical activity (due to crime)	1	5.9
Lack of safe areas for physical activity (due to lack of pavements)	0	0
Lack of motivation	2	11.8
No barriers to success	3	17.6
Other, not indicated	1	5.9
	17	100.0

ways in which mothers and their children can both be a focus of the intervention.

Strengths and limitations of the study

This pilot project provided a prospective evaluation of the application of the GLB programme with a group of high-risk Hispanic women. It required collaboration between the community site and the investigators. Successful implementation of the GLB programme created the potential for sustainability within the large infrastructure of the City of Dallas WIC Program. Since the completion of this project, the DPSC has received funding to translate the core transition and

post-core support GLB sessions into Spanish. As a result, the entire GLB programme is now available in Spanish to healthcare providers, and can be accessed on the DPSC website (www.diabetesprevention.pitt.edu).

This was a small pilot study designed to evaluate the translated GLB materials and assess the effectiveness of their application. Consequently, our project represents an initial evaluation of the linguistic translation of the materials, and does not address cultural adaptations that might enhance the programme's potential effect. Although efforts were made to enrol men, only young and middle-aged women took part in this study. Therefore it will be important to evaluate the Spanish-translated GLB programme with men as well as with other age groups in future projects. Finally, the rate of attrition in this population was a cause of concern, and certainly warrants further consideration.

Conclusion

There is a lack of up-to-date DPP intervention materials available for implementation with the Hispanic general population. This project was an important step towards initiating more widespread diabetes prevention efforts in high-risk and vulnerable minority populations. It is anticipated that by translating and evaluating the GLB materials for Spanish-speaking individuals, this project will further efforts to reach those who are in dire need of such intervention. Future research should focus on the determination of the specific cultural adaptations needed to make the programme more appropriate for Hispanic people, the evaluation of the effectiveness of such modifications, barriers to participation, and strategies to facilitate attendance at sessions. This is of particular importance in the prevention of diabetes among high-risk, underserved Hispanic communities.

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CONFLICTS OF INTEREST

None.

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