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Article in *Research Quarterly for Exercise and Sport* · January 2022

DOI: 10.1080/02701367.2021.1971149

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To cite this article: María Sanz-Remacha, Luis García-González, Javier Sevil Serrano & Alberto Aibar Solana (2022): A Qualitative Evaluation of a Community-Based Intervention on Health-Related Behaviors in Disadvantaged Women, Research Quarterly for Exercise and Sport, DOI: [10.1080/02701367.2021.1971149](https://doi.org/10.1080/02701367.2021.1971149)

To link to this article: <https://doi.org/10.1080/02701367.2021.1971149>



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A Qualitative Evaluation of a Community-Based Intervention on Health-Related Behaviors in Disadvantaged Women

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ABSTRACT

Purpose: Grounded in social ecological model and self-determination theory, the aim of this study was to qualitatively evaluate the first and second year follow-ups of a community-based healthy lifestyle programme on health-related behaviors, and outcomes in disadvantaged adult women. **Methods:** Eleven disadvantaged adult women ($M = 37.72$; $SD = 8.34$) (seven of them from the Roma population) participated in this community-based participatory action research. Discussion groups, semi-structured interviews, and field notes were used to assess the effects of the intervention programme on health-related behaviors and health outcomes through thematic analysis. **Results:** Women perceived improvements in PA-related variables, healthy eating, and other health-related outcomes throughout two years. Most women mentioned these behavior changes in the first year, while others perceived them in the second year. **Conclusions:** These findings highlight the importance of developing contextual and culturally tailored interventions that address the specific problems and needs that emerge from ethnic groups. Given that some of these behavior changes were only mentioned by most of these women in the second year, long-term interventions seem to be ideally required in this population.

ARTICLE HISTORY

Received 19 May 2020
Accepted 13 August 2021

KEYWORDS

Roma ethnic group; exercise; diet; health promotion

Physical inactivity and unhealthy eating are two health-risk behaviors associated with negative consequences such as type 2 diabetes, cancer, obesity, depression, weight gain, and obesity risk (Ding et al., 2016; Nardocci et al., 2019). However, high physical activity (PA) levels and healthy eating have been independently associated in adults with a wide range of physical, social, and mental health benefits (Dinu et al., 2018). Despite the benefits of these two health-related behaviors, most of the global adult population does not meet PA recommendations (Guthold et al., 2018), or the optimal intake for each dietary factor (Afshin et al., 2019). The lowest percentages are found above all among disadvantaged populations, who are less likely to meet PA recommendations and to have a healthy diet (Ball et al., 2015). Disadvantaged populations are characterized by having a poor health status, low education levels and socioeconomic status (SES), and living in marginal areas (Mechanic & Tanner, 2007; WHO, 2013).

The Roma population is one of the largest ethnic minority groups in Europe, and especially in Spain (i.e., between 800,000 and 970,000 Roma people) (Fundación Secretariado Gitano, 2009). This disadvantaged population usually suffers social exclusion in decisive areas, such as education, residence, and employment (Anthonj et al., 2020; Fernández-Feito et al., 2017). Previous studies have shown that the Roma population health status, especially women, is worse than the non-Roma population and, consequently, they may have a high prevalence of overweight and obesity, cardiovascular diseases, and type 2 diabetes

(Fernández-Feito et al., 2017). For example, a previous study found that 24.45% of Roma women were obese in comparison to 10.22% of non-Roma women (Carrasco-Garrido et al., 2010).

The Roma population diet is usually characterized by a low intake of fruit and vegetables, and a high weekly consumption of soft drinks and fast food (Fernández-Feito et al., 2017). Moreover, more than half the European Roma ethnic group does not do any leisure-time PA (LTPA) (Fundación Secretariado Gitano, 2009). Of all the correlates of physical inactivity in the Roma population, the lack of motivation to engage in PA has been found to be one of the main reasons (Tsimaras et al., 2011). The few existing studies have shown that Roma adult women are even less likely to meet PA recommendations and to have a healthy diet than Roma men (La Parra-Casado et al., 2015). Furthermore, Roma women also show lower LTPA levels than non-Roma women (Babinská et al., 2014). Considering the prevalence of multiple health-risk behaviors among Roma adult women, designing and implementing community-based healthy lifestyle programmes are required to improve health-related behaviors, and consequently, to reduce health inequalities (Fernández-Feito et al., 2017).

The number of interventions that have been conducted in disadvantaged populations with the aim of promoting healthy lifestyles has increased over the last years. An umbrella review (Craike et al., 2018), which examined the effectiveness of interventions to improve PA among adults from disadvantaged populations, found inconclusive and mixed findings. Most of

the interventions that reported improvements in PA levels showed small effect sizes. Moreover, PA changes were not maintained at post-intervention follow-up. The majority of reviews (Bull et al., 2018; C. L. Cleland et al., 2012; V. Cleland et al., 2013; Craike et al., 2018) showed that intervention duration was not associated with positive short-term effects of the interventions. However, studies grounded in behavioral theories highlighted that long-term interventions (>6 months) were required to change and maintain behaviors such as PA (Prochaska & DiClemente, 1992). A previous systematic review, conducted in low-income groups, showed that, in contrast to PA, diet changes were maintained at post-intervention follow-up (Bull et al., 2014). Therefore, it seems that the effectiveness of interventions in low-income groups depends on the behavior addressed. Interventions targeting PA or healthy eating among disadvantaged populations have also evidenced improvements in other health-related outcomes, such as motor skills, physical fitness, weight loss, health awareness-raising, self-rated health, and quality of life (Ingram et al., 2012; Jayaprakash et al., 2016). It should also be highlighted that the positive behavior changes of these healthy lifestyle programmes can also produce a ripple effect on their family members (Hand et al., 2014).

A wide range of specific strategies have been implemented in different healthy lifestyle programmes among disadvantaged populations. Recent systematic reviews (Bull et al., 2018; Craike et al., 2018) have examined what types of strategies are more effective in improving some health-related behaviors among disadvantaged populations. These reviews revealed that the context and mode of delivery of PA interventions were more effective when conducted at home or in a community setting, including direct instruction in the learning process, allowing sufficient time for behavioral practice, implementing group-based sessions, intensive interventions, and involving the stakeholders in their design and implementation. Regarding diet interventions, more effective interventions (Emmons et al., 2005; Jackson et al., 2011; Keyserling et al., 2008) included behavior change techniques, such as encouraging self-monitoring and providing face-to-face contact with health professionals (Bull et al., 2018). Furthermore, implementing cultural adaptation strategies regarding the ethnic group should be considered in health promotion interventions among disadvantaged populations. In particular, strategies ranging from surface structures (e.g., conducting the intervention in familiar contexts, involving ethnic lifestyles elements, etc.) that are related to the presentation of the strategies, to deep structures or content of the strategies (e.g., involving family members, using networks and social support, adding cultural values, etc.), have been recommended (Barrera et al., 2013; Jayaprakash et al., 2016; Resnicow et al., 1999).

Recently, multiple health behavior change (MHBC) interventions (e.g., targeting two or more health-related behaviors together) have been proposed as a promising strategy to improve healthy behaviors (Geller et al., 2017). Although MHBC interventions do not seem to have an additional effect on health-related behaviors, in comparison to interventions focusing on one single health behavior, some studies seem to suggest that MHBC

interventions could maximize the impact on health (i.e., non-communicable disease [NCD] prevention) (C. L. Cleland et al., 2012; Redmond et al., 2019). Grounded in transfer theory, these additional health effects could be explained by carry-over mechanisms (i.e., the improvement of one health-related behavior may serve as a gateway for another one; Geller et al., 2017; Prochaska & Prochaska, 2011). Several authors such as Noble et al. (2015) also recommended implementing MHBC interventions aimed at promoting health-related behaviors among disadvantaged populations.

Although no differences have been found in health-related behaviors between theory-based and no-stated-theory interventions (Dalgetty et al., 2019), behavioral theories such as self-determination theory (SDT) and/or social ecological model could provide a framework of reference to guide behavior change techniques in target variables during the intervention (Kwasnicka et al., 2016). Previous studies have shown that these frameworks have been associated with greater effectiveness in PA levels (i.e., increasing PA levels) and/or healthy eating (Kwasnicka et al., 2016; Ntoumanis et al., 2020; Sallis et al., 2006, 2015).

The social ecological model (Sallis et al., 2006, 2015) holds that health-related behaviors are determined by different levels of influence (i.e., individual, interpersonal, community, and political). Previous evidence suggests that multilevel interventions (i.e., seeking changes in at least two levels of influence of the social ecological framework) may be more effective and sustainable than single level interventions (Sallis et al., 2006, 2015). In particular, interpersonal and community levels have been identified as key components for sustainable interventions (Fleury & Lee, 2006). Given the influence of all these factors on health-related behaviors, the social ecological model has become a framework of reference to design and guide community-based healthy lifestyle programmes among low income populations (Evans et al., 2018; Gans et al., 2016; Stasi et al., 2019).

Moreover, SDT (Ryan & Deci, 2017) is a widely used motivational framework that explains how the adoption of health behaviors is influenced by the satisfaction of three basic psychological needs (BPN; i.e., autonomy, competence, and relatedness). SDT proposes that these three innate and universal BPNs must be satisfied to attain the development, health, and well-being of human beings (Ryan & Deci, 2017). A recent meta-analysis in the health domain has shown that SDT-based interventions produce positive changes in motivational outcomes and, consequently, in health-related behaviors (Sheeran et al., 2020; Teixeira et al., 2012). Authors such as Zhang and Solmon (2013) hold that the integration of the social ecological model and SDT frameworks could enhance the understanding of the motivational processes associated with behavioral changes in PA. While both theories point out that individual and social factors influence behaviors such as PA, SDT helps to explain the motivational mechanisms through which these changes occur (Zhang & Solmon, 2013). However, to date and to our knowledge, there are no intervention programmes aimed at promoting healthy lifestyles among disadvantaged populations, based on the integration of these

frameworks (Gillison et al., 2019; Ntoumanis et al., 2020). Hence, future intervention studies should integrate these theories to produce long-term behavioral changes.

To date, most of the community-based healthy lifestyle programmes among disadvantaged adult women have focused on single health behaviors, such as PA or healthy eating, during a short period of time (i.e., ≤ 6 months), and using quantitative methods (Craike et al., 2018). To our knowledge, no long-term programmes have been implemented and evaluated through a qualitative approach among this type of population. So, the length of time required to change behavior has not been explored, either. Therefore, the aim of this study was to qualitatively analyze the first and second year follow-ups of a community-based healthy lifestyle programme on PA-related variables, healthy eating, and other health-related outcomes in disadvantaged adult women, particularly among Roma women.

Methods

Study participants

This community-based healthy lifestyle programme was carried out from June 2016 to June 2018 in a deprived neighborhood (per capita income of €16,000, the lowest incomes of the city) called “Perpetuo Socorro,” in Huesca (Spain), a city with a total of 52,463 inhabitants (National Statistics Institute—INE, 2018). An initial purposive sample of 14 women were invited to participate in this study. With a drop-out rate of 21.4% due to the long duration of the programme (20 months), family and job responsibilities, a final sample of 11 disadvantaged women (seven of them from the Roma population) voluntarily participated in the intervention. The women’s age range varied from 27 to 58 years ($M = 37.72$; $SD = 8.34$), most of them had overweight or obesity problems, and they resided in this deprived neighborhood. It has to be noted that 0.6% of the total population of Huesca belongs to the Roma ethnic group. The inclusion criteria to participate in the study were: 1) Be overweight or obese and, if possible, have overweight or obese children (i.e., being the mother or legal tutor) who attended the neighborhood school [details are omitted for peer review]; 2) Belong to disadvantaged populations (i.e., low-income people); 3) Have low education level (i.e., compulsory education not completed). Participants were requested to sign an informed consent form to participate in the study.

Contextualization of the present study: “Pio keeps moving” intervention programme

The present study is framed within a community-based healthy lifestyle intervention programme called “Pio keeps moving.” This intervention has been designed using a community-based participatory action research (CbPAR) approach to facilitate the creation of healthy communities and empower disadvantaged women to change unhealthy behaviors (Stringer, 2008). The starting point of the “Pio keeps moving” intervention programme was the concern about obesity and overweight among the children of disadvantaged women living in a deprived neighborhood. These concerns were also reported

by health practitioners (i.e., pediatrician, social worker, and teachers), who observed an urgent problem related to the obesity and overweight of the women and their children. The health practitioners formed a working group to deal with this health problem. Considering that children’s health-related behaviors are closely linked to their mothers’ behaviors (Draper et al., 2015), women from disadvantaged populations were invited to participate in this community-based healthy lifestyle programme. Public practitioners participated in the design, implementation, and assessment of the intervention programme, while disadvantaged women took part in the design of this intervention.

The main aim of the “Pio keeps moving” intervention was to promote PA and healthy eating among this disadvantaged population. This community-based healthy lifestyle was culturally adapted to this disadvantaged group (e.g., low socioeconomic level), especially to the Roma ethnic group (e.g., worship, Roma women’s responsibilities, cultural values, etc.). Perceived barriers to PA (Sanz-Remacha et al., 2019), and women’s needs and problems were also considered in the design and development of the intervention programme. “Pio keeps moving” was conducted over two years (20 months) and divided into four phases (i.e., catching attention, awareness development, empowerment development, and learning to be autonomous). A total of 117 sessions (i.e., 106 behavioral sessions and 11 cognitive sessions) were conducted during the intervention. The aim of the behavioral sessions was to get participants to experience the different benefits of healthy behaviors, while the cognitive sessions were aimed at raising awareness about these healthy behaviors as well as the importance of leading a healthy lifestyle.

Although the intervention mainly focused on PA promotion (90% of the sessions), 10% of the sessions also focused on healthy eating. Given that most of the intervention focused on PA promotion, PA sessions were especially based on need-supportive strategies according to the tenets of SDT. Autonomy-supportive (e.g., facilitating decision-making), competence-supportive (e.g., providing activities with different levels and intensity), and relatedness-supportive strategies (e.g., group-based sessions) were developed by a sport sciences instructor with expertise in SDT-strategies. Depending on the programme phase, the instructor focused on the development of each different type of strategy. During the first and second phases, the instructor focused on relatedness and competence-supportive strategies, whereas during the last phases, special attention was paid to developing competence and autonomy supportive strategies. For a further description of the study design, see the Supplementary material and the study protocol (details are omitted to guarantee anonymity). The study was approved by the Research Ethics Committee of the Community of Aragon (CEICA).

Data collection

Qualitative techniques such as discussion groups, one-to-one semi-structured interviews, and field notes were used to assess the effects of the “Pio keeps moving” intervention programme on health-related behaviors and health outcomes. The questions were related to the following topics: PA, sedentary behaviors,

and diet. Data collection was conducted by a female expert in qualitative methodology. Discussion groups and one-to-one interviews were recorded, while another qualitative researcher simultaneously took notes. Six discussion groups were held over the two-year period (three discussion groups per year), in December 2016 and 2017, in March or April 2017 and 2018, respectively, and in June 2017 and 2018. Each discussion group session lasted for approximately 45 minutes, and the average participation was six participants. Semi-structured interviews were also conducted at the end of each year. A total of 14 interviews were held throughout the intervention. Eight participants were interviewed during the first year and six participants during the second year. It should be noted that not all the women participated in both the discussion groups and the one-to-one interviews. Field notes were taken during all the programme sessions held over the two years, and were relevant to redirect the intervention programme. The main questions and statements were: “How did the session go?”, “What were the lead researcher’s feelings regarding the participants?”, and “Emergent needs during the session.” Finally, all collected data were transcribed by the lead researcher of this study.

Data analysis

The constructivist paradigm was used to understand and interpret the participants’ perceptions, in order to generate meaning and reconstruct their reality (Denzin & Lincoln, 2011). Given the scarce evidence of studies related to the Roma ethnic group and its specific cultural characteristics, an initial deductive analysis, and later, a deeper inductive reflexive thematic analysis were conducted (Braun et al., 2016), using NVivo Pro 11 software. Following the Braun et al., (2016) phases, data analysis started by reading the data-set to find a whole meaning and to create the first codes. Later, main and generic themes were identified from the questions and behaviors addressed during the intervention. Thus, illustrated extracts were identified for each theme. Later, emergent subthemes were identified by the researchers from within the main themes, which provided meaning and described the phenomenon to be studied. Afterward, through a reflexive process of moving forward and backward by means of coding, developing themes and subthemes, and naming, researchers refined the codes and reached an agreement on the coding process and names. Finally, the process was supervised and agreed by three members of the research team. To ensure the research quality, we have followed a rigorous and reflexive process based on Tracy’s (2010) universal criteria. This is the first MHBC intervention among a disadvantaged population, mainly Roma women, converting it into a relevant and worthy topic. The *credibility* of the study was enhanced through thick description and crystallization, involving several qualitative techniques and researchers, whose resulting data converge on the same conclusions. Grounding in theoretical frameworks and reflexive process allowed rich rigor to be reached in the research. The rich description of the findings may be useful to do naturalistic generalizations and transferability (reaching the *resonance* of the study), allowing readers to relate their personal experiences to the participants’ experiences. Through the integration of the aforementioned theoretical frameworks, heuristic significance

whereby the research encourages readers to explore the topic, and providing useful and practical knowledge for future studies, the *relevant contribution* is ensured. Finally, *meaningful coherence* is shown through the design, data collection, and analysis, which are interconnected to reach the study aims.

Findings

Through a thematic analysis, two themes were identified from the data-set (See Table 1). The first main theme was called health-related behaviors, from which two generic themes were identified: healthy eating and PA. In turn, two subthemes emerged, (i.e., adopting healthy eating and resistance to change (un/healthy eating behaviors) within the healthy eating theme. The following subthemes emerged within the PA theme: incorporation of PA, intention to participate in PA, motor skills, physical fitness, and resistance to change sedentary behaviors. The second main theme was called health-related outcomes, from which four themes emerged: health awareness-raising, body changes, physical health benefits, and family health-related behaviors (See Table 1).

The description and the main quotes of the health-related behaviors and health-related outcomes perceived by these women over the first and second years of this intervention are presented in Table 1. Overall, most of the women perceived positive findings over the two-year intervention programme both in health-related behaviors and health outcomes. In particular, the PA theme was mentioned by the majority of the participants over the two years of the intervention, while only a few women perceived healthy eating and health-related outcomes. Although most women perceived changes in both main themes in the first year (i.e., adopting healthy eating, incorporation of physical activities, physical fitness, health awareness, and resistance to change sedentary behaviors), other behavior changes were also perceived by most of these women in the second year (i.e., resistance to change (un/healthy food, motor skills, and family health-related behaviors). It should be highlighted that intention to be physically active was only perceived by some women after the second year. Moreover, other health-related outcomes, such as body changes and physical health benefits, were mentioned by some of these women in both years of the intervention.

Discussion

Improving health-related behaviors among disadvantaged population groups is a public health challenge to reduce health inequalities. Given the lack of long-term interventions that qualitatively examine their effects on multiple health behaviors and health outcomes among disadvantaged population groups, the aim of this study was to qualitatively evaluate the first and second year follow-ups of a community-based healthy lifestyle programme on PA-related variables, healthy eating, as well as other health-related outcomes in disadvantaged adult women, and in particular, Roma women.

Going deeper into the different main themes, quotes related to the PA theme were mentioned by most of the participants, while healthy eating and health-related outcomes were perceived by a few women over the two years of the intervention. This

Table 1. Health-related behaviors and outcomes perceived by these women during the first and second years of this intervention.

Main themes	Generic themes	Subthemes	Descriptors	Sample quotes during the first year	Sample quotes during the second year
Health-related behaviors	Healthy eating	Adopting healthier eating (+1) habits	Most women perceived improvements in healthy eating (i.e., increasing healthy foods and decreasing unhealthy foods)	"Well, I drink water, I eat fruit, I don't drink coke, I hardly eat bread, I eat lots of salad, and listen, I'm going to turn into a cow eating so much grass" (GD_11).	"I stopped drinking coke in June, none at all since then" (GD_1V)
		Resistance to change (un)healthy eating habits (-2)	Some of the women perceived a resistance to consuming healthy foods such as fruit and vegetables, and a resistance to completely exclude unhealthy foods, such as skimmed milk, from their diets throughout the two years of the intervention.	Sometimes I can, when I can, and apart from that, well, it's hard for me to go on a diet. No particular reason, going on a diet is healthy, it's food, but I don't know how to explain it... where there's a good stew, you can forget about vegetables—you can't compare (ID_5).	"I don't know, I can't explain it. Because I go there, white coffee, I go home, white coffee, not the same size of glass, but I've started drinking milk again" (ID_7).
	PA	Incorporation of physical activities (+1)	All the women reported participation in a variety of physical activities (e.g., going up/down stairs, walking, cycling, playing football, and swimming)	"I didn't know that I was going to be able to walk, that I could go out walking alone, that I could go up stairs, swim, ..." (ID_7).	"Now, I sometimes play basketball with my son, or football, I like it but I didn't before" (ID_5)
		Intention to participate in PA (+2)	Some women reported greater intention to be physically active at the end of the second year.	I don't know if it's because of the exercises we've done or that I manage my body a little better; of course, I don't sit around on the settee all day, but I notice I've improved' (ID_3).	"I want to join the gym; I think that I'd like to join the gym" (GD_VI).
		Motor skills (+2)	A large number of women reported positive changes in motor skills (e.g., agility) throughout the two years of the intervention programme.		"And I'm a lot more agile than I thought, I mean doing all that; lifting my leg up, dancing here, dancing there, in other words ..." (GD_VI).
Health-related outcomes		Physical fitness (+1)	Some women perceived improvements in physical fitness (i.e., aerobic capacity and muscle strength) throughout the two years of the intervention.	I get less tired than before. I feel like going out walking more, whereas before I lounged around on the settee and no one could move me. Now, even though I have to come and go 20 times and go round the neighborhood 20 times, or I have to go shopping, it's not so much an effort (...) That's why I don't find it so much an effort; although it's true that there are days when I've woken up feeling stiff, but hey! If that's what it takes' (ID_1)	"They manage the walking better than last year; we were walking for almost an hour, talking, although at a slow pace, without getting tired" (Field notes).
		Resistance to change sedentary behaviors (-1)	Some women perceived a resistance to completely reducing time spent on sedentary behaviors.	"I don't spend a lot of time on the settee" (Discussion group 1). "I have to be doing something. If I sit down it's to look at my mobile" (ID_3).	Yes, I insist, but it's difficult for me [to incorporate PA] and on top of everything I've no... what do you call it... flexibility [flexibility] (ID_9).
	Health awareness- raising (+1)		Most women perceived improvements in health awareness throughout the two years.	I'd not heard about the sugars. Yes, I knew there was sugar, but I didn't know that there was so much; and that has taught me something' (ID_5).	"I find it necessary, if not I don't feel well (ID_7).
	Body changes (+1 = 2)		Some women reported losing weight throughout the two years of the intervention.	"I lost 13 kg in 3 months and it was the result of both things [referring to healthy eating and doing PA] (ID_2).	Well, I have lost 15 kg in 2 years, and I haven't put them back on again' (ID_7).
	Physical health benefits (+1 = 2)		A large number of participants perceived physical health benefits (e.g., lower consumption of medicines and pain intensity) throughout the two years.	"I've got them, because of my health. At least I don't have to take pills for my circulation, although I sometimes have them, but I don't take them any longer. I don't need them because they did some tests, like a microphone to see how fast the blood runs and it says I no longer need them. So, one less pill. My blood pressure has dropped a lot, I no longer take pills, either. Now, I only have the ones for my nerves, from the 7 I used to take (ID_6).	"I take less pills. I no longer take the blood pressure one, or the one for sugar. They've reduced the dose (ID_7).
	Family health-related behaviors (+2)		Most women perceived a positive impact on the health-related behaviors of their families throughout the two years.	"My son does not drink hot chocolate; he just drinks it white. He has realized" (GD_11).	"You know, my son is more aware about what he has to eat now, that he must move about more (ID_1).

The following symbols (i.e., + or -) refer to the positive (+) or negative (-) effects of this intervention programme. Moreover, the first and second years of the intervention, when the study variables were more frequently mentioned, were also highlighted as follows: (+ or -1) or (+ or -2). The study variables that were equally mentioned throughout the two years of the intervention were highlighted as follows: (+ or -1 = 2), (+ or -1 = 2), or the same throughout the whole programme (1/2)".

result suggests that PA-related changes were more easily perceived by these women than healthy eating and health-related outcome changes in our programme. The fact that most of the intervention sessions focused especially on PA promotion (i.e., ~90% of the sessions) could explain this difference. Targeting a similar number of sessions for each behavior, when implementing MHBC interventions, is necessary to further explore differences in several behavioral changes.

With respect to the temporal evolution of study variables, it should be noted that body changes and physical health benefits were similarly mentioned by the same number of women over the two years of the intervention. Most women perceived changes in health-related behaviors and health outcomes during the first year (i.e., adopting healthy eating, incorporating physical activities, physical fitness, health awareness-raising, and resistance to change sedentary behaviors). Contrary to the first year, other behavior changes and health outcomes were mentioned during the second year (i.e., resistance to change (un)healthy eating behaviors, motor skills, and family health-related behaviors). It should be highlighted that intention to participate in PA was only perceived by some women after the second year.

In line with the results, previous studies have suggested that some behaviors may require more time for greater changes to take place in disadvantaged population groups (Bull et al., 2014). A previous systematic review with a meta-analysis of PA interventions, conducted among socioeconomically disadvantaged women, also showed that long-term interventions may be particularly important in this population to achieve long-term maintenance of PA (V. Cleland et al., 2013). All these findings highlight the importance of developing long-term interventions in this type of population, not only to experience behavior changes, but also to achieve long-term maintenance of health-related behaviors.

The behavioral changes mentioned in the first year could be due to several factors. Firstly, both the type of sessions of the first phases of this programme (i.e., catching attention and awareness development), and the women's initial lack of health knowledge before starting the programme, could have given rise to most women perceiving health awareness changes over the first year. Developing health awareness sessions and group-based sessions at the beginning of the interventions among women from disadvantaged populations seems to be important to promote changes in health-related behaviors (Jayaprakash et al., 2016). However, despite the importance of developing them especially at the beginning of the intervention, it could also be relevant to maintain them throughout the intervention programme given their possible ripple effects on other behaviors (e.g., PA and healthy eating).

Secondly, the adoption of healthy eating behaviors (i.e., increasing healthy foods such as fruit and vegetables, and decreasing unhealthy foods such as soft drinks or sweets) was mentioned by the majority of women during the first year, unlike the second one. This could be due to the strategies developed over the first phases of the intervention that were aimed at raising healthy eating awareness, which might have a positive collateral effect on adopting healthy eating behaviors.

Thirdly, the fact that the incorporation of PA into their lives was perceived by most of the participants during the first year could be explained by the fact that a broad range of new activities were proposed in the first year (i.e., cycling, dancing,

swimming, etc). Therefore, participation in a variety of new physical activities during the intervention programme could have facilitated the incorporation of PA (Sylvester et al., 2018). In another short intervention programme, conducted on underserved South Asians, participants also reported PA improvements as a result of the incorporation of new physical activities into their daily lives (e.g., walking, yoga, and dancing; Jayaprakash et al., 2016). Furthermore, the latest findings supported by SDT show that novelty could be a new candidate need (González-Cutre et al., 2020). In line with these findings and those of the present study, it is highly advisable to carry out new and varied activities during the interventions among disadvantaged populations. The design of these activities should be based on participants' preferences.

Fourthly, the improvements in physical fitness perceived by most women during the first year could be attributed to the initial low aerobic capacity and low muscle strength of the women before starting the programme. Incorporating PA sessions every week during the intervention could also help to improve women's perceptions of physical fitness. For instance, improvements in physical fitness have also been perceived in other interventions conducted among overweight women and ethnic subgroups (Sabiston et al., 2009; Whitt-Glover et al., 2014). Lastly, some women also perceived a resistance to completely reduce sedentary behaviors, particularly during the first year of the programme. Previous studies among disadvantaged groups also highlighted important cultural barriers to sedentary lifestyles that are difficult to change (Baruth et al., 2014; Coe et al., 2017; Roche et al., 2015; Van Stappen et al., 2018). Hence, future healthy lifestyle interventions should pay greater attention to culturally adapting intervention strategies in favor of preventing sedentary behaviors. Our results could be explained because PA and sedentary behaviors may co-occur at the same time in the lives of these women (Mansoubi et al., 2014). The massive and widespread use of social media in this group of disadvantaged women may hinder the change of some behaviors. Nevertheless, further studies are required to determine why reducing sedentary behaviors in disadvantaged populations seems to be especially difficult, and how these sedentary behaviors could be reduced or modified.

The behavior changes mentioned by most of the women in the second year could also have several explanations that deserve to be discussed. The type of sessions of the last phases of this programme (i.e., empowerment development and learning to be autonomous), and the development of competence and autonomy-supportive strategies may have led women to perceive themselves as more autonomous in terms of the behaviors addressed. Firstly, most of the women perceived a reduction in the intake of ultra-processed foods over the two years. However, it should be highlighted that several women reported a resistance to completely exclude unhealthy foods, such as skimmed milk, from their daily diets, particularly throughout the second year. These results could be due both to the lack of healthy eating sessions and the difficulty in achieving autonomy satisfaction among disadvantaged people. Consequently, more healthy eating sessions should be developed to achieve changes in this type of population, and thus, the last phase, focused on autonomy, could be longer than the

rest. Furthermore, disadvantaged women involved in other studies also mentioned important cultural eating barriers that are difficult to exclude from their daily diets (Roche et al., 2015). Hence, further efforts are required to contextually and culturally adapt intervention strategies in favor of preventing unhealthy eating (Portacio et al., 2018). For example, increasing the number of sessions to promote the awareness of some typical unhealthy foods included in their culture, or extending this type of nutrition sessions to all family members, should be considered to overcome this type of barrier (Bender et al., 2014).

Secondly, contrary to the results found in physical fitness, most women perceived improvements in motor skills (e.g., agility) throughout the second year. Given that agility begins to gradually decline in adulthood, the perceived improvement of motor skills may require more time to change (Teimoori et al., 2012). The implementation of a wide variety of activities during the programme could explain the progressive improvement of the different motor skills among these women. Moreover, perceived improvements in physical fitness and weight loss by these women throughout the first year might help to perceive some positive motor skill changes and greater agility throughout the second year (Robinson et al., 2015).

Finally, several women mentioned that this programme influenced their family's health-related behaviors, particularly their children's and husbands'. These results could be explained because disadvantaged adult women, and particularly Roma women, are primarily responsible for shopping and preparing food in a patriarchal culture (Dimitrova & Ferrer-Wreder, 2017). Aligned with previous studies on disadvantaged women (e.g., Hand et al., 2014), the perceived improvements in health awareness and the incorporation of physical activities in this programme could have an additional downstream effect on their children's health-related behaviors. Given that some sessions were extended to the children of these women (i.e., family PA sessions), positive PA-related changes could also be directly obtained by their children. Moreover, training women to support and encourage their children's PA and healthy eating could also be effective to change children's health-related behaviors (Draper et al., 2015). The fact that the majority of the women mentioned improvements in the second year could be explained because these women may require time to experience improvements in their own health-related behaviors. Possible spill-over effects to other family members might, therefore, require more time to be perceived and incorporated into their daily lives. These results reinforce the importance of targeting disadvantaged adult women with children in healthy lifestyle programmes, to extend their health benefits. This is particularly important because health-related behaviors acquired in childhood tend to track into adulthood (Telama et al., 2014).

Contrary to other behaviors, body changes such as weight loss and physical health benefits were mentioned by some of these women throughout both years. Consistent with previous lifestyle interventions in adults at risk of NCDs (Goebbels et al., 2012), weight loss and greater body satisfaction during the programme could be attributed to improvements in PA-related variables, and the development of healthy eating behaviors. Previous long-term MHBC interventions also revealed

that positive behavior changes in PA levels and eating behaviors may result in a significant reduction in body weight in obese or low-income women (Moredich & Kessler, 2014). However, due to the qualitative methodology adopted in this study, it was not possible to determine the degree of body weight reduction throughout the intervention. The physical health benefits of PA that were mentioned by these women are well-documented in research literature (Dinu et al., 2018). The reduction in the consumption of medicines and in pain intensity throughout the intervention could be explained by the improvements in almost all health-related behaviors and health-related outcomes. However, although physical health benefits are often found in healthy lifestyle programmes conducted among disadvantaged populations (Ingram et al., 2012), these effects should be carefully interpreted as they can be associated with other causes (e.g., medical treatment) not related to the programme. To understand the reasons for these improvements, further mixed method research studies that combine qualitative findings with quantitative analysis (e.g., correlational or inferential analysis) could be particularly useful.

Women from the "Pio keeps moving" intervention perceived improvements in almost all health-related behaviors and health-related outcomes during both years. These findings are meaningful considering that most of these women had an overweight or obesity problem. This is of paramount importance because a healthy lifestyle could prevent or reduce the prevalence of NCDs and, consequently, reduce health inequalities (Gakidou et al., 2017). The main results of the intervention are congruent with the few healthy lifestyle interventions in disadvantaged adult groups that have qualitatively examined participants' perceptions of their health-related behaviors. For example, underserved South Asians, who were involved in a 4-month community-based cultural lifestyle intervention, reported greater engagement in a variety of physical activities (e.g., walking, yoga, and dancing), and improvements in healthy eating (e.g., inclusion of fruit and raw salads, and reduction of whole milk consumption), and other health-related outcomes (e.g., healthy eating-related awareness, weight loss; Jayaprakash et al., 2016).

Given the complex and long-term nature of the "Pio keeps moving" intervention, it is not possible to identify which behavior change technique was more effective in improving the different health-related behaviors and health outcomes. There were several possible explanations to interpret these findings. Firstly, we suspected that the use of this CbPAR approach allowed us to design and adapt the intervention to the barriers to PA, needs, culture, and preferences of these women. This fact may foster a sense of empowerment in them that may contribute to improving health-related behaviors and outcomes. It is known that community-based interventions that incorporate cultural adaptations have proven to be effective in improving health-related behaviors in disadvantaged adults (Craike et al., 2018). Secondly, given that group-based sessions were developed over two years, the promotion of positive relationships and trustworthiness among the group of women could have facilitated positive behavioral changes. According to SDT, group-based sessions seem to be one of the most promising strategies for improving health-related behaviors among disadvantaged

women, due to the social support provided by significant others (V. Cleland et al., 2013). Furthermore, group MHBC interventions seem to be more effective than face-to-face interventions to lose weight (Abbott et al., 2020). Thirdly, the integration of both theoretical frameworks into the design of the intervention and the strategies could have helped to modify behaviors in this population (Kwasnicka et al., 2016). Fourthly, and finally, all the women who participated in this study manifested a strong predisposition toward changing their own health-related behaviors, as well as reducing overweight and obesity rates in their children. Other studies in disadvantaged adult women have also revealed that one of the main reasons for changing their own health behaviors was to influence their children's health-related behaviors (Ingram et al., 2012).

This study has several strengths that increase the trustworthiness of the findings and make a meaningful contribution to literature. The duration of this healthy lifestyle intervention among disadvantaged adult women is one of the major strengths of this study. Another important strength is also the use of CbPAR approach to conduct the intervention, which permitted the cultural adaptation of the programme to the participants' needs and problems. The intervention was designed according to the needs and preferences of the target population, and involved both local stakeholders and public health practitioners. In addition to the use of a CbPAR approach, theoretical frameworks such as social ecological model and SDT, and the development of a MHBC intervention targeting PA and healthy eating, were also important contributions to achieve behavioral outcomes among disadvantaged women. Finally, the combination of multiple qualitative techniques and measurement moments over two years enabled us to crystallize the effects of the intervention from a deeper qualitative approach and to guarantee the quality research.

Several limitations and future directions should also be acknowledged. Firstly, the study was undertaken with a small purposive sample of women, which might affect the transferability of these findings to other disadvantaged populations. Future community-based interventions should be conducted in larger representative samples of disadvantaged adult populations. Secondly, the effects of the intervention were exclusively examined by qualitative methods. To strengthen these findings, future studies should introduce complementary measures such as self-reported questionnaires on diet and psychological factors as well as device-measured PA levels. Thirdly, although the women reported their intention to continue to be physically active, and the intervention was guided by the integration of two behavioral theoretical frameworks, the lack of a post-intervention follow-up does not allow us to examine the maintenance of health-related behaviors after the end of the intervention. Future interventions should include short-, mid-, and long-term post-intervention follow-ups. Fourthly, although a multilevel and multicomponent community-based interventions approach has been considered, the complexity of this type of interventions does not allow us to identify which level, component, behavior change technique, or type of session was more effective in improving the different health-related behaviors and outcomes. Finally, the attendance rates in the intervention were low, especially during the second year of intervention. Future studies should develop more culturally-tailored strategies to avoid the consumption of ultra-

processed food and sedentary behaviors, as well as to increase participation rates and retain populations with specific cultural characteristics.

Practical implications

The findings of the study represent a significant contribution to the scarce literature about this topic, related to disadvantaged populations, and in particular to the Roma ethnic group. Firstly, it seems essential to conduct cognitive sessions to increase the participants' health awareness and relatedness-supportive strategies to improve relatedness among these women, especially at the beginning of the intervention programme.

Secondly, some behaviors were not perceived by participants until the second year of intervention. For this reason, a one-year intervention, at least, is recommended, based on this type of intervention approach. This will provide sufficient time to modify health-related behaviors among women from disadvantaged populations. However, future programmes should assess whether shorter programmes with more actions can also lead to behavioral changes.

Thirdly, despite mixed evidence in literature regarding the effect of single or MHBC interventions, our positive findings support the use of MHBC to promote health-related behaviors (e.g., PA and healthy eating) among disadvantaged populations, in particular, the Roma ethnic group.

Fourthly, the results support the use of CbPAR approaches to empower participants to change their behaviors based on their preferences. This approach will allow involving health practitioners from different health areas, which might be useful to unify efforts, and increase the effectiveness of the intervention with the same cost. Furthermore, involving participants in the process permits the incorporation of cultural and personal adaptations, and, as a result, an increase in the effectiveness of the intervention.

Developing all these practical implications could be useful for practitioners from different areas (e.g., doctor, nurses, social workers, etc.), community, and researchers to promote health-related behaviors according to the different levels of the social ecological model and SDT frameworks.

Conclusions

The twenty-month community-based healthy lifestyle programme called "Pio keeps moving" leads to positive behavior changes in PA-related variables, healthy eating, and other health-related outcomes among disadvantaged adult women, mainly composed of Roma women. These findings highlight the importance of developing MHBC interventions, supported by CbPAR approach, the social ecological model and SDT frameworks, which address specific problems related to their complex lives (e.g., finances, health, lack of resources, cultural problems, etc.), and needs (e.g., improving their health status, lifestyles, etc.) arising from ethnic groups. Further efforts are required to overcome some barriers to completely reduce sedentary behaviors and to exclude some unhealthy foods from their daily lives. Given that some of these behavior changes were only mentioned by most of these women in the second year, long-term MHBC interventions are recommended.

IRB approval

This study was approved by the Research Ethics Committee of the Community of Aragon – CEICA (reference number PI16/0295)

Funding

This work was supported by the European ERDF funds within CAPAS CIUDAD-CITÉ project [reference EFA O95/15].

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