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Does social environment mediate the association between perceived safety and physical activity among adults living in low socioeconomic neighborhoods?

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ABSTRACT

Background: Environmental and social factors may affect residents' physical activity, which has a strong impact on their well-being.
Purpose: The present study examines the association between perceived safety variables and physical activity (Leisure-Time Physical Activity (LTPA), Transport-Related Physical Activity (TRPA), and Total Physical Activity (TPA)) and whether these correlations are mediated by the social environment.
Methods: For this purpose, a questionnaire was distributed systematically among 2000 adults living in low socioeconomic neighborhoods in Bandar Abbas city, Iran. A total of 1833 qualified questionnaires were used for further analysis.
Results: Men were more likely to do TRPA and TPA than women; in addition, married people were less likely to do these activities than single people. Aging significantly decreased the odds of LTPA and TPA. Having at least one motor vehicle in the households decreased the chance of TRPA. Perceived safety from crime, general safety, and social ties were positively associated with all types of physical activity. Collective efficacy also increased the odds of TPA. Incivilities associated with LTPA after social variables were added to model. The findings revealed the mediatory effect of social environment on the link between perceived safety and physical activity. Additionally, findings recommended that perceived safety also slightly mediates the relationship between social environment and physical activity.
Conclusions: Strategies that empower collective efficacy and social ties within the neighborhoods can be utilized to limit the effect of neighborhood problems on healthy physical activities.

1. Introduction

Regular physical activity (PA) is of paramount importance because it is connected with a decrease in mortality (Zwald et al., 2014). It has been evidenced that PA is correlated with decreased cardiovascular disease, blood pressure, diabetes, and other chronic diseases (Rountree and Land, 1996). Overall, nearly half of adults are estimated to be insufficiently active (WHO, 2010). Review studies conducted in Iran showed that the estimates for inactivity ranged from approximately 30% to almost 70% (Fakhrzadeh et al., 2016).

The environment is known as an important determinant of behavior, which provides conditions that facilitate or restrict behavior

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(Trost et al., 2002). In Iran, because most of the people reside in cities, the environment in the cities has direct influence on people's quality of life such as their health. The health and well-being of individuals across all age groups are affected by an assessment of elements both within and outside the control of the individual. The model provided by Whitehead and Dahlgren (1991) describes the layers of effect on the health of a person. These factors have been introduced as fixed factors such as age, sex, and genetics, as well as many possibly modifiable variables expressed as the number of layers of impact including personal lifestyle; physical and social environment; and broader socioeconomic, cultural, and environmental conditions. This framework has helped researchers build several hypotheses regarding health determinants, which assess the relationship of these determinants on various health outcomes, and the associations between the different determinants. However, this may only be applicable to similar socioeconomic, environmental conditions and population. To support this framework, we need to evaluate these determinants in various communities.

Evidence from 14 cities across 10 countries showed that environmental attributes can possibly fundamentally and fairly add to grown-ups' PA on a worldwide scale (Cerin et al., 2018). It was suggested that the perception of neighborhoods influences on the level of adults' PA (Cerin et al., 2018). One of these factors is safety. Safety is measured based on its perceived or actual crime rate; however, the results between objective and subjective measures (perception of residents) of safety are different. In several studies, the perception of safety among residents was lower than actual safety (Yavuz and Welch, 2010). Thus, sense of safety may be more effective than actual safety for residents' behavior, as it influences how residents feel and behave. With regard to this, studies conducted in Iran suggested that perceived neighborhood disadvantages such as incivilities and fear of crime inhibit residents to do outdoor PA (Aliyas, 2019b). Crime measures fear of being assaulted, harmed, or attacked in a neighborhood, whereas incivilities refer to presence of groups or youths causing problems in a neighborhood; neighbors' misbehavior; or presence of dirty/vacant areas, graffiti, and vandalism in the neighborhoods. Safety feeling of parents in the neighborhoods also influences adolescents' PA level (Evers et al., 2014). Crime-related safety is known as barriers to neighborhood walking in Iranian communities (Dashti et al., 2014). Perceived lack of safety may inhibit residents from social connection (Gainey et al., 2011; Jiang et al., 2013; Yuan and McNeeley, 2017). The neighborhoods with physical and social incivilities create a sense of fear, which leads to limited social interaction and linkage among residents and their inclusion on neighborhood participation and PA in their neighborhoods (King et al., 2002; Taylor, 1986). Similarly, high crime levels restrain PA by convening anxiety, stress, and disorders to residents and also creating fear and restricting socializing (Hedayati Marzbali et al., 2016; Kim, 2010).

The social environment plays an important role in encouraging or discouraging PA among residents in the neighborhoods; however, this issue has not been widely studied (McNeill et al., 2006). The likelihood of accomplishing the suggested level of PA increases significantly among residents with high social linkage and connection (Martin et al., 2017). In addition, social attributes in the neighborhoods may decrease negative perceptions of physical environments among residents (Ingram et al., 2017). Social ties and collective effectiveness have been distinguished as especially critical working in the social setting of minorities and particularly important for promoting PA (McNeill et al., 2006). Exploration of how social environment mediates the association between perceived safety and PA may help to better understand how these factors correlate with healthy behaviors of residents.

Low socioeconomic neighborhoods are described by unemployment, low wage jobs, high rates of poverty, and low educational attainment. People residing in low socioeconomic areas perceive less safety than those in moderate-to-high socioeconomic areas (Wilson et al., 2004), which debilitate occupants from taking part in outdoor PA (Hannon et al., 2012; Romero, 2005). In addition, it has been evidenced that socioeconomic characters of neighborhoods are associated with a social relationship within neighborhoods (Haines et al., 2011; Wikstrom and Treiber, 2016).

Iranian societies have encountered rapid urbanization and urban spread, adding to the decline of physical movement (Sahebkar et al., 2018) and changes in occupants' PA plan (Hajian-Tilaki et al., 2014). Because of this fast urbanization, a few neighborhoods stayed as previously and have not developed yet. Neighborhoods are therefore classified as developed or undeveloped areas. Most of these undeveloped areas are known as low socioeconomic communities. Studies have suggested that burglary, assault, and violence are highly associated with socioeconomic situation among Iranian population (Hadad and Moghadam, 2010). For example, it was suggested that economic factors are correlated with burglary but do not affect willful murders. In addition, low level of education contributes to both murders and threats. Average income of families is known to be a deterrent factor for crime against properties.

Moreover, it has been reported that population residing in poor socioeconomic areas are less likely to be physically active (Burgess et al., 2015; Cerin et al., 2008; Lee et al., 2007). Consequently, the risk of overweight and obesity increases compared with those in developed areas (Ball and Crawford, 2005). According to the mentioned points, it is critical to know how environmental and social factors associate with PA in such areas. Previous studies have been performed in America, Europe, or Australia to investigate this possible relationship. To the best of our knowledge, no studies regarding the correlation of environmental and social factors with PA in low socioeconomic neighborhoods in Iranian communities have been conducted thus far. The Iranian population's socio-demographic profile could change the relations obtained in other countries. Moreover, there are significant differences between urban communities in Iran and other countries in environmental features and social behaviors, which could prompt a distinctive relationship with physical activities.

Previous studies conducted in Iran with no classification of socio-demographic variables showed the significant association of environmental and social determinants with PA (Aliyas, 2019a; Soltani and Hoseini, 2014). Furthermore, social segregation in accessibility to facilities such as parks has been determined in several studies conducted in Iran (Breuste and Rahimi, 2015; Lotfi and Koohsari, 2011), which ascertain low attention and poor planning in low socioeconomic areas in Iran. Therefore, the present study was conducted to examine the association between perceived neighborhood safety and PA in low socioeconomic neighborhoods and whether these associations are mediated by neighborhood social environment in Bandar Abbas city, Iran.

2. Methodology

2.1. Sample selection and data collection

Iran is a large country with multiple cultural and ethnicity context. Each region of Iran is known to have a specific culture or ethnicity; however, the capital city of the country and a few large cities are known as multiple contexts. Bandar Abbas city, although is considered as a medium-sized city of Iran owing to its economic and industrial situation is considered as a multiple cultural and ethnicity context city. Every year many people from other parts of the country immigrate to this city. Bandar Abbas is located in the south of Iran, with a population of approximately 0.54 million. The city includes 84 neighborhoods, with 20 of them determined as poor on the basis of income and education levels. A total of 2000 questionnaires (a minimum of 79 to a maximum of 125 questionnaires) were distributed according to the number of households in these 20 neighborhoods using systematic sampling. The trained students distributed questionnaires door-to-door among adult residents (18 years old or above) and explained the aim of the study. One adult randomly was selected in each household to participate in the study. The questionnaire was filled in the presence of trained students. Most of the questionnaires were distributed in the evening or weekend to increase the presence of all adult residents of the households. The study was conducted from September to December 2018.

2.2. Self-reported physical activity

Self-reported PA was evaluated utilizing the well-validated International Physical Activity Questionnaire (IPAQ) survey (Craig et al., 2003). It is of note that the validity and reliability of the Persian translation of IPAQ have been confirmed in Iran (Moghaddam et al., 2012; Vasheghani-Farahani et al., 2011). The long-form IPAQ questionnaire evaluates PA in a variety of activities including work-related, gardening and domestic, leisure time, and transport-related PA in the course of the most recent 7 days. The IPAQ was used to independently measure the duration (in minutes) and the frequency (days) of moderate to vigorous PA. In each PA category, the total number of minutes per week was calculated. In the current study, three result factors were determined: (1) Leisure-Time Physical Activity (LTPA), (2) Transport-Related Physical Activity (TRPA), and (3) Total Physical Activity (TPA).

A total of 150 min/week or higher PA was recommended by the WHO for achieving health benefits (Simoes et al., 2009); however, a lower cut-off point is suggested for a specific type of PA (Cleland et al., 2008; Kramer et al., 2013). The results revealed that less than 4% of participants do PA for at least 150 min/week or higher for LTPA or TRPA. Therefore, the study used a lower cut-off point for these two outcomes. Sensitivity analysis was tested for 30 and 60 min/week of LTPA and TRPA, respectively. No significant differences were found. LTPA and TRPA were dichotomized into < 60 min/week and ≥ 60 min/week. TPA was dichotomized into < 150 min/week and ≥ 150 min/week as per WHO PA recommendations.

2.3. Neighborhood social environment

Social ties were measured on the basis of four Likert questions adopted from a previous study (Warner and Rountree, 1997). The participants were asked to choose one answer through the previous year from 1 = about once per day to 5 = never. The respondents were asked about the frequency of borrow or exchange things with neighbors, visiting neighbors in their houses, asking neighbors for help, and having fun and entertainment with neighbors. The items were reverse-coded before the analysis. Cronbach's alpha was 0.89, indicating good reliability. The full details of the items are presented in Appendix A.

Collective efficacy was developed from scales including shared willingness, social cohesion, and trust. All items were adapted from a previous study (Jiang et al., 2013). Three questions about the likelihood of local neighborhood residents intervening in children's misconduct measured shared willingness. The respondents were asked to answer the items in a Likert scale format from 1 = very unlikely to 5 = very likely. Cronbach's alpha was 0.81, indicating good reliability. Four questions regarding trust and attachment among neighbors were asked to measure the social cohesion and trust. The respondents were asked to answer the items in a Likert scale format from 1 = strongly disagree to 5 = strongly agree. Cronbach's alpha was 0.82, indicating good reliability. Collective efficacy variable was created through the factor analysis by examining shared willingness and social cohesion and trust that were combined. Cronbach's alpha was 0.79. The full details of the items are presented in Appendix A.

2.4. Perceived neighborhood safety

Fear of crime was measured utilizing five questions about the level of worry they feel about being a victim in their neighborhoods, adapted from a previous study (Swatt et al., 2013). The respondents were asked to answer the items in a Likert scale format from 1 = Not worried to 5 = Very worried. Cronbach's alpha was 0.89. The full details of items are presented in Appendix A. The items were reverse-coded before analysis.

Perception of incivilities was measured using nine questions about social and physical neighborhood problems (Swatt et al., 2013). The respondents were asked to answer the items in a Likert scale format from 1 = No problem to 5 = Big problem. Cronbach's alpha was 0.79. The full details of items are presented in Appendix A. The items were reverse-coded before analysis.

Perceived overall safety was estimated by two questions about feeling safe to walk alone in the neighborhoods for both day time and night time (Peterson et al., 2004; Rountree and Land, 1996). These questions can help to measure the overall perception of residents' neighborhood safety and can represent the view of residents regarding different factors such as traffic, crime, and disorders. The respondents were asked to answer the items in a Likert scale format from 1 = not safe at all to 5 = very safe. The two items were

combined for further analysis.

2.5. Sociodemographic variables

Sociodemographic information was obtained from participants using a self-administered questionnaire. The respondents were asked about gender, age, marital status, education level, occupation, and the number of motor vehicles in households. Age of participants was measured in an open-ended question. Marital status was classified as single or married. Education level was categorized as a diploma or lower and bachelor or higher. The occupation status was categorized as working, unemployed, students, housewife, and retired. Having motor vehicles was classified as 0 and ≥ 1.

2.6. Statistical analysis

The questionnaire was distributed among 2000 adults residing in the selected neighborhoods. Of these, 167 questionnaires were excluded for unacceptable levels of missing data (Schlomer et al., 2010). Therefore, the final analytic sample comprised 1833 participants. SPSS version 22 was used for all data analyses. Descriptive statistics were computed for sociodemographic information and LTPA, TRPA, and TPA levels. All types of physical activities were converted to dichotomous variables. To examine the correlation between socio-demographic variables and LTPA, TRPA, and TPA, multivariate models were constructed. Afterwards, a bivariate analysis was performed (using Pearson correlation) among safety, social, and sociodemographic variables and different types of PA. The results indicated moderate to a nonsignificant association between variables (data not shown). Accordingly, multiple logistic regression was used for each of the three dependent variables, namely, LTPA, TRPA, and TPA, to investigate the association with social and safety variables. The models for each dependent variable included sociodemographic variables as control variables. The first model for each variable included safety variables comprising crime safety, perceived incivilities, and general neighborhood safety. The second model for each variable included social variables, namely, social ties and collective efficacy. The third model for each variable included all variables to control the effects of the other models. Overall, nine logistic regression models were extracted.

3. Results

The participants' sociodemographic profile is presented in Table 1. Of all participants, 50.8% were female and 49.2% were male. More than half of the participants were in the age range of 18–30 years, married, had a diploma or lower education, and had at least

Table 1
Demographic characteristics of participants.

Variable	No. (%)
Gender	
Male	899 (49.2)
Female	929 (50.8)
Age (years)	
18–30	903 (52.5)
31–45	588 (34.2)
46–70	230 (13.4)
Education	
Diploma or lower	1105 (60.7)
Bachelor's or higher	713 (39.3)
Marital status	
Single	680 (37.3)
Married	1143 (62.7)
Occupation	
Working	792 (43.4)
Housewife	359 (19.7)
Student	324 (17.8)
Retired	123 (6.7)
Unemployed	225 (12.4)
Having motor vehicle	
0	689 (38.2)
1 or more	1113 (61.8)
Leisure time physical activity	
< 60 min/week	1107 (66.9)
≥60 min/week	547 (33.1)
Transport-related physical activity	
< 60 min/week	1006 (60.5)
≥60 min/week	658 (39.5)
Total physical activity	
< 150 min/week	1119 (68.1)
≥150 min/week	523 (31.9)

Table 2
Association of individual characteristics with physical activity.

	Odds Ratio (95% CI) [a]		
	LTPA	TRPA	TPA
Gender			
Women	1.00	1.00	1.00
Men	0.93(0.72–1.21)	1.26(1.12–1.66)*	1.89(1.23–2.19)*
Age (years)	0.98(0.96–0.99)*	0.99(0.98–1.01)	0.89(0.76–0.99)*
Education			
Diploma or lower	1.00	1.00	1.00
Bachelor or higher	1.15(0.89–1.49)	0.99(0.77–1.28)	1.27(0.97–1.66)
Marital status			
Single	1.00	1.00	1.00
Married	1.02(0.75–1.39)	0.75(0.55–1.00)*	0.57(0.41–0.78)*
Occupation			
Working	1.00	1.00	1.00
Housewife	1.28(0.87–1.86)	1.39(0.97–1.99)	
Student	1.18(0.78–1.78)	1.38(0.93–2.04)	1.22(0.89–1.54)
Retired	2.48(1.40–4.40)*	2.49(1.44–4.31)	1.47(0.4–2.59)
Unemployed	1.47(1.03–2.10)*	1.45(1.03–2.04)*	1.48(1.02–2.14)*
Having motor vehicle			
0	1.00	1.00	1.00

*$p \leq 0.05$.
[a] Adjusted for gender, age, education, marital status, occupation, and number of motor vehicle.

one car in their households. Nearly half of all participants (43.4%) reported having a job, while 12.4% reported having no job. Less than 40% of the participants reported doing at least 60 min LTPA and TRPA per week. However, only 31.9% of the participants met the recommended guidelines for PA ($\geq$150 min/week). Based on the context of the items that measured fear of crime, the items have been classified as fear of crime within private realm (1 item) or fear of crime within public realm (4 items). The results indicated a higher score for fear of crime within public realm (mean = 3.97) than private realm (mean = 3.52).

As shown in Table 2, men were more likely to do TPA and TRPA than women. No significant association was identified between education level and any type of PA. Aging was associated with lower LTPA and TPA. In addition, married people were less likely to do TRPA and TPA than single participants. Moreover, unemployed participants were more likely to do any type of PA than working participants. Having at least one motor vehicle in the household decreased TRPA compared to having no cars.

Tables 3–5 display multiple regression results of controlling the sociodemographic variables. The first set of 3 regressions was run with LTPA as a dependent variable. The results of models 1 and 2 indicated that crime safety, perceived overall safety, and social ties are associated with higher LTPA. Model 3 included all safety and social variables. The results indicated increases in the odds of crime safety and perceived overall safety, while perceived safety from incivilities become positively significant. In Models 1, 2, and 3, respectively, 3%, 4%, and 6% of the variation was explained.

The second set of regression was run with TRPA as a dependent variable. The results of model 4 revealed the association of crime safety and perceived overall safety with TRPA. In model 5, the correlation between social ties and TRPA was revealed. In Model 6, when all safety and social variables were added, the results indicated an increase in the odds of crime safety and perceived overall safety with TRPA, while the association between collective efficacy and TRPA becomes significant. In Models 4, 5, and 6, respectively, 3%, 2%, and 8% of the variation were explained.

The third set of regression was run with TPA. The results of Models 7 and 8 indicated the positive association of social ties and collective efficacy with TPA, while no association between safety variables and TPA was revealed. However, in Model 9, when all

Table 3
Multivariate associations of social and safety factors with Leisure Time Physical Activity.

	Odds Ratio (95% CI) [a]		
	Model 1	Model 2	Model 3
Safety factors			
Crime safety	1.49(1.17–1.93)*		1.80(1.27–2.24)*
Perceived overall safety	1.13(1.03–1.23)*		1.23(1.16–1.34)*
Perceived Incivilities	1.07(0.91–1.27)		1.08(1.00–1.16)*
Social factors			
Social ties		1.48(1.32–1.66)*	1.46(1.30–1.65)*
Collective efficacy		1.07(0.91–1.26)	1.13(0.95–1.34)
$\mathbf{R^2}$	0.03	0.04	0.06

*$p \leq 0.05$.
[a] Adjusted for gender, age, education, marital status, occupation, and number of motor vehicles.

Table 4
Multivariate associations of social and safety factors with Transport-Related Physical Activity.

	Odds Ratio (95% CI) [a]		
	Model 4	Model 5	Model 6
Safety factors			
Crime safety	1.34(1.12–1.98)*		1.86(1.13–2.32)*
Perceived overall safety	1.11(1.01–1.21)*		1.36(1.99–2.15)*
Perceived Incivilities	1.01(0.86–1.18)		1.05(0.89–1.23)
Social factors			
Social ties		1.34(1.20–1.50)*	1.30(1.16–1.46)*
Collective efficacy		1.12(0.95–1.30)	1.18(1.01–1.40)*
$\mathbf{R^2}$	0.03	0.02	0.08

*p ≤ 0.05.
[a] Adjusted for gender, age, education, marital status, occupation, and number of motor vehicles.

Table 5
Multivariate associations of social and safety factors with Total Physical Activity.

	Odds Ratio (95% CI) [a]		
	Model 7	Model 8	Model 9
Safety factors			
Crime safety	1.99(0.85–2.16)		2.08(1.04–2.19)*
Perceived overall safety	1.04(0.96–1.12)		1.13(1.05–1.21)*
Perceived Incivilities	1.11(0.94–1.31)		1.14(0.97–1.35)
Social factors			
Social ties		1.18(1.05–1.32)*	1.21(1.07–1.36)*
Collective efficacy		1.27(1.08–1.49)*	1.24(1.04–1.47)*
$\mathbf{R^2}$	0.003	0.02	0.07

*p ≤ 0.05.
[a] Adjusted for gender, age, education, marital status, occupation, and number of motor vehicles.

safety and social variables were added, a significant association of TPA was observed for crime safety and perceived overall safety.

4. Discussion

The study examined social ties and collective efficacy as mediators in the relationship among fear of crime, perceived general safety, and incivilities with different domains of PA. The findings of this study showed a low level of PA in low socioeconomic neighborhoods, which is consistent with the findings of previous studies in other countries (Ford et al., 1991; Romero, 2005). In support of this outcome with studies conducted in Iran, Fakhrzadeh et al. (2016) stated that approximately 68% of the participants did not achieve the recommended level of PA or another study conducted by Aliyas (2019b) showed that less than 8% of adults walk at least 120 min/week for transportation or leisure. Studies conducted in Iran also revealed that access to recreational facilities is different on the basis of socioeconomic status (Lotfi and Koohsari, 2009, 2011), which may support the low level of PA among these groups of adults. In general, this study produced results that corroborate the findings of a great deal of the previous work in this field in poor socioeconomic areas (Lindström et al., 2001).

The study examined the relationship between different domains of PA (i.e., LTPA, TRPA, and TPA) with sociodemographic variables. The study showed the association of some socioeconomic characters with PA. The findings suggested a higher level of PA and TRPA among men than women. This finding was largely consistent across many countries (Pollard and Wagnild, 2017). However, the outcome showed that women were more likely to walk for LTPA. This finding may be due to the fact that LTPA is the activity that women can undertake with their children, and it is possible that child care plays an important role in leisure activity of women (Miller and Brown, 2005).

Despite the findings of studies conducted in developed countries (Bize et al., 2007), no association between education level and PA was found. This result may be due to the low level of education among the studied population. The study suggested that unemployed people who usually have more free time are more likely to do TPA, LTPA, and TRPA than employed people. In contrast to findings of Ghani et al. (2016), the outcomes of the study indicated that older people were significantly less likely to do LTPA and TPA. In addition, retired people were more likely to do LTPA, suggesting that this is a critical life-stage for promoting walking. Although this finding is in contrast with the previous findings of the study, which suggested negative association of aging with LTPA and TPA, a possible explanation for this might be to not consider gender differences for aging. Women are usually less likely to walk and have higher perceptions of crime, which may seem to constrain their PA (Van Dyck et al., 2013; Won et al., 2016). In addition, having at least one motor vehicle in the households decreased the likelihood of TRPA among studied population (Adkins et al., 2017). The study conducted by Yang et al. (2007) stated that PA was significantly predicted by sociodemographic variables, suggesting that

the social environment is an important factor regulating PA.

This study supports the accumulating evidence that fear of crime and perceived overall safety are associated with different types of PA (Bracy et al., 2014; da Silva et al., 2016). In line with the results of previous studies, the study showed no significant association between incivilities and different domains of PA (Brownson et al., 2009). However, after controlling the social environment, the incivilities were associated with LTPA. This result suggested the intermediate effect of social ties and collective efficacy on the relationship between incivilities and LTPA. Social ties is a consistently strong predictor of all domains of PA (Gomes et al., 2016; Rhodes et al., 2018). It has been determined as an important mediator of health behavior change, as well. Moreover, the study revealed a higher collective efficacy among studied people, which increased the odds of TPA after safety variables were added to the model. This finding showed that perceived neighborhood problems influence the association between collective efficacy and TPA.

In general, the study found that the neighborhood social environment might be an important influence on the association between perceived safety and PA, while these relationships are affected by socioeconomic differences. The study suggested that the higher social connection among participants increases the link between perceived safety and different domains of PA. In addition, it is suggested that perceived safety slightly mediates the link between social environment and PA (Timperio et al., 2015). Although we found no association between collective efficacy and TPA, this relationship became significant after adding safety variables to the model. Thus, in the last models of all PA variables, the odds of social environment after adding safety variables slightly changed.

These outcomes emphasize the need to identify successful strategies to reduce the influence of neighborhood disadvantage (fear of crime; incivilities) on healthy behaviors in neighborhoods with the low socioeconomic condition. Policy makers should improve the quality of these areas by providing proper sidewalks to promote walkability of the neighborhoods. It would help increasing the safety feeling of the residents (Wasfi et al., 2016). The government should support organizations for youth sports, which is another example of public policies to increase PA and social participation not only among youths but also among adults and elderly people. Moreover, epidemiologists and public health practitioners must pay more attention on evaluating the influence of social determinants on health. Strategies that empower collective efficacy and social ties within the neighborhoods can be utilized to limit the effect of neighborhood problems on healthy physical activities. Community events related to culture or informal/formal organizations within neighborhoods may encourage residents to interact in the areas (Gasevic et al., 2011). Improving social ties, social cohesion, and informal social control can promote PA among residents by increasing feeling safe in poor socioeconomic neighborhoods (Ball et al., 2010; Burgess et al., 2015). Following the style of old-generation neighborhoods in Iran, such as providing neighborhood center and communal open spaces that are designed to support religious ceremonies, celebrations, and daily visit of the neighbors, would help to promote collective efficacy among neighbors. Further, by improving social interaction and social support among neighbors, policy makers can decrease the negative effect of neighborhoods' disadvantages and fear of crime to raise the level of outdoor walking. In addition, a neighborhood should be safe for residents to walk outdoor. Some policies can be applied in this regard by providing street lighting, sidewalks, and increasing surveillance. Providing proper lighting and sidewalks may help residents feel safe in their neighborhoods and promote PA outside of their households. Creating high-quality public recreational spaces within neighborhoods such as parks can increase social connection and linkage among residents, as well as increase the level of PA.

4.1. Strength and limitation of the study

The strength of the study includes a sizable sample of adults in poor socioeconomic areas. There is a vulnerable at-risk population in the study area, with the PA level lower than that of adults living in moderate-to-high socioeconomic areas. In addition, this is the first study in Iran regarding healthy behavior, which specifically focused on subjects with particular socioeconomic status. Moreover, this is one of the first studies to examine whether the social environment is a mediating mechanism through which the safety problems may operate to influence TPA, TRPA, and LTPA. As suggested in several studies, social and environmental factors have a different influence on different aspects of PA. Therefore, the study examined this relationship with three outcomes of PA.

The study has some limitations, as well. This is a cross-sectional study and cannot be generalized to other neighborhoods with different socioeconomic status. Further, PA variables were self-reported, which leads to some biases. Another restriction on our PA measures is that there was no distinction between PA carried out in or outside the micro-neighborhood environment of one's neighborhood. Unfavorable microenvironmental factors in the neighborhood may not affect participants engaged in PA outside their neighborhood. After that, safety was self-reported. However, the perceived neighborhood problem may be more prohibitive than the actual rate of crime (Yavuz and Welch, 2010).

5. Conclusion

Promoting PA to maintain health among adults is a public priority in Iran. The study suggests that measures to improve collective efficacy and social ties may be important predictors in promoting the level of PA. The social determinants could be the significant factors in decreasing the negative effects of a disadvantaged neighborhood and fear of crime. In addition, the findings of the present study demonstrated that socioeconomic variables are correlated to PA.

For future studies, it is recommended that other physical factors such as accessibility to the neighborhood facilities, quality of public open spaces, and esthetics of a neighborhood in relation to PA should be considered in low socioeconomic neighborhoods. The mediate effect of public open space on the link between social connection and PA should be evaluated, as well. Moreover, to achieve more reliable PA measures, it is recommended measuring the objective PA as well as using tools to obtain information regarding the location that all PA performed. In this way, it would be possible to distinguish between PA performed inside or outside of the neighborhoods. Furthermore, future studies should investigate the association between actual crime rate and level of PA in the poor

socioeconomic areas.

Conflicts of interest

The author declares no conflict of interest.

Ethical approval

The autonomy of the participants was fully respected, and written information including the purpose of the study, use and application of the study, assurance of their right to refuse, and the security of personal information was provided to each participant. All participants signed a consent form to participate in this study. Prior to commencing data collection, ethical clearance was applied for and approved by the deputy research directorate of Islamic Azad University, Bandar Abbas Branch, Iran.

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Appendix A. Full details of questionnaire items

Social ties	(1) How often did you borrow or exchange things with neighbors such as food, tools, and others? (2) How often did you ask someone from the neighborhood over to your house or go to their house for a meal, to play chess, watch TV, or talk? (3) How often did you ask a neighbor for help, like moving stuff, or taking care of a child? (4) How often did you go out for an evening with someone from the neighborhood to a movie, sports event, or others?
Shared willingness	(1) Children skipping school and hanging out on a street corner, (2) children spray painting graffiti on a local building, (3) children showing disrespect to an adult in the respondent's neighborhood.
Social cohesion and trust	(1) People around in my neighborhood are willing to help each other, (2) My neighborhood is a close-knit one, (3) People in my neighborhood can be trusted, (4) People in my neighborhood generally don't get along with each other (this statement was reverse coded).
Fear of crime	(1) Someone will try to break into your home while no one is here, (2) Someone will try to steal things that you might leave outside your home overnight, (3) Someone will try to rob you or steal something from you while you are outside in this neighborhood, (4) Someone will try to attack you or beat you up while you are outside in this neighborhood, (5) Someone will try to involve your child or family member in selling drugs.
Perceived incivilities	(1) Dirty or unkempt buildings and lots, (2) Vacant or abandoned lots, (3) Neighbors who make too much, (4) Homeless loitering, (5) Vandalism [this means destroying property such as breaking windows of abandoned homes], (6) Public drug or alcohol use, (7) Graffiti, (8) Groups of young people hanging out/around, (9) Truancy, that is kids not being in school when they should be.
Perceived overall safety	(1) How safe do you feel walking alone in your neighborhood in day time? (2) How safe do you feel walking alone in your neighborhood in night time?

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