

## What Are The Safety Factors Associating with Physical Activity in Urban Neighborhoods? (A Systematic Review)

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### ABSTRACT

Previous researches revealed the factors associating with urban neighborhoods' safety and physical activity separately. In addition, they highlighted the significance of each of which to make the urban neighborhoods more vibrant and alive. According to the significance of physical activity in improving the residents' satisfaction of their urban neighborhoods, this research is established based on discovering the safety factors relating to physical activity in urban neighborhoods. To do so, 25 research articles with the focus on urban neighborhoods' safety and physical activity research area were undertaken and reviewed. As result, factors such as people feel afraid to leave the house, number of people around, problem with dogs, street lighting, traffic and victimization experience (e.g. vandalism, violence, attack or physically injured, robbery and so on) are revealed as safety factors associating with physical activity in urban neighborhoods. The result established the holistic guidance for urban developers and designers due considering the safety and physical activity in urban neighborhoods simultaneously.

**KEYWORDS:** Safety, Physical Activity, Urban Neighborhood.

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### 1- INTRODUCTION

As an effective strategy in preventing associated increase in chronic diseases and health care expenditures, physical activity is a significant factor to improve public health in urban neighborhoods [18]. On the other hand, safety influences people's physical activity by providing the condition that they overcome on the nonexistence of any actual or apparent risks in urban neighborhoods [16]. There are several studies with the focus on the significance of physical activity and safety due improving the quality of life for the residents of urban neighborhoods. Reviewing the factors influencing residents of urban neighborhoods' quality of life, Najafpour et al (2014) highlighted the importance of safety and physical activity for urban neighborhoods [24]. Furthermore, the importance of examining the factors affecting safety and physical activity in urban neighborhoods persuaded researchers such as Rad et al (2014) to highlight the factors associating with physical activity in urban neighborhoods [29], Najafpour et al (2014) to discover factors associating with sense of security in urban neighborhoods [23] and Rad et al (2014) to manifest the factors relating to urban neighborhoods' safety [28]. In this regard several researches were undertaken the statistical analysis to examine the relative safety and sense of security factors in urban neighborhoods [22, 26 and 27]. Although the factors affecting safety and physical activity in urban neighborhoods are highlighte separately in previous researches, the safety factors that are directly associated with physical activity are not examined. According to the importance of safety for improving urban neighborhoods' physical activity, discovering the safety factors influencing urban neighborhoods' physical activity is vital. Undertaking previous researches on safety and physical activity in urban neighborhoods empowered this research to discover the safety factors associating with physical activity in urban neighborhoods. Due to the aim of this research, 25 research articles addressing safety and physical activity factors in neighborhoods are considered and the result are revealed in following sections.

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## 2- METHODS

In terms of the aim of this research, searching the relative literatures is started in accordance to the most extensive investigation on research articles that was associated with safety factors associating with physical activity in urban neighborhoods.

### 2-1- The Strategy of Research

Five electronic databases involving Web of science, Sage publication, Taylor and Francis ,Elsevier publication and Google scholar as most wellknown and significant search engines were undertaken in electronic search approach of this study [30]. In addition, the scope of research was designed based on English research articles published during 2000 to 2014. After reviewing the abstract and conclusion of extracted research articles, those with most appropriateness and association with safety factors associating with physical activity in urban neighborhoods and the principles of this research were gathered. Performing the hand search by considering first authors of eligible articles comparing to other published eligible papers consisting of their names was investigated. Finally, chosen articles were evaluated by the experts in physical activity and safety in urban neighborhoods' research area to catch the accuracy and robustness of study [21, 34].

### 2-2- Selection of Criteria

This research only focused on the articles was conducted on urban neighborhoods. Meanwhile, those articles that fulfilled the safety and physical activity criteria and their related factors were investigated.

## 3- RESEARCH RESULTS

### 3-1- The Characteristics of Research

Table 1 indicated the characteristics of 25 reviewed research articles. All reviewed articles were directly related to physical activity and safety in urban neighborhoods. In addition, Most of the reviewed research articles were developed based on American case studies and the rest were developed in Australian and European countries. The range of sample size in the most of the reviewed research articles was more than 1000 participants and a few were less than 150 respondents. Moreover, the reviewed research articles mostly were focused on male and female as gender variables and the rest were just focused on females. Due providing the holistic and detailing overview of the results extracted of the literatures the results is presented for each article separately. In addition, the diverse ideas regarding the association among safety and physical activity and extracted safety factors associating with physical activity in urban neighborhoods are illustrated in Table 2.

### 3-2- Assessment of Factors Affecting Physical Activity in Urban Neighborhoods

Ball et al (2007) investigated on the association among the personal, social and environmental variables with women socio-economical inequalities in terms of their walking for transport and leisure time walking and resulted that improving the neighborhoods' safety associated with leisure time walking improvement [2]. Considering the association among individual and neighborhoods' perception with physical activity, Harrison et al (2007) highlighted individuals who feel safe in urban neighborhoods were more interested for participating in physical activity in urban neighbourhoods [13]. Piro et al (2006) examined the relationships among the level of violence in urban neighborhoods, fear of violence with physical activity between elderly people and revealed that high level of violence in urban neighborhoods associated with less physical activity among men and low safety was related with less physical activity among women [25]. Moreover Doyle et al (2006) examined the association among walk-able and safe urban neighborhoods environment with health indicators and highlighted that occurred crimes in urban neighborhoods resulting on physical activity reduction in urban neighbourhoods [9]. In this regard, Vest et al (2004) considering the association among perceived urban neighborhoods' characteristics with leisure time physical activity in eastern Travis country, Texas, USA revealed the direct relationship among level of safety from crime and physical activity among urban neighborhoods residents [37]. Suminski et al (2005) focused on examining the relationship among the neighborhoods' environment' features and walking in the neighborhoods among U.S. adults and revealed that high level of safety among women increase their physical activity for exercise in urban neighbourhoods [36]. Furthermore, Li et al (2005) examined the association among built environment factors with walking in both residential and neighborhood level revealed the strong association among safety and physical activity at residential level [19]. Lim et al (2005) examined the factors associating with physical activity among New South Wales (NSW) older population and revealed no significance relationship between crime-related safety factors and physical activity in urban neighbourhoods [20].

**Table 1:** The Characteristic of Research Based on 25 Reviewed Articles

References	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	Total		
<b>Sample size</b>																												
<b>n ≤ 150</b>													X												X	2		
<b>150 (n ≤ 500)</b>						X					X	X	X												X	4		
<b>500 (n ≤ 1000)</b>							X	X	X					X	X	X						X	X	5				
<b>n ≥ 1000</b>	X	X	X	X	X			X	X	X	X						X	X	X					X	X	14		
<b>Country</b>																												
<b>America</b>				X	X	X	X			X				X	X	X	X					X	X	X	14			
<b>Europe</b>			X	X												X					X					X	6	
<b>Australia</b>	X							X	X												X	X	5					
<b>Setting</b>																												
<b>Urban</b>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	22	
<b>Urban + rural</b>								X																	X	X	3	
<b>Gender</b>																												
<b>Female + male</b>			X	X	X	X	X	X	X	X	X					X	X					X	X	X	X	X	X	18
<b>Female</b>	X										X	X	X	X					X					X	7			

Sources 1: Ainsworth et al. (2003), 2: Ball et al. (2007), 3: Booth et al. (2000), 4: Brownson et al. (2001), 5: Carnegie et al. (2002), 6: Craig et al. (2003), 7: De Bourdeaudhuij et al. (2003), 8: Doyle et al. (2006), 9: Eyler et al. (2003), 10: Foster and Giles-Corti, 11: Harrison et al. (2007), 12: Hooker et al. (2005), 13: Humpel et al. (2004), 14: King et al. (2000), 15: Li et al. (2005), 16: Piro et al. (2006), 17: Ross. (2000), 18: Sallis et al. (2008), 19: Steptoe and Feldman. (2001), 20: Suminski et al. (2005), 21: Vest and Valadez. (2005), 22: Wilbur et al. (2003), 23: Wilcox et al. (2000), 24: Wilcox et al. (2003), 25: Young and Voorhees. (2003).

**Table 2:** Safety Factors and their Associations with Physical Activity

No	Safety Factors Effecting Physical Activity	Significant Associations Between Physical Activity and Safety Items	Author(s)
1	<ul style="list-style-type: none"> <li>Street lighting</li> </ul>	The association among safety and physical activity in urban neighborhoods was rejected	Ainsworth et al. (2003)
2	<ul style="list-style-type: none"> <li>Street lighting</li> </ul>	Increasing the safety in urban neighborhoods increases the leisure time for physical activity*	Ball et al. (2007)
3	<ul style="list-style-type: none"> <li>Street lighting</li> </ul>	Perceiving neighborhood as safe for physical activity was associated with being active*	Booth et al. (2000)
4	<ul style="list-style-type: none"> <li>Violence</li> <li>Robbery</li> <li>Heavy traffic</li> <li>Street lighting</li> <li>Unattended Dogs</li> </ul>	High crime and “no safe place” associated with less physical activity*	Brownson et al. (2001)
5	<ul style="list-style-type: none"> <li>Street Lighting</li> </ul>	Negative perceptions of safety during the night associated with less physical activity*	Carnegie et al. (2002)
6	<ul style="list-style-type: none"> <li>Number of people around</li> <li>Street lighting</li> <li>Traffic</li> <li>Vandalism</li> </ul>	Increase of safety in environmental score associated with increased physical activity*	Craig et al. (2003)
7	<ul style="list-style-type: none"> <li>Street lighting</li> <li>Victimization</li> </ul>	The association among safety in urban neighborhoods and physical activity between males was approved*	De Bourdeaudhuij et al. (2003)
8	<ul style="list-style-type: none"> <li>Violence</li> <li>Attack or physically injured</li> <li>Robbery</li> </ul>	Increasing the safety in urban neighborhoods was associated with reducing physical activity in urban neighborhoods*	Doyle et al. (2006)
9	<ul style="list-style-type: none"> <li>Street lighting</li> <li>Victimization</li> </ul>	Reducing safety in urban neighborhoods was associated with reducing physical activity*	Eyler et al. (2003)
10	<ul style="list-style-type: none"> <li>Street lighting</li> </ul>	Less interest for physical activity for 15 min/week in urban neighborhoods was reported among females who felt their neighborhoods unsafe for physical activity*	Foster et al. (2008)
11	<ul style="list-style-type: none"> <li>Vandalism</li> </ul>	Those who feeling safe are more interested for contributing in physical activity*	Harrison et al. (2007)
12	<ul style="list-style-type: none"> <li>Street lighting</li> <li>Victimization</li> </ul>	The association among safety in urban neighborhoods and physical activity between white people was approved*	Hooker et al. (2005)
13	<ul style="list-style-type: none"> <li>Busy roads and traffic</li> <li>Unattended Dogs</li> </ul>	More interest for physical activity for pleasure in urban neighborhoods among male was reported when they feel safe*	Humpel et al. (2004)
14	<ul style="list-style-type: none"> <li>Traffic</li> <li>Street lighting</li> <li>Victimization</li> </ul>	No significant association between safety items and physical activity	King et al. (2000)
15	<ul style="list-style-type: none"> <li>Vandalism</li> <li>Violence</li> </ul>	Association among safety and physical activity in residential level of urban neighborhoods*	Li et al. (2005)

No	Safety Factors Effecting Physical Activity	Significant Associations Between Physical Activity and Safety Items	Author(s)
16	<ul style="list-style-type: none"> <li>Neighborhood's violence</li> <li>Robbery</li> </ul>	High violence and robbery in urban neighborhoods was related to reducing physical activity and reducing safety was associated with reducing physical activity for women*	Piro et al. (2006)
17	<ul style="list-style-type: none"> <li>Attacked or physically injured</li> <li>Robbery</li> <li>Felt afraid to leave the house</li> </ul>	Increasing safety associated with increasing the physical activity*	Ross. (2000)
18	<ul style="list-style-type: none"> <li>Street Lighting</li> </ul>	No significant association between victimization and physical activity	Sallis et al. (2008)

	<ul style="list-style-type: none"> <li>• Victimization</li> </ul>		
19	<ul style="list-style-type: none"> <li>• Problem with unattended dogs</li> <li>• Traffic and road safe</li> <li>• Vandalism</li> </ul>	No association between neighborhood's safety items and physical activity	Stephoe and Feldman. (2001)
20	<ul style="list-style-type: none"> <li>• Street lighting</li> <li>• The traffic's speed</li> <li>• Victimization</li> </ul>	Increasing safety items in urban neighborhoods for females was associated with increasing physical activity*	Suminski et al. (2005)
21	<ul style="list-style-type: none"> <li>• Street lighting</li> <li>• Violence</li> <li>• Robbery</li> </ul>	Reducing safety was related with reducing physical activity*	Vest and Valadez. (2005)
22	<ul style="list-style-type: none"> <li>• Street Lighting</li> <li>• Victimization</li> </ul>	The existence of safety from victimization in urban neighborhoods increase the women interest for physical activity*	Wilbur et al. (2003)
23	<ul style="list-style-type: none"> <li>• Street lighting</li> <li>• Victimization</li> <li>• Traffic</li> <li>• Problem with unattended dogs</li> </ul>	No significant association between safety items and physical activity	Wilcox et al. (2000)
24	<ul style="list-style-type: none"> <li>• Victimization</li> <li>• Heavy traffic</li> <li>• Street Lighting</li> </ul>	Increasing safety in urban neighborhoods was associated with increasing physical activity*	Wilcox et al. (2003)
25	<ul style="list-style-type: none"> <li>• Traffic</li> <li>• Street Lighting</li> <li>• Victimization</li> </ul>	The association among safety and physical activity in urban neighborhoods was rejected	Young and Voorhees. (2003)

On the other hand, Hooker et al (2005) considered the relationship between perception of social and safety regarding the attributes of urban neighborhoods' environment with physical activity and walking among adult African-American and highlighted that white people who perceiving their urban neighborhoods safe are more likely to participate in urban neighborhoods' physical activity [14]. Examining the relationship between the attributes of perceived urban neighborhoods' environment and walking for general, exercise, pleasure and getting to and from places, Humpel et al (2004) argued that perceived safety improvement among men were directly related with physical activity improvement in urban neighbourhoods [15]. Foster and Giles-Corti (2008) examined the association among adults' perception of physical and social environment with walking behaviors and revealed that women with unsafe feeling about their urban neighborhoods' environment were less interested to physical activity [11]. Determining the relationship among personal, social, environmental factors of urban neighborhoods with the level of physical activity among African-American women, Rohm Young and Voorhees (2003) resulted no significant relationship among crime related safety factors and physical activity in urban neighbourhoods [31]. On the other hand, Wilcox et al (2003) examined the physical activity factors among 102 rural older women and revealed that improvement in perception of safety was associated with increasing the physical activity in urban neighbourhoods [40]. In addition, Wilbur et al (2003) identified the personal, social and physical environmental correlates of physical activity and highlighted that women were more interested to participate in urban neighborhood physical activity when they felt safer there [38]. Describing the epidemiology of walking for physical activity among U.S. respondents, Eyler et al (2003) revealed that unsafe places are related with less physical activity there [10]. De Bourdeaudhuij et al (2005) investigated on the level differences of physical activity in perceived psychological and environmental correlates of activity among Portuguese and Belgian adults and argued that greater perceived safety from crime was associated with less time spent physical activity for males [8]. Ainsworth et al (2003) examined the association among personal, social, cultural, environmental, and policy variables with physical activity between women in ethnic minority groups and revealed no significant association between crime-related safety items and physical activity [1]. On the other hand, Billie Giles-Corti and Donovan (2002) studies the environmental and individual characteristics of physical activity and revealed the composite attractiveness, safety and interest score association with physical activity for recreation, physical activity as recommended, any vigorous activity, and exercising vigorously at the recommended level [12]. Craig et al (2002) investigated on understanding the effects of neighborhoods' physical design on behavior in terms of the income, university education, poverty, and degree of urbanization's effects on association among walking to work and the characteristics of neighborhood design and highlighted that safety improvement in urban neighborhoods' environment were associated with increasing the physical activity to work [6]. Examining the association among the aesthetic and practical environment with people

walking in their urban neighborhoods, Carnegie et al (2002) revealed association among the negative perception of safety in urban neighborhoods with physical activity there [5]. In this regard, Steptoe and Feldman (2001) argued that there is no relationship among urban neighborhoods' problems and physical activity [35]. On the other hand, Brownson et al (2001) examined the policy and environmental characteristics of physical activity in United States and highlighted that increasing the crime and existing unsafe places in urban neighborhoods caused the physical activity reduction there [4]. Wilcox et al (2000) revealed no significant association among crime related safety factors with urban neighborhoods' physical activity [39]. On the other hand, Ross (2000) highlighted the direct relationship among physical activity and urban neighborhoods' safety [32]. Considering the personal, program based and environmental barriers for physical activity in urban neighborhoods, Wilcox et al (2003) highlighted that there is no significant relationship among safety related crime factors and physical activity in urban neighbourhoods [40]. On the other hand, Booth et al (2000) identified the social cognitive and perceived environmental effects on urban neighborhoods' physical activity and highlighted that perceiving the footpaths as safe was associated with physical activity in urban neighbourhoods [3]. Evaluating a measure due examining the effects of perceived physical environment on urban neighborhoods' physical activity, Sallis et al (2008) revealed no significant relationship among environmental score including crime related safety factors with urban neighborhoods' physical activity [33].

#### 4- CONCLUSION AND DISCUSSION

Safety plays a key role in improving physical activity of urban neighborhoods. Therefore, discovering the safety factors associating with physical activity in urban neighborhoods is very important. This study was conducted with the aim of discovering the safety factors associating with physical activity in urban neighborhoods. To do so, the systematic review approach using Web of science, Sage publication, Taylor and Francis and Google scholar as most well-known and significant search engines was undertaken. In addition, all related research articles during 2000 to 2014 with the focus on safety and physical activity in urban neighborhoods were selected and 25 research articles have met the scope of this study. Most of the research articles highlighting American, European and Australian urban neighborhoods were conducted between males and females and their sample size was mostly more than 1000. The research articles mostly revealed the direct influence of safety on physical activity in urban neighborhoods highlighting the association among them. As result, six safety factors associating physical activity in urban neighborhoods are revealed. People feel afraid to leave the house, number of people around, problem with dogs, street lighting, traffic and victimization experience (vandalism, violence, attack or physically injured, robbery and so on) highlighted as six safety factors associating physical activity in urban neighborhoods. Considering the significance of physical activity and safety, this study can be used for improving the quality of life and physical activity in urban neighborhoods.

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