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Green Pocket Spaces Strategy in Oman

Research Paper

GREEN POCKET SPACES STRATEGY AND THE NEIGHBOURHOOD PARKS IN OMAN

a strategy for active and inclusive communities

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Abstract

Oman National Spatial Strategy has identified that the lack of green pocket spaces evenly distributed in residential neighborhoods is one of the main factors curbing citizens' engagement in a more active lifestyle. Small scale green spaces, and neighborhood parks are easier to access than Bigger Parks, where the city council has concentrated the resources lately. The crucial advantage of Neighborhood parks over other types of public open spaces is that they are more socially inclusive. Taking children to the playground is an important argument to motivate women to use public spaces. We developed a comprehensive method for this study employing a combination of site analysis methods, including microscale urban environmental audits, and short questionnaires in seven neighborhoods of Muscat. The methodology works with two different components - first, the access of the neighborhood to the central area designated for the park, and secondly, the environmental qualities of the park itself. We found that none of the studied cases present acceptable environmental quality needed to support the activities of the residents. In particular, they fail to provide the necessary types of equipment and services to attract different demographics. In addition, the streetscape of the most studied areas presents severe barriers for pedestrians along the way to the park. Enabling residents to walk to the park instead of driving is essential to providing universal access. Finally, we claim that Oman urges to create a comprehensive policy based on community-led initiatives with attention to social-inclusive spatial development to provide adequate recreational areas in the residential districts. We propose a set of recommendations to guide a program to regenerate neighborhood parks, making them active and socially inclusive places.

Keywords

Healthy Communities, Pocket spaces, Physic Activity, Urban Audits

1. Introduction

1.1. Physical inactivity is a global challenge

Regular physical activity can prevent heart disease, stroke, diabetes and breast and colon cancer and improve mental health and quality of life. Emerging evidence indicates that physical activity prevents the incidence and mortality due to respiratory diseases including COVID-19 (Nieman and Sakaguchi, 2022;

Rahmati *et al.*, 2022). Promoting physical activity can also lead to cleaner air and less congested, safer roads (WHO, 2013). The Global Action Plan on Physical Activity 2018 – 2030 adopted by Member Sates of the World Health Organization set a global target of 15% reduction in the prevalence of physical activity by 2030. The COVID-19 pandemic disrupted societies, economies and health systems including health programmes such as physical activity awareness campaigns. Accelerated efforts are needed to promote physical activity if countries are going to meet this global target; this is especially the case in the Eastern Mediterranean region, the second most inactive region globally and the region with the highest levels of inactivity among women (Al Siyabi, R. M. Mabry, *et al.*, 2021).

Unlike many countries in the region, Oman has a national physical activity policy and plan of action developed by a national multisectoral team over a 3-year period. Although this plan aligns well with the global plan, it focuses mainly on individual actions through the health, education and sports sectors rather than tackling large scale systemic changes in improving urban design, transport and environmental policies and actions (Al Siyabi, R. M. Mabry, *et al.*, 2021). These upstream interventions are recommended by public health and urban design researchers in Oman (Mabry *et al.*, 2014, 2020).

1.2. Why major cities in Oman need a regeneration strategy -Urgently!

A small but growing body of evidence on physical activity and the built environment is emerging that can inform national and local policies (Al Riyami, Afifi and Mabry, 2004; R Mabry, 2018; Mabry *et al.*, 2020; Al Siyabi, R. Mabry, *et al.*, 2021; de Siqueira *et al.*, 2021). The focus has been on pedestrian activity within existing residential areas (De Siqueira and Al Balushi, 2020; Al Siyabi, R. Mabry, *et al.*, 2021; de Siqueira *et al.*, 2021). Engaging community members has identified redesign proposals focusing on neighbourhood mosques as central for walkable cores. It also pointed to the need for socially acceptable public spaces for women, such as neighbourhood parks, where they can socialize and engage in physical activity (De Siqueira and Al Balushi, 2020); a commonly raised issue in policy discussions on physical activity in Oman (Al Riyami, Afifi and Mabry, 2004; Mabry *et al.*, 2014, 2020; Ruth Mabry, 2018).

Oman National Spatial Strategy has prioritized the creation of neighbourhood parks to promote a more a more active lifestyle (MoHUP, 2020). Global evidence shows that park users more likely to achieve recommended PA compared to non-users (Giles-Corti *et al.*, 2005). For example, parks accounted for about half of vigorous physical activity levels for residents living within 0.5 mile of a park in the USA (Han, Cohen and McKenzie, 2013). In an 8 country study, neighbourhoods with more parks within 1 km was associated with high levels of physical activity than those neighbourhoods with fewest parks (Schipperijn *et al.*, 2017). Creating parks within walking distance encourages engaging in physical activity (Kaczynski, Potwarka and Saelens P, 2008; Bancroft *et al.*, 2015). In addition to proximity, park safety, aesthetics, facilities supportive of physical activity like walking paths, open spaces and playgrounds (Kaczynski, Potwarka and Saelens P, 2008; McCormack *et al.*, 2010). Although protocols and tools are available to examine the impact of neighbourhood parks on increasing the prevalence of physical activity, their relevance to Oman and the region as a whole has not yet been examine. Thus, this study aims to examine neighbourhood walkability and its association to park usage especially as it relates to physical activity.

2. Methods

2.1. Data Generation and selection of study areas

We searched for existing neighbourhood parks in the Muscat Capital area that matched the set of two criteria: 1) they are integrated in a residential neighbourhood in terms of size and location, 2) they are public, accessible by all residents and open at all times of the day and the days of the week. We found eight areas in Muscat and one in Barka (which is officially a neighbour city to Muscat, but geographically

is attached to the outskirts of the Capital Area). We selected students of the Urban Planning and Architectural Design course of the German university of technology to conduct the data collection. Students of the Urban Design 2 course (3rd semester) received a five days long training prior to the field work in September 2021. The training consisted of theoretical principles of active mobility, ethics in research, and the outline of the tool as well as data collection procedures.

For each selected study area, we examined both the qualities of the Neighbourhood Environment (NE) at a microscale level and the environmental quality of the Neighbourhood Park located in the centre of the study area (PA).
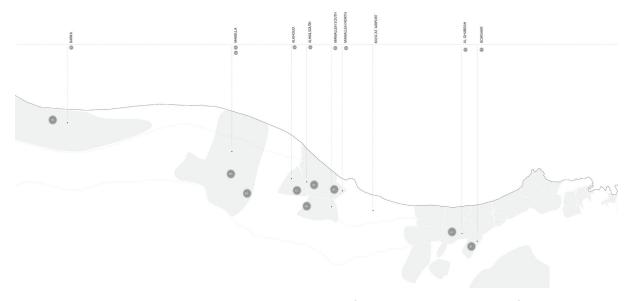

Figure 1 - Nine study areas covered by the original design of the study. They consisted of residential areas with a Neighbourhood Park accessible for the public without restrictions.

2.2. Neighbourhood Environment Audit (NE)

Environmental attributes relevant to active mobility patterns are divided into two categories: microscale and macroscale attributes. net residential density, street connectivity count to the first while pedestrian infrastructure, aesthetics, and safety count to the latter (Cain *et al.*, 2014).

The Microscale Audit of Pedestrian Streetscapes is a tool developed to assess the neighbourhood environment contribution to active mobility patterns at a microscale level (Cain *et al.*, 2014; Sallis *et al.*, 2015). We deployed MAPS-mini to evaluate the access of neighbours to the existing parks. The environment conditions might work as a barrier hindering the use of that amenities. Another assessment (section 2.3) will examine the environmental qualities of the park itself.

In the study we employed the MAPS mini version in English. The research team decided that no items needed to be modified (consult with experts and discussion) and the translation into Arabic was not necessary. Because it was simple to understand and conducted by students with a minimum English proficiency level IELTS 5.5.

The areas were limited by a circle of 500 m of radius. For each area four routes were selected; each route had to cross the whole diameter of the area and pass through the park (in the centre of the circle). The hierarchy of the roads in the region is not very strong, but we tried to capture different types of roads in order to cover most of the possible scenarios.

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Description of MAPS – procedure two raters for each route, one questionnaire filled for each segment of the route (segment composed of a street segment plus crossing), description of the number and types of items evaluated.

The Interrater reliability is calculated in SPSS per intraclass correlation. The results are classified according to (Koo and Li, 2016) see table 1. Significance tested at 0.05 alpha.

ICC coeficient	Reliability level	Threshold
<0.5	Poor	Not acceptable
0.5-0.75	Moderate	Not acceptable
0.75-0.9	Good	Acceptable
>0.9	Excellent	Acceptable

Table 1 - reliability thresholds for ICC scores suggested by Koo and Li (2016)

2.3. Park Environment Audit (PE)

We employed a structured questionnaire with 13 items based on the public life tools by Gehl architects (gehl, no date) to assess the perceived qualities of the neighbourhood park in the selected study area. Additionally, two open ended questions were added that will not be assessed by the present study.

The tool entails questions related to services provided, equipment, the quality of the social environment and the maintenance status of the park in question (see Table 5). It was deployed- similarly to the NE- by two independent members of the research team whose responses have been statically compared through reliability tests.

3. Results

3.1. Assessing reliability

Each study area entailed four routes assessed by two raters each. Street segments with inter-rater reliability scores below 0.750 (KOO and Li 2016) have been considered too low and have been excluded. Study areas with more than two routes have been excluded from the further steps. Overall, five routes have scored too low ICC estimates (m3.2, m3.3, m3.4, R1.1, and r1.2). The M3 area has been completely removed from the study since three routes have not achieved sufficient reliability scores.

Route	ICC	95% Conf. Interval			F Test with True Value 0		
		Lower	Upper	Value	df1	df2	Sig
b1_1	.912	0.867	0.942	11.313	89	89	0.000
b1_2	.892	0.836	0.929	9.250	89	89	0.000
b1_3	.854	0.778	0.904	6.948	89	89	0.000
b1_4	.889	0.831	0.927	8.901	89	89	0.000
g1_1	.957	0.932	0.972	24.397	89	89	0.000
g1_2	1.000				89		
g1_3	1.000				89		

g1_4	.804	0.694	0.873	5.422		89	89	0.000
k1_1	.830	0.737	0.890	6.194		89	89	0.000
k1_2	.833	0.745	0.891	6.205		89	89	0.000
k1_3	.923	0.884	0.950	13.154		89	89	0.000
k1_4	.968	0.951	0.979	30.578		89	89	0.000
m2_1	1.000					89		
m2_2	1.000					89		
m2_3	1.000					89		
m2_4	1.000					89		
m3_1	.758	0.628	0.842	4.331		89	89	0.000
m3_2**	.663	0.487	0.778	2.952		89	89	0.000
m3_3**	-.287	-0.959	0.154	0.777		89	89	0.882
m3_4**	-.224	-0.872	0.198	0.819		89	89	0.826
r1_1**	.730	0.591	0.822	3.722		89	89	0.000
r1_2**	.555	0.326	0.706	2.256		89	89	0.000
r1_3	.763	0.640	0.844	4.189		89	89	0.000
r1_4	1.000				89			
w1_1	.812	0.714	0.876	5.295		89	89	0.000
w1_2	.894	0.839	0.930	9.522		89	89	0.000
w1_3	.811	0.712	0.876	5.249		88	88	0.000
w1_4	.810	0.712	0.875	5.282		89	89	0.000
w2_1	1.000					89		
w2_2	1.000					89		
w2_3	1.000					89		
w2_4	1.000					89		

Table 2 -Table 2 - Inter rater reliability tests using ICC – streetscapes tested by routes in all 8 areas.

As for the Park audit, each of the eight areas have been assessed with the PARK audit by two independent raters. Three areas (B1, G1, M2) have perfect scores, and three more are at excellent score level. Two remaining areas (M3 and W10) achieved poor and moderate scores respectively, and failed to achieve the defined reliability level.

Area	ICC	95% Conf. Interval		F Test with True Value 0			
		Lower	Upper	Value	df1	df2	Sig
B1	1.000			12			
G1	1.000			12			

K1	.914c	0.730	0.974	11.667	12	12	0.000
M2	1.000			12			
M3 *	.348	-0.888	0.793	1.571	12	12	0.223
R1	.900	0.685	0.969	10.000	12	12	0.000
W1*	.710	0.029	0.912	3.316	12	12	0.024
W2	.923	0.757	0.976	13.000	12	12	0.000

Table 3 – Inter rater reliability ICC tests for the Park Audits (PA). *Two study areas (M3 and W1) failed to achieve acceptable scores.

Overall, six out of the eight areas have obtained acceptable reliability scores and will be considered in the further steps of the study.

3.2. environmental scores for selected areas

The environmental estimates for both units – the park and neighbourhood streetscape – are quite low (average scores 0.57 and 0.32 respectively). The highest PA score is for M2 (0.769) and the lowest for B1 and G1 (0.462). For the NE, G1 achieves the highest score (0.5) and M2 the lowest (0.19).

	PA	NE
B1	0.462	0.34127
G1	0.462	0.5
K1	0.654	0.224206
M2	0.769	0.19246
R1	0.731	0.368056
W1	0.423	0.329365
W2	0.500	0.333333

Table 4 - Average environmental scores for each study area. PA - Park Audit results/ NE - Streetscape Audit as an indicator of the Neighborhood environment. 0 indicates lowest/ 1 highest possible score for both measurements.

3.3. Overall scores by items in the Parks

While assessing the scores of the park audits across all raters and study areas (n=14) we found that the social environment - covered by questions 11 to 13 - achieved perfect scores (1.00). Also, despite the apparently poor conditions of some playgrounds, question 4 (Does the place have a playground or kid-friendly play space?) scored perfect and question 5 (Does the place have a multi purpose lawn/ grass area?) has an excellent score. The access to the parks (question 9) have also achieved a good score. Conversely, items related to equipment such as questions 1, 3, 6, 7 and 8 scored poorly (0.00-0.36). Finally, items related to the maintenance (10) and the neighbourhood environment (2) have been scored as close to moderate (both 0.43).

#	Question/ Item	Av.Score
1	Does the place offer enough opportunities to sit and rest?	0.36
2	Does the place offer things to look at/ nice views?	0.43

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3	Does the place offer areas for exercising/ or team sports?	0.21
4	Does the place have a playground or kid-friendly play space?	1.00
5	Does the place have a multi purpose lawn/ grass area?	0.93
6	Are there food and drink vendors in the place (incl. Kiosks, cafes and carts)?	0.00
7	Does the place has shaded eating places/ tables for socializing?	0.29
8	Does the place have public toillets?	0.00
9	Is the access to the place restricted by walls, fences or barriers?	0.79
10	Is the place well mantained (new benches, pavements, garbage bins etc)?	0.43
11	Is the place good for... Being social/ being with family or friends?	1.00
12	... Doing different kinds of activities?	1.00
13	... Meeting with different people (age/ gender)?	1.00

Table 5 - Park Audit Items and average scores

4. Using neighbourhood parks to activate communities – a comprehensive strategy

Creating an inclusive agenda for healthy habits and communities as targeted by the ministry of health in Oman and the ONSS (MoH, 2019; MoHUP, 2020) will largely depend on adequate urban environments where the population naturally engage in physical activity.

The results of the study expose the overall lack of adequate leisure infrastructure within the residential neighbourhoods in Muscat, but the finds are likely to be representative to other cities of the GCC. The existing Neighbourhood Parks fail to provide acceptable conditions to cover the physical activity demands of residents of all ages and genders. Considering the cultural norms in place, it affects especially female demographics, who are more vulnerable to the effects of non-communicable diseases in the region. The necessity to revert the extreme scarcity of recreational areas at a district level has been already recognised in the new national spatial strategy of Oman and the creation of parks is considered one of the top development priorities in the metropolitan areas (MoHUP, 2020).

However, the development strategies must go beyond the arbitrary pulverization of recreational spaces if the problems associated with their absence are to be fought effectively. As the results of the present study suggest, the efforts of authorities should not only focus on providing every neighbourhood with local parks (Green Pocket Spaces) that are well equipped and adequately designed to become attractive activity centres. They must also tackle the accessibility constraint caused by the overall poor neighbourhood environment conditions.

Despite the overall poor conditions of the existing parks, the social environment is positively perceived. Thus, strategy to improve the recreational spaces should explore the sociability of the locals and create spaces that facilitates gatherings.

Many of the lacking qualities could also be integrated into the existing surroundings of the parking and the neighbourhoods should benefit of interventions that increase the number of the available equipment such as urban furniture and places for physical activity such as work out areas and sport fields but also and integrated pedestrian and cyclists' network that is extended to the whole neighbourhood.

5. Limits and Outlook

This study has been originally designed to be conducted in nine areas in Muscat. For different methodological restrictions described in the methods section two areas have been discarded. In future studies measures to solve discrepancies between raters should be introduced to maintain the original samples.

The MAPS tool for the neighbourhood environment audit at the streetscape level has been deployed successfully in several countries (Fox *et al.*, 2021). However, in our knowledge it is the first time it has been employed in the GCC. Further, studies exploring the tool such as a construct validity exploring the correlations with other objective environmental indicators might be useful to strengthen the findings and to validate the tool, extending its application to other countries in the vicinity.

As for the Park Audit, the developed an audit with thirteen questions inspired by Gehl's observation tools that showed some potential to become a useful tool for the assessment of neighbourhood parks environment. It is very compact in comparison to other park audit tools (Edwards *et al.*, 2013; Geremia *et al.*, 2019). However, although it has been originated by a leading research team, its validation is not yet available in any scholarly publication. Some future studies would be necessary to assess its sensitivity to capture environmental attribute changes.

Also, the present assessments might benefit of the association with other methods such as digital mapping and field observations of the behaviour of users in the parks.

Finally, the development of a comprehensive strategy to activate the residential areas similar to other initiatives to regenerate the public realm in Oman (De Siqueira, 2021) would perfectly work within an action research framework based off pilot interventions and pre- post assessment for the impact evaluation.

5. Acknowledgement

6. References

Bancroft, C. *et al.* (2015) 'Association of proximity and density of parks and objectively measured physical activity in the United States: A systematic review', *Social Science & Medicine*, 138, pp. 22–30. doi: 10.1016/J.SOCSCIMED.2015.05.034.

Cain, K. L. *et al.* (2014) 'Contribution of streetscape audits to explanation of physical activity in four age groups based on the Microscale Audit of Pedestrian Streetscapes (MAPS)', *Social Science & Medicine*, 116, pp. 82–92. doi: 10.1016/J.SOCSCIMED.2014.06.042.

Edwards, N. *et al.* (2013) 'Development of a Public Open Space Desktop Auditing Tool (POSDAT): A remote sensing approach', *Applied Geography*, 38(1), pp. 22–30. doi: 10.1016/J.APGEOG.2012.11.010.

Fox, E. H. *et al.* (2021) 'International evaluation of the Microscale Audit of Pedestrian Streetscapes (MAPS) Global instrument: comparative assessment between local and remote online observers', *International Journal of Behavioral Nutrition and Physical Activity*, 18(1). doi: 10.1186/S12966-021-01146-3.

gehl (no date) *How to use the Public Life Tools*. Available at: https://gehlpeople.com/tools/participant-survey/ (Accessed: 30 August 2022).

Geremia, C. M. *et al.* (2019) 'Validating and Shortening the Environmental Assessment of Public Recreation Spaces Observational Measure', *Journal of Physical Activity and Health*, 16(1), pp. 68–75. doi:

10.1123/JPAH.2018-0142.

Giles-Corti, B. *et al.* (2005) 'Increasing walking: How important is distance to, attractiveness, and size of public open space?', *American Journal of Preventive Medicine*, 28(2 SUPPL. 2), pp. 169–176. doi: 10.1016/j.amepre.2004.10.018.

Han, B., Cohen, D. and McKenzie, T. L. (2013) 'Quantifying the contribution of neighborhood parks to physical activity', *Preventive Medicine*, 57(5), pp. 483–487. doi: 10.1016/J.YPMED.2013.06.021.

Kaczynski, A. T., Potwarka, L. R. and Saelens P, B. E. (2008) 'Association of park size, distance, and features with physical activity in neighborhood parks', *American Journal of Public Health*, 98(8), pp. 1451–1456. doi: 10.2105/AJPH.2007.129064.

Koo, T. K. and Li, M. Y. (2016) 'Cracking the Code: Providing Insight Into the Fundamentals of Research and Evidence-Based Practice A Guideline of Selecting and Reporting Intraclass Correlation Coefficients for Reliability Research', *Journal of Chiropractic Medicine*, 15, pp. 155–163. doi: 10.1016/j.jcm.2016.02.012.

Mabry, Ruth (2018) 'Urbanisation and Physical Activity in the GCC : a Case Study of Oman', *LSE Middle East Centre Paper Series*, 21(February).

Mabry, R (2018) 'Urbanisation and physical activity in the GCC: a case study of Oman', (February). Available at: http://eprints.lse.ac.uk/86875/.

Mabry, R. M. *et al.* (2014) 'Addressing physical inactivity in Omani adults: perceptions of public health managers', *Public health nutrition*, 17(3), pp. 674–681. doi: 10.1017/S1368980012005678.

Mabry, R. M. *et al.* (2020) 'Physical activity and the built environment: perceptions of policy-makers in Oman', *Health Promotion International*, 35(4), pp. 762–770. doi: 10.1093/HEAPRO/DAZ066.

McCormack, G. R. *et al.* (2010) 'Characteristics of urban parks associated with park use and physical activity: A review of qualitative research', *Health & Place*, 16(4), pp. 712–726. doi: 10.1016/J.HEALTHPLACE.2010.03.003.

MoH, M. of H. O. (2019) 'Annual Health Report 2019 MOH Oman', *Annual Health Report*. Available at: https://www.moh.gov.om/documents/274609/4243161/2019/9+السنوي+الصحي+التقريرafb3559-6f77-9e79-1251-e3d0a26b4861%0A.

MoHUP, M. of H. and U. P. (2020) *Features of the urban spatial strategy 2040*.

Nieman, D. C. and Sakaguchi, C. A. (2022) 'Physical activity lowers the risk for acute respiratory infections: Time for recognition: Running Head: Physical activity and illness', *Journal of Sport and Health Science*. doi: 10.1016/J.JSHS.2022.08.002.

Rahmati, M. *et al.* (2022) 'Baseline physical activity is associated with reduced mortality and disease outcomes in COVID-19: A systematic review and meta-analysis', *Reviews in Medical Virology*, p. e2349. doi: 10.1002/RMV.2349.

Al Riyami, A., Afifi, M. and Mabry, R. M. (2004) 'Women's Autonomy, Education and Employment in Oman and their Influence on Contraceptive Use', *https://doi.org/10.1016/S0968-8080(04)23113-5*, 12(23), pp. 144–154. doi: 10.1016/S0968-8080(04)23113-5.

Sallis, J. F. *et al.* (2015) 'Is Your Neighborhood Designed to Support Physical Activity? A Brief Streetscape Audit Tool', *Preventing chronic disease*, 12(9). doi: 10.5888/PCD12.150098.

Schipperijn, J. *et al.* (2017) 'Access to parks and physical activity: An eight country comparison', *Urban Forestry & Urban Greening*, 27, pp. 253–263. doi: 10.1016/J.UFUG.2017.08.010.

de Siqueira, G. *et al.* (2021) 'Sustainable Transportation and Policy Development: A Study for Impact Analysis of Mobility Patterns and Neighborhood Assessment of Walking Behavior', *Sustainability 2021, Vol. 13, Page 1871*, 13(4), p. 1871. doi: 10.3390/SU13041871.

De Siqueira, G. (2021) *Safe and Active Mobility: A Prototype for the Re-pedestrianisation of Residential Neighbourhoods in Oman*. Available at: https://blogs.lse.ac.uk/mec/2022/01/15/safe-and-active-mobility-a-prototype-for-the-re-pedestrianisation-of-residential-neighbourhoods-in-oman/ (Accessed: 30 August 2022).

De Siqueira, G. and Al Balushi, A. (2020) 'Co-designing the pedestrian revolution in Muscat', *City, Territory and*

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Mabry, R.; Agirbas, E.

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Architecture, 7(1), p. 11. doi: 10.1186/s40410-020-00119-6.

Al Siyabi, H., Mabry, R. M., *et al.* (2021) 'A Critique of National Physical Activity Policy in Oman Using 3 Established Policy Frameworks', *Journal of physical activity & health*, 18(12), pp. 1473–1478. doi: 10.1123/JPAH.2021-0152.

Al Siyabi, H., Mabry, R., *et al.* (2021) 'Adaptation of the Physical Activity Neighborhood Environment Scale in Oman', *Sultan Qaboos University Medical Journal [SQUMJ]*. doi: 10.18295/squmj.4.2021.035.

WHO (2013) 'Global action plan for the prevention and control of noncommunicable diseases 2013-2020.', *World Health Organization*, p. 102. doi: 978 92 4 1506236.