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A systematic Review of Green Space and Physical Fitness

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ABSTRACT

Green spaces in urban area might have better caring health effect than other places. Urban residents experience further environment risky exposure, attention demand, and stressor than their suburban counterpart. This review synthesized the result of approaches that tested how the green spaces and health relationships differs by urban cities. Articles in April 2019 have been searched to establish a positive association among green spaces and physical fitness. Involved papers confirmed for effects modifications by urban city between one or more outcome relevant to health and environment parity. The oblique result as 1 = strong associations in other urban area, − 1 = strong associations in lesser urban area, or 0 = no differences. The founded of 57 analysis in 37 papers that meet proposed inclusions principles. Amongst this analysis, 50.9% shows no differences, 38.6% shows strong associations for more urban area, and 10.5% shows strong associations for lesser urban area. Additional urban area had strong association for cardiovascular-related, births, and humanity outcome and for green spaces measures with 500 m. strong greens place-health association in other urban area may be clarified in amount by the mechanical pathway under this association. Green spaces could decrease harm from environment exposure include air pollutions, noise, heats, and artificial lights at night) in adding to relieving attention demand, decreasing chronic stressor, and supporting healthy behavioral - factor which may be further required, prevailing, or strong in urban area. This prospective explanation warranty extra investigations. The finding of proposed review informs community health strategy and development professional who are trying to make city comfortable for wholly dwellers.

Keywords: green space, physical health, Urban Areas, City

1. INTODUCTION

Several persons perceived city as harmful place where green space –country have archaeologically left city for greenbelts and the rural area in measure to living in better and green area [1-5]. The COVID19 disease has revived this desire; numerous urbanite again pursue to life in lower-density area with beautiful and outdoors reformation opportunity [6-10]. Nonetheless green spaces do occur in city further; urbanizes green spaces may develop physical fitness. The progressive urbanize world, where 70% of persons will lives in city area by 2050 [11], it is impractical to required larger number of persons to moves away from city to maintains their fitness. In its place, pathway to fitness live have to include make city fitness place to lives for wholly resident [12-15], and green spaces could be one part of that mystery. There are two causes to trust that green spaces in city might be just as health-promotion as green spaces in

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lesser urban area. Firstly, many large-scale observation approaches, experiment approaches, and review have observed the protecting health effect of green spaces, particularly in urban area, and, in overall, they establish green spaces in city can indorse fitness [16-20]. Secondly, the pathway by which green spaces improve health occur in urban and lesser urban area; consequently, the asset of association among green spaces and health can be equivalent among this area. Green spaces are in general recognized to assist human health via three set of pathway: dropping harmful, reinstating capacity and construction capacity [21-30]. The condition for this pathway to be motivated could be presents in urban place, suburban place, and rural context. This condition contain attention demand [30-35], barrier to physical activities [36], air pollutions [37], noisy [38-40], exciting heat [41], and artificial lights at nights [42] amongst other protracted stressor [43] and environment factor disturbing health and behavior outcome, like sleep [44]. Due to this element could happen through urban–country spectrums, it can be expect the fitness benefit of green spaces not to differ by urban cities [45]. Nevertheless, investigative the pathway via green spaces improve health suggest that the effect of green spaces on health may be strong in urban area. Figure 1 illustrates theoretical frameworks of how this pathway condition could be activating in rural and urban area; the frameworks display a ration for why this condition might be strong and further omnipresent in the city. This structure build on other frameworks that lead expert in the fields established by [46-50] and modified in other review on effects mediations in the humanity health and green area relationships [51-55]. As examples, green area might have mainly stronger mitigations effect in urban environment due to that the air and sound pollutions are in general higher in city where traffics and roadway is concerted [56-60]. Green area might have stronger restoratives capacity in city because of the urban residents might undergo from mostly higher level of attention demand and chronic stressor [61-70]. Lastly, urban green space is further probable to be design for accessing and uses with passable illumination.

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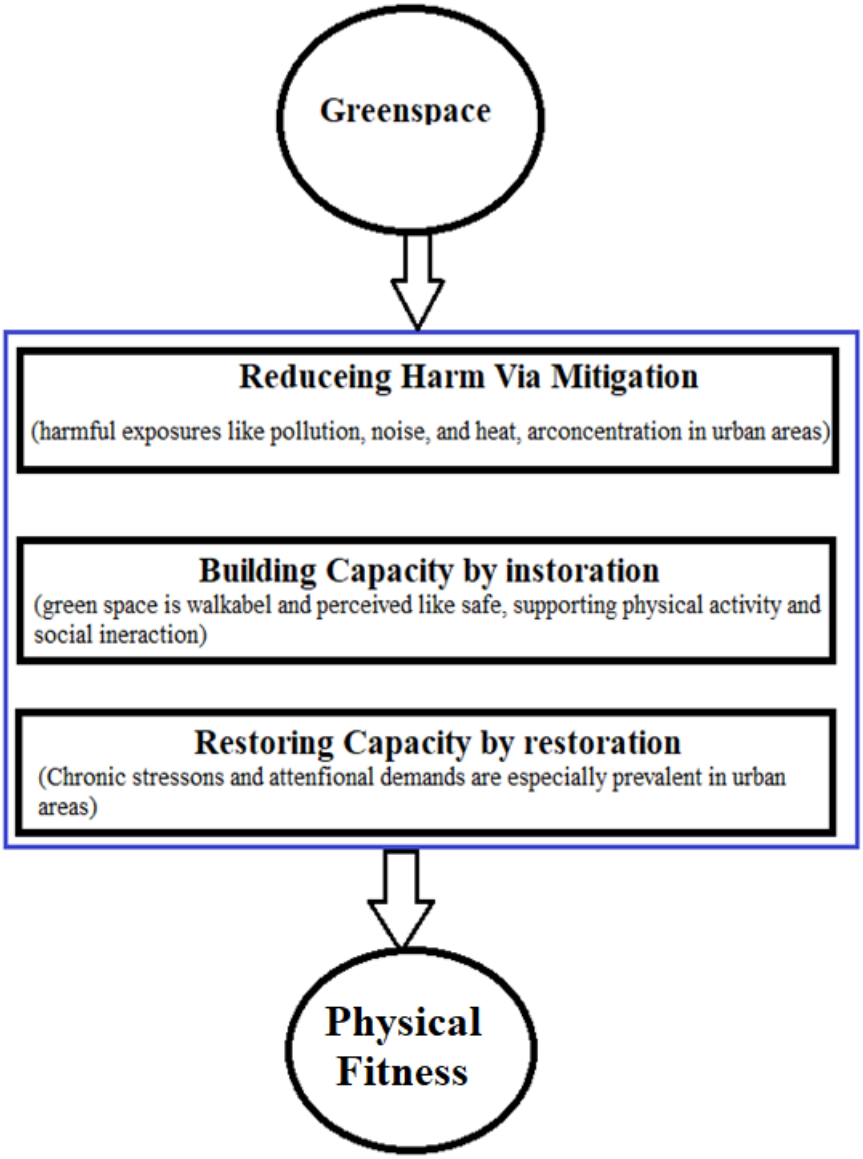

Figure 1: Reason why green spaces might endorse physical health healthier in urban than lesser urban area

This designs characteristic offer opportunity for instaurations over physical activities and societal interactions further so than remote green space [71-75]. Further, green space is established for cities-live additional probable to be locates in walk talented neighborhood and close to the persons living [76-80]. Green space in the urban area has related with additional visitor engage in moderated exercises and few guests sit down than green space in lesser urban area [81-85]. Notwithstanding this reason to trust that green space might have strong protecting effect on health in urban setting, ignorant of any researches that have scientifically examine these topics?. These are mostly important oversight because of the significant communal health needs for environment factor that endorse health in city. Consequently, the main goal of these systematic reviews is to fill these needs: looking for understanding where green spaces matter the furthermost, specifically in additional urban or lesser urban area. Additional precisely, we target to consolidated wholly obtainable evidences on how urban cities modify the relationships

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amongst green spaces and health. In addition, we confidence that the finding is adaptable into community health policy, urban plan recommendation, and upcoming researches need. Now, we defined urban city as the attendance of condition in further rural area or other urban area. Definitely, other urban area tends to have high level of populations densities and impermeable surface and healthier higher-speeds internet accessing, community transportations service, health caring facility, job, and business, amongst other service [86-90]. To this reason and other, the urbanizations could have positive and negative impact on humanity health [91-100]. Depend on the frameworks presents in Figure 1, that adapt from foundation works, we assume that green spaces-health association is strong in further urban area than in lesser urban area. This theory is bases on prospect that the condition for the mechanism by which green spaces improve healthy is sturdier and more omnipresent in city. Hence, urban dweller may have extra gains from green spaces than resident of lesser urban area. We focused on 8-physical fitness effects; include cardiovascular-relate, birth outcome, obesities-relate, respirational relate, diabetes, humanity, overall physical fitness, and cancers. We diagnose the greater values in study the psychological health benefit of green spaces. Nevertheless, we essentially limits our present focusing to the outcome surrounding the furthermost recognize outcome that shows inequality established on socioeconomic state, races/ethnicities, genders, and other identity [101-110]. Over 100 healthy outcome of green spaces experience have been identify [111-120], so we targets smaller subsets with greater communal health reputation to limits the pertinent keyword to a sensible numbers. Consequently, this outcome is amongst the utmost serious target for environment health intervention. In search of our main goals, we examined two other aims. A secondary objective of present reviews are to define the study and researches approach to operationalize green spaces, urban cities, and effects modifications test that have examine how urban cities impact the green spaces and healthy relationships. The finding from these objectives is intend to classify the gap and limitation in the literatures and informs upcoming researches. The tertiary goals are to inspect how this study methodology impacts the controlling roles of urban cities on the green spaces and healthy relationships, if at all. We imagine this finding to more advance a mechanistic sympathetic of the green spaces-fitness relationships. Many articles have been reviewed to produce improved guidance in health fitness in green places.

2. Methods

2.1. Articles Identifications

These reviews are amount of large projects that methodically observed effects modifier in the relationships among green spaces and healthy fitness. For whole descriptions of the large project searches processing is as in [121]. In brief, we conducts separated keywords search on 2019, for every of eight healthy outcome in five database include Scopus, CINAHLs, Cochrane, PubMed, and Webs of Sciences. Every article publishes or in press through 2019 was qualified for inclusions. Research papers were comprised if they reading the associations among a health outcomes of interesting and green spaces experience or covered– the definitions of green spaces was not pre-determine nonetheless gone up to the discretions of the study author; and the analyzes of probable for effects modifications by urban cities irrespective of how urban cities was operationalize – here, “effects modifications” refer to the change in effects level or

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directions of the exposures of interesting (green spaces) on the outcomes (fitness) nevertheless does not conclude interconnection, like when talk about "effect of" rather than "association among" green spaces experience on fitness [122]. Additionally, the founded of either the complete studies populations or subsamples show a useful relationships among green spaces and healthy; and were publish in English and a peer-review journals. Concerning to third inclusions criteria, this expected that the studies findings positives associations among green spaces and fitness in the complete samples but no important association among these variable in more urban city and lesser urban layers will have been comprised. These theoretical situations could classify as not differences among further and lesser urban area. Four writers selected every titles, abstract, and fully texts for inclusions. They resolve disagreement by agreement. We follow wholly Prefer Report Item for Systematic Review and Meta-Analyze standard [123].

2.2. Data Extractions

Comparable to articles identifications, four novelists extracts the data and resolve disagreement by agreement. We follow standard from another review and enter multiple row into our data database for similar articles if it include more than one relevant analyzing [124-130]. We enter multiple rows if the researches designs, health outcomes, or green spaces measure differs among analyze. Extracts data involved samples characteristic, study designs, units of analyze, health outcomes measures, green spaces measures, urban cities measures, effects modifications test, the basis for test effects modifications by urban cities, and result of effects modifications test by urban cities. Unit of analyzing were coded rendering to the populations sizes of study area: Separated, package, blocks, neighborhoods, districts, and cities. Green spaces measure was classify through class, areas, distances, and resolutions. Three green spaces measure was use: green land covers, free green spaces, and reserved resident yard and garden. The first class reference what numerous scholar named green spaces and encompass any setting with lives vegetation [131]. Measure assign to this class were those that use satellites-derive indict, like the normalize differences vegetation indexes (NDVIs) or lands used and lands covers-derive (LULCs) dataset to estimates the analysis of natural area with physical areas or whole "greenness" of an areas [132]. Measure assign to the other two classes include public green spaces and garden is describe as green space with exact purpose and user. The areas of green spaces describe whether measure were distances-base, containers-base, or others. The distances and resolutions of green spaces depicts the distances from physical point in which measure were calculates and the pixels sizes of raster data. Urban cities measure was records and coded as densities-base, self-reporting, or a typologies schemes [133]. Densities-base measure includes population's densities or residentially densities. The typologies schemes identify measures that were binary or ordinal variable with mutual exclusives division. The self-reporting measures indicates what levels of urban cities a study participant self-identify. No measured of lands covers were identify in the primary articles screen, and no correspond codes was assign. In comparisons, government agency often relied on typologies scheme that combined densities and another metric. As examples, urban–rural classifications scheme in the US normally used a combinations of population's sizes, densities, commuting threshold, and commuting flow see [134]. In contrasts, the reports by the UN show that another country used diverse definition of

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what is "urban" see [135]. We use the classes afterward a initial investigations of the urban cities measure use in the involved study. We determine what code will be useful for references in upcoming researches in different physical context. Effects modifications test were coded as stratify or interaction [136]. Stratified analyze refers to relationship among experience and outcomes variable being assess through subgroup define thru a baseline/demographic factors. Interaction refers to when exposure and baseline/demographic factor are involved together as interactions terms in a statistic models. We record the ration for analysis effects modifications thru urban cities qualitative. Pattern in the data were identify via sole authors by use inductive approaches [137-140]. Result of effects modifications test via urban cities were retrieve for every analyzed and coded as integer. Analyze with green spaces display further protecting association in additional urban area were assign scores of one. Analyze with green spaces viewing extra protecting association in lesser urban area were assign scores of minus one. Analyze with green spaces display non-significant difference among further and lesser urban area were assign scores of zero. For interactions test, we coded that there was a differences in the effects of green spaces among further and lesser urban area when the interactions terms was important ($p < .05$); then, we assign a scores of zeros. For split-samples analyze, we assign scores of (1 or – 1) in any of the subsequent case: one sample show important protecting association, and another did not; both sample show important protecting association, nonetheless one sample association were further protecting and their 95% confidences interval did not overlapping those of another samples. Then, we assign scores of zero. When stratified analyze involved extra two group, we examine whether there were difference in protecting association above or below the average.

2.3. Methodology Accuracy of Involved Study

We evaluate the accuracy of every article methodology with the tools used in the design to review the excellence of epidemiologic study. Four classes were relevant for the study involved in this paper reviews which comprise the study designs, green spaces experience, used and justifications of confounder, and statistic analyzing. We assign score to every row of data by use four classes and average all marks to conclude the last scores. Study within manifold rows of information were assign the similar biases scores for all row. We detected not differences in the probable for methodologic accuracy across the analyzing in individual study. The Study was eventually assign one of below level:

(≥81% of class scores)…… Excellent
(60–80%)…… Good
(40–60%)…….. fair
(20–40%)……. Poor
(poor, and very poor)…….. Very poor

3. Result

3.1. Study characteristic

The number of (30) articles was met our inclusions criteria as in [141-170]. Reports in these articles were 57 relevant analyzing as show in Figure 2. Study were practically completely conducts in European (N = 18, 49% of analyzing) or North American (N = 13, 34%). The regular samples sizes for individual-levels study was around 375. In large unit of analyzing, the

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regular numbers of individual studies was around 35,500. Wholly study use observation design, and 77.2% were cross-section. The massive popular of analyzing is 84.2% use individual as units of analyzes. At smallest two analyzes were recovered for every of the eight healthy outcome of importance. Practically, three-in-four analyzes (73.7%, N = 42) use green lands covers measure. This involved complete inexperience, lands covers dominate by vegetation, and trees covering covers. The remnants of article measure community green space – specifically park and another openly available green space with no details provide by studies author. Furthermost green spaces measure were distances-base in its place of containers base (76% vs. 20%, individually). Distance in which green spaces was measure range from (50 to 3,000) m (M = 774, SD = 816). The utmost commonly distances was 500 m (N = 11, 28%). Around 80% of objectives green lands was covers measure had resolution among (2 and 30) m^2 and data from one calendars seasons. NDVI was use in utmost of this analyzes (N = 31, 78%). Two analyze use an objectives calculations of distances to the nearby green spaces of a definite types, counting the close parks and recreation areas. Four analyzes use self-reports measure of green spaces: green spaces shortage; perceive distances from the homes to the close forest, report times in green space, and photograph. Analyzes compare two level of urban cities around partial the times (57%, N = 32) as illustrated in Table 1.

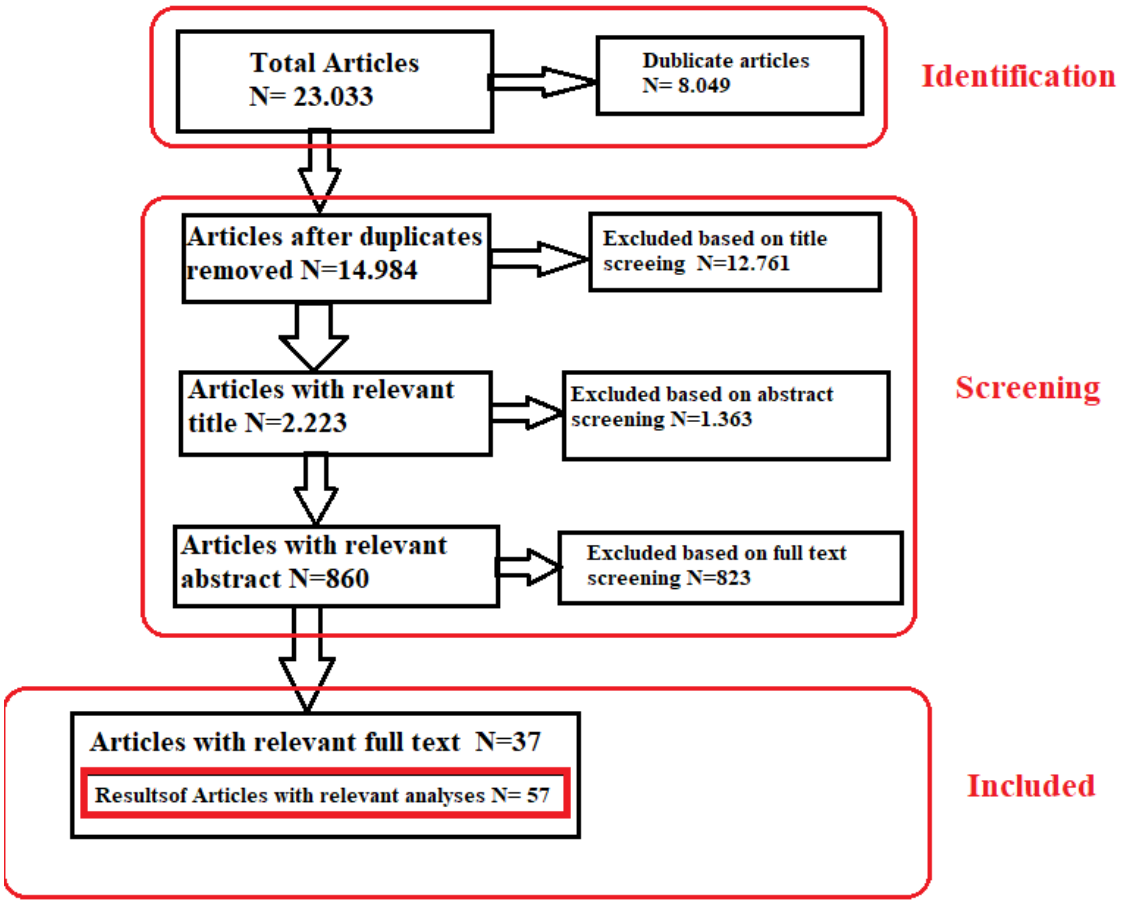

Figure 2: Articles identifications processing

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Table 1: urban city measure use in involved analyzed (N=57)

Measures	N	Percentage %
Typologies schemes	31	55
Densities	23	41
Self-reports	3	6
Urban city level		
2	32	57
3	12	22
4		
5	9	16
>6	1	2
NA	1	2
1000 to 2000 unit/km^2	4	13
2000 to 10000 unit/km^2	1	4
>10000 unit/km^2	3	10
Housing densities		
1,500 unit/km^2	7	22
Averaged unit/km^2	2	7
Whole housing	3	10
Not quantifiable description of level	12	38

These levels were usually base on typologies scheme or populations/resident density; merely three analyzes use self-reports measure of urban cities. Approximately wholly of two-levels grouping of urban cities compare urban and rural area; simply once did a two-level groupings compared urban and residential area. Two-levels grouping is describe in one of three methods: cut point that separate the level by populations/resident densities; averaged populations/resident density in every levels; or whole populations/resident unit in every levels. In the articles with populations densities cutting point, city vs. country was separate at a wider ranges of value: (1,000 to 19,000) peoples/km^2. Wholly study with covering densities cutting point use 1,600 unit/km^2 to differentiated city from country area. Around one-third of analyzes with two-levels grouping did not described the level in any measurable manners. Analyzes is with bigger number of urban cities grouping utmost common use three or five level. Stratify analyze were the best use approaches to investigation for effects modifications of 86.0% of analyzes as show in Table 2. Multiplication interactions term were use in 24.6% of analyzes, chi-square test were use in 5.3% of analyzes, and numerous approach were use in 15.8% of analyzes. Merely one

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articles reports important protecting association among green spaces and bodily fitness in the whole samples and completely non-significant association in stratify.

Table 2: articles to examine the effects modifications

Articles	**N**	**Percentage %**
Single article		
Stratify investigation (city vs country subsample)	40	71
Multiplicative interactions	8	14
Numerous articles		
Stratify investigation and Multiplicative interactions terms	6	11
Stratify investigation and chi-squared investigation	3	6

We identify three designs of ration for analysis the effect of urbanizations on the green spaces and healthy relationships: due industries, urban–rural difference, and explanation past finding. Due industry describe when author cite past works that found difference in healthy outcome across level of urban cities, explain that such difference can occur with not citation or explanations, or only list urban cities as one of numerous probable modifier that examine. We identify these patterns in 56% (N = 20) of papers. Urban-rural difference relate to author describe difference in city resident's lifestyle, experience, and health compare to their lesser urban counterpart or difference in the strengths of the pathway by which green spaces impact health in urban and lesser urban area. We observe these patterns in 44% (N = 16) of the articles. Latest, the patterns of explain past finding was identify in a single articles, that required to understands the unexpected positives relationships among green spaces and increase humanity in a priors studies.

3.2. Where green spaces matter greatest

We observe trends toward green spaces whichever matter similarly in urban city and lesser urban city area or towards green spaces matter further in urban city area than lesser urban area as show in Figure 3. The chi-square tests shows that the numbers of experiential finding for every of this outcome was diverse than the numbers of expects finding. Specially, the observe numbers of finding preferring more urban area have strong association was higher than predictable (22 observe vs. 19 probable).

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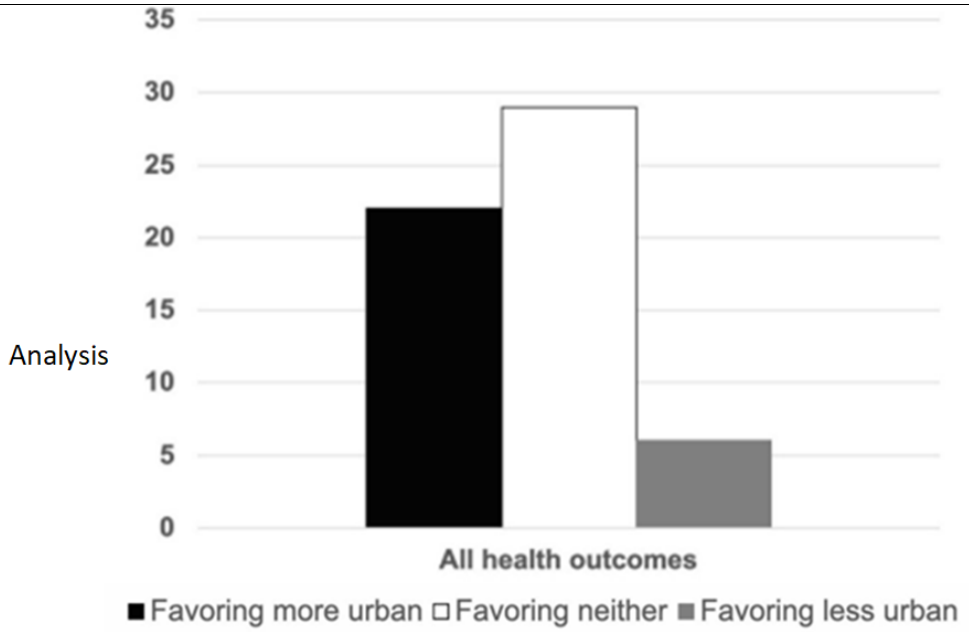

Figure 3: urban city area than lesser urban area

In contrasts, the observe numbers of finding preferring lesser urban area have strong association was lesser than estimated. The experiential numbers of finding preferring no difference base on urban cities was also greater than estimated. Generally, between the analyzes shows difference green spaces-health association among more urban and lesser urban area, more analyzes shows that green spaces had strong association with health in more urban area. The trends towards more urban area show strong association among green spaces and health was more apparent for definite health outcome as show in Figure 4.

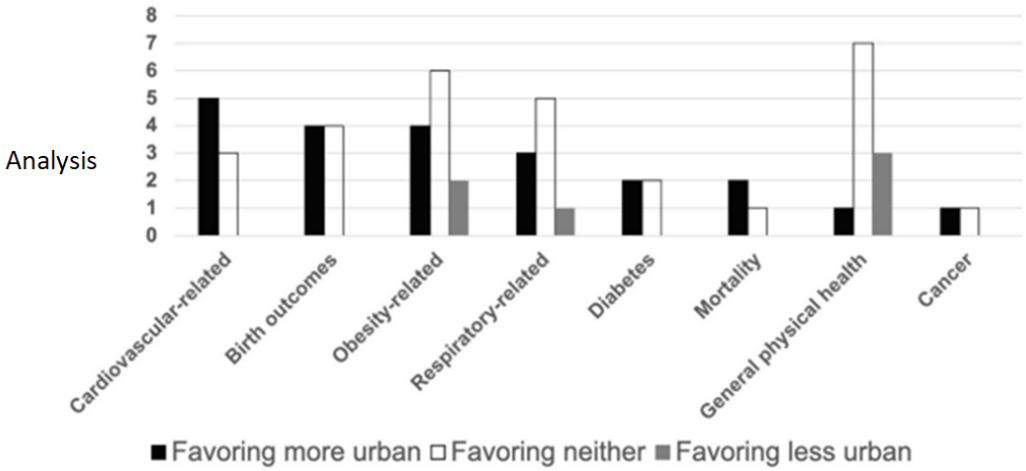

Figure 4: urban area show strong association among green spaces and health was more apparent for definite health outcome

Furthermost cardiovascular-relate, births outcome and humanity endpoint show that green spaces had strong protecting association in urban area. No finding with this healthy outcome show lesser urban area had strong protecting association. In contrasts, greatest finding for obesities-relate, respiratory-relate, and common physical fitness endpoint show neither more

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nor lesser urban area had strong association. Any other inferential statistic did not performs in this paper like chi-square test on this subsample or other because of the limits samples size and smaller number of analyzing within definite subsample.

Green spaces measure show difference in association through urban city and rural area as show in Figure 5. The large amount of investigates with green lands covers measured shows more urban area had strong protecting association than lesser urban area, while a small amount of communal green spaces investigates show these result (41% vs. 34%, correspondingly). Not investigates with communal green spaces supports lesser urban area has strong protecting association than more urban area. In divergence, 15% of investigates with green lands covers shows strong protecting association of green space in lesser urban area.

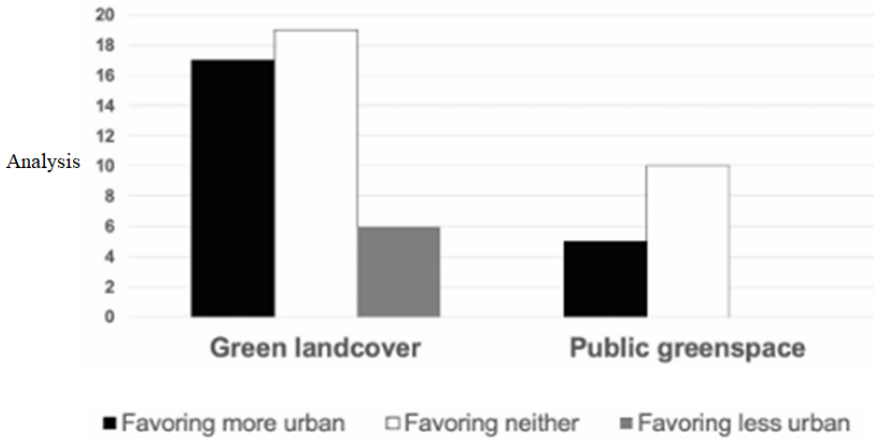

Figure 5: Numbers of finding show green spaces association is strong via measures

Distance in which green spaces was measure also influence its association with healthy in urban and rural area as show in Figure 6. Investigates with green spaces measure in small distance from the homes are shows strong green spaces-healthy association in more urban area than in lesser urban area. The larger numbers of examines with 500 m distance shows that extra city area had strong protecting association than lesser urban area compare to examines with greater distance.

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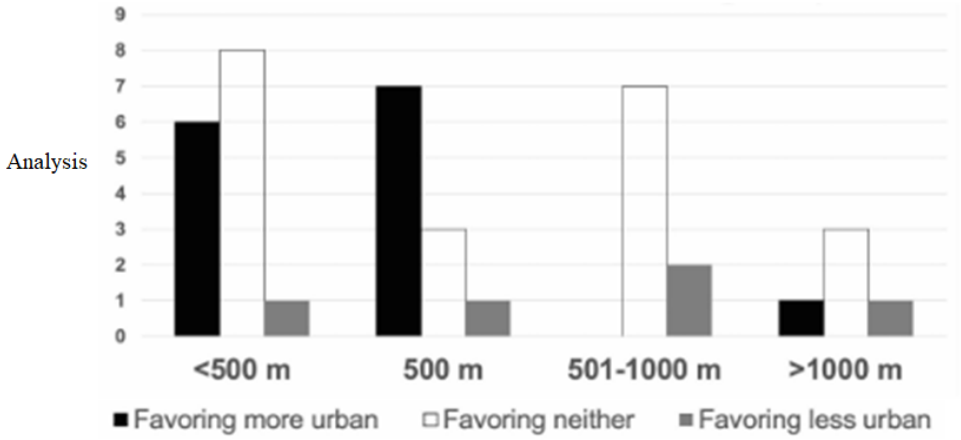

Figure 6: Numbers of finding show green spaces association is distances in which it is measures

The considerable shared of investigates with green spaces measure up to 500 m from homes similarly shows strong protecting association in more urban area than lesser urban area (40% of this analysis). In divergence, the definite urban cities measured did not variation the effects modifications of urban cities in the green spaces-healthy relationships as show in Figure 7.

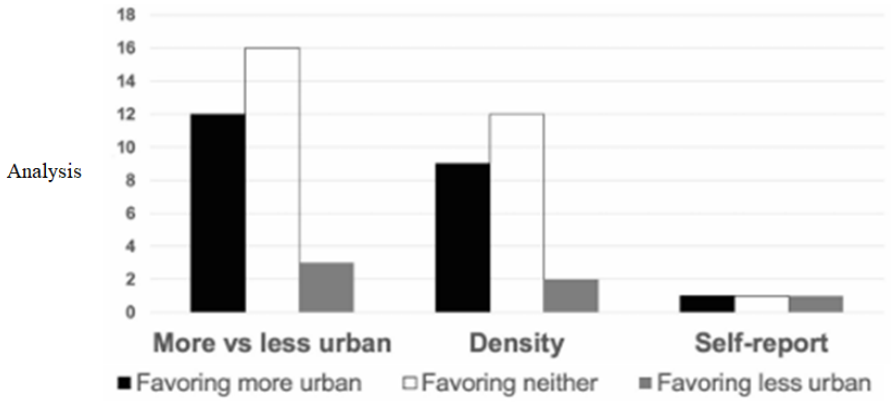

Figure 7: Numbers of finding show urban cities measure association is strong via measures

Typology scheme and density-base measure shows around equal ratio of analyzing preferring more urban area have strong association (39% vs. 38%, correspondingly). The investigated with self-reports measure of urban cities shows equivalent level of supporting for every of the three conceivable outcome of effects modifications test. Diverse effects modifications test yield deviating result concerning the impacts of urban cities in the green spaces and healthy relationships as show in Figure 4D.

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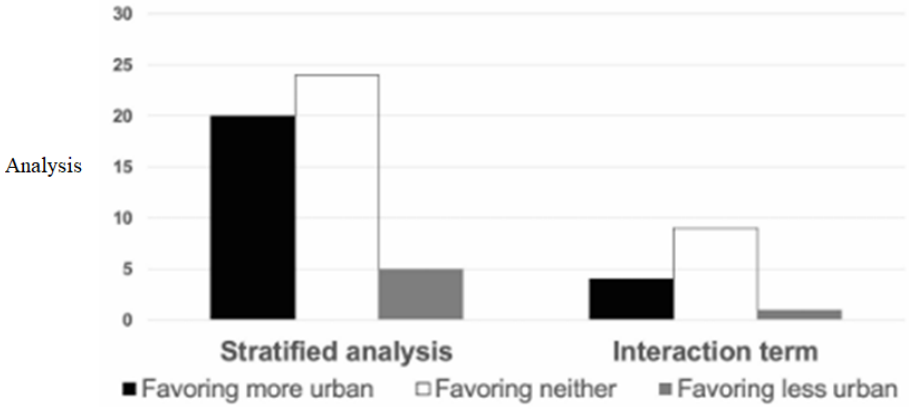

Figure 8: Numbers of finding show green spaces association is strong via measures and analytic approaches

The larger proportions of stratify investigates preferred more urban area have strong protecting association (N = 20, 41% of investigates with these approaches). In divergence, a small proportions of investigates with interactions term show this results (N = 4, 29% of investigates with these approaches). Though, like the finding for another comparison reports exceeding, utmost investigates with stratify or interactions term show that the green spaces-healthy association not vary in more vs. lesser urban area.

Figure 4: finding number shows where green spaces association is strong via measures (A), distances in which it is measures (B), urban cities measures (C), and logical approaches (D).

3.3. Methodology Accuracy

Fair study was N = 11, 30% of article or respectable methodology accuracy was N = 26, 71%. Public reason that investigates receive low score was observation studies design and cross-section data. Sympathy investigates limits to a subsamples of analyzing N = 38 with improved methodology accuracy. Comparable to the key result, we observe trends towards more urban area shows strong protecting association among green spaces and healthy, even though greatest investigates shows that such association not differs base on urban cities. Different the chief result, moderately fewer investigates with green lands covers measure shows strong association for further urban area; furthermore, different in the chief result, utmost 500 m distances base measure shows that neither further urban nor lesser urban area had strong association.

4. Discussion

This review merged wholly obtainable indication on how urban cities modify the relationship among green spaces and healthy fitness. We establish 30 articles that examine these relationships. Our major goal is to recognize where green spaces matter the utmost, specifically in further urban or lesser urban area, to choice health outcome. This include eight physical fitness outcome, containing cardiovascular-relate, births outcome, obesities-relate, respirators relate, diabetes, mortalities, overall physical fitness, and cancers. This outcome shows important inequality base on socioeconomic status, races/ethnicities, genders, and another identity in the world and global. Hence, this outcome was essentially target for conservational

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healthy intervention. Communally, the comprised papers advised that, amongst the study displaying difference green spaces-healthy association by urban cities, green spaces tend to matters utmost in urban area. After 20 investigation reports urban area had strong protecting association among green spaces and healthy lesser urban areas, while merely six examines shows the opposite. However, the number of examines (N = 29) shows not difference among additional urban and lesser urban area. The opportunity of green spaces signifying further in urban area can be clarified by urban persons have more to gaining from green spaces than persons who lived in lesser urban area. Green spaces are in general recognized to acts on healthy fitness over three pathways domain: decreasing harmful, reinstating capacity and construction capacity. The condition that is required but not adequate for certain of this domains pathway. The conclusion of another reviews article moderately supports the finding of these reviews. Though, we are ignorant of previous systematic review comparable to our works, at least one evaluation that conclude green spaces matter further in urban area. In a history reviews, discussed that the healthy fitness benefit of green spaces may be strong in urban area than lesser urban area for humanity. Two another evaluation have determined that there is an inadequate evidence to select whether green spaces matter other in urban area than lesser urban area. Though, the numbers of current articles on green spaces and healthy fitness is quickly growing. Numerous articles on green spaces, healthy, and urban cities have been available and 40% of the papers comprised in our reviews were publish after 2020. Hence, our finding might contrast from earlier review due to these extra literatures. Additional main differences among the existing and earlier review are our new coding schemes to produce the finding of effects adaptation test, which reflect our careful effort on investigative whether urban cities moderated the association among green spaces and healthy fitness. Previous effort has defined how urban cities impact the green spaces and healthy fitness relationships in a description formatting without clearly aiming on the probable moderations effect of urban cities.

5. Conclusion

The proposed reviews combined the accessible confirmation on whether green spaces show further protecting association with bodily fitness in extra city area comparative to lesser urban area. The cooperative confirmation from 37 papers proposes that though the range of examines show no difference in the protecting association among green spaces and physical fitness, considerably more investigates shows strong protecting association in urban area than in lesser urban area. This finding offers certain helpful confirmation for community health strategy and urban preparation professional looking for to made city comfortable for wholly dwellers. The global disaster of environment variation will be improved if further persons transfer to housing and rural area to search for green spaces and protection throughout viruses since alive away from city could increases carbon footprint. We confidence that provided that confirmation to policymaker and the community about green spaces have strong protecting association with fitness in urban area could leads to a larger gratitude that health alive in city could be promising.

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