Comprehensive 5-P framework for active ageing through ecological approach: an iterative systematic review

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Azadeh Lak a_lak@sbu.ac.ir
Shahid Beheshti University
Corresponding Author
ORCiD: 0000-0001-8475-1781

Parichehr Rashidghalam
Shahid Beheshti University

Phyo K Myint
University of Aberdeen

Hamid R Bradaran
University of Aberdeen

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Abstract

Background "Active Ageing" is an inclusive term thus has been defined from a variety of aspects in different domains throughout the literature. The aim of this review is to identify the aspects which play significant roles in building this concept in an ecological approach. Methods We searched seven online databases, JSTOR, Pub-Med, Web of Science, Google Scholar, ProQuest, EBSCO, and Scopus, from 2002 to 2018 (from introducing this concept by WHO) for both qualitative and quantitative articles in only English language. Two reviewers independently found the related articles using the search terms “active ageing” and “built environment” and included both “ageing” and “aging”. Results Of 1337 records which passed the screening, 86 were eligible for the inclusion for the review purpose. A total of 15 themes were derived: Personal characteristic, Behavioral attitude, Land-use, Access, Physical form, Cityscape/City Image, Public open spaces, Housing, Social Environment, Cultural Environment, Economic Environment, Good Governance, Physical Health, Mental Health, and Social Health. Ecological themes of active ageing can be defined as the 5P model: Person, Processes, Place and Policy-Making based on the Prime aspect of health. Conclusions This study sheds light on the aspects of "Active Ageing" through ecological model while offering the significance of the multidimensional nature of active ageing micro (person), meso-(process) and macro-system (place and policy-making) based on health (prime) environments according to the relationships between person and environment at the individual, interpersonal and environmental levels for the future research and population ageing policies.
Background

Creating positive aspects of ageing life is an important factor in achieving health expectancy. In the societies and communities with an increasing number of older people, their contribution to the well-being of their families and themselves are of high significance. According to the UN (2015) the proportion of older people ≥ 65 years will skyrocket from 901 million (12.3%) in 2015 to 1.4 billion (16.5%) in 2030 (i.e. 56% increase). Active ageing is referred as ageing well [1], and according to WHO (2002), they will be able to sustain health and well-being if older peoples’ participation in activities increases. WHO has also described the goal of active ageing as the process of optimizing opportunities for health, participation, and security in order to enhance the quality of life as people age while noting that these policies and programs should be based on the rights, needs, preferences, and capacities of older people [2].

The societies which aim to provide opportunities for older people to take part in national schemes such as social security schemes, environmental and urban planning, health services, civil society, and legislation to name a few, are likely to reach the goal of active ageing. Active Ageing Index is the means to provide rankings of different countries based on their level in such societal measures as the participation of the elderly in the workforce or life expectancy [3]. This is perhaps why WHO (2002) does not interpret active ageing as a highly standard quality of life for a group of people as this term is not considered as a phenotypic description of an individual or individuals.

However, the term “active ageing” has been used to refer to different aspects in recent years [3]. For instance, several researchers classified and offered a
definition to the active ageing phenotype according to WHO among which are: good functional ability and fitness; and continued involvement in one’s family and/or peer group; the maintenance of positive subjective well-being; being in a state of good physical, social and mental health; and engagement with community throughout the ageing process. These have been proposed as key aspects that describe an active ageing phenotype [4, 5].

There are several ignored ecological aspects which are considered to be conducive to the concept of maintaining active ageing communities. Therefore, this study aims to provide to explore the topic with a new approach for the analysis of determinants of active ageing through the narrative review. The ecological approach considers ageing as an interplay between an individual’s functional age, adaptation and their physical and social environment [6] which link ageing to the respective concepts of urban design and service planning for disability and ageing. Such approaches are wide-ranging such as the creation of healthy cities, livable communities, walkable communities, universal design, as well as accessibility [7, 8]. Although all these notions aim for different goals, they commonly provide older people with essential elements for health e.g. accessible and affordable health and healthcare service, opportunities to stay active, etc., and social security e.g. home and pedestrian safety, neighborhood safety[9], community safety, transportation safety, financial security, affordable housing and services, etc., and allows active social participation and engagement activities e.g. through accessible public transportation, information services, recreational programs, social connections, volunteer opportunities, places to worship, etc. [10].

Thus, cities and urban environments must focus on their local conditions aiming for the health and comfort of the older people while acknowledging their impact. Cities,
enjoying their long-time experience of working with local communities and local problems, are also in the right position to satisfy these needs of ageing adults [11–13]. For this, there is a need to identify the particular factors contributing to the aspects of health in older peoples’ lives while understanding of the elements that would prohibit them from taking part in activities. Of major importance are mobility and independence along with identification and promotion of motivating factors to encourage these. This could lead to a lower level of assisted living conditions and dependency [12–14].

A review provides an analysis of research evidence according to the proposed questions with a specific systematic method to determine, select, and appraise the related primary research [15]. Therefore, in this narrative review, we define the ageing population as those individuals who are 60 years of age or over, and hope to cover the different international and cultural variations. We aim to offer an understanding of what dimensions contribute to elderly’s activities in place in regard to the ecological perspective through the built environment while providing suggestions for future research in ecological approaches to active ageing.

Methods

The method for this research was narrative reviewing a series of studies on the topic of active ageing while investigating the views data obtained wider evidence as the results of qualitative and quantitative surveys [16]. This led the authors to decide on the classification of the experiences, social contexts and views on active ageing as a common theme based on the ecological approach of the related articles [17–19]. Therefore, theoretical and empirical studies were also analyzed in order to merge (synthesize )the data as a narrative review [20]. In line with existing
literature, we aim for a group of goals as follows: defining concepts, reviewing evidence, analyzing the methodological issues of a concept as well as reviewing the theories [21].

2.1 Searching strategy and study selection

An iterative approach was applied in this study as a narrative review providing the authors with the possibility to revise the inclusion and exclusion criteria (Table 1), search strategy (Figure 1) and the main research questions after consideration of the evidence [20, 22]. Problem identification stage clarified the fact that despite ageing being a natural part of our life process, active ageing could be a positive concept towards a healthier concept rather than passive ageing. Therefore, studying active ageing also includes investigating the aspects and characteristics of the ageing potential as well as offering methods to improve human beings’ understanding of ageing [23]. The main question of this research was “what are the effective attributes in developing the notion of “active ageing” according to an ecological model?”

The literature search was carried out as the second stage of narrative review from August to October 2018 and updated again in January 2019. A total of seven online databases namely Pub-Med, Web of science ISI, Google Scholar, ProQuest, EBSCO, and Scopus were searched. The keywords used were “active ageing” and “built environment” and included “ageing” and “aging” “senior”/"seniors", "retirees", and "pensioners".

In order to provide an inclusive search strategy, a common review strategy of building blocks was applied while search items were categorized into concepts and later expanded with the synonyms through Boolean operators [20]. Another
approach used was Berry Picking which is commonly applied in the iterative search which has the clear benefit of allowing the search strategy to evolve from the information obtained throughout the process of review [24, 25]. Whenever a piece of new evidence is discovered, this review approach allows modification of the strategy based on the new evidence. In addition, the `drop a concept' searching technique allowed for the stacking of terms approach to be used by firstly combining all term/concepts of the review then removing the least relevant concepts to cast a wider search net [20]. The Boolean strategy [26] was utilized the inclusion criteria for which included “active ageing”/”active aging” in the title as well as the abstracts with the following terms: “model,” “definition,” “theory,” “structure,” “dimension,” and “attributes”. Then, after gathering the full studies, some terms were excluded in order to avoid overlapping, e.g. ageing, healthy ageing, successful ageing, and ageing well. The key searched terms were then classified into the following categories of ageing (active ageing, older people, elderly people), built environment (built environment, housing, capacity of building), and health outcomes (mental health, physical health, social health, wellness, wellbeing, disability, quality of life, comorbidity, functional limitations, disabled persons, mentally disabled persons) (Fig. 2).
Table 1: Inclusion/exclusion criteria for the selection of articles for this review.

| Inclusion                                                                 | Exclusion                                      |
|---------------------------------------------------------------------------|-----------------------------------------------|
| Selection criteria included the stipulation that only studies meeting the following criteria would be reviewed: sampling of community-dwelling older adults aged 60 years or older; assessments of health-related issues or component behaviors of the World Health Organization’s active ageing concept; studies that considered the environment or related concept as a potential correlate of health or activity; and studies that adopted qualitative, quantitative or mixed-methods approaches. | No Participants in residential area. |
| - the application of a stated theory or conceptual framework;             | - No Define or measure the built environment attributes. |
| - Included an English abstract or summary.                                |                                               |

2.2 Data extraction and quality assessment

The results were recorded into a Reference Manager database and the titles and abstracts were screened by the main reviewer (AL). The team members verified the records regarding their rigor and completion through secondary blind screening of 30% of the original 1500 records. Then, the studies which met the inclusion and exclusion criteria (see Table 1) were again checked and regular meetings were held to resolve the disagreement if any and discuss the review process.

2.3 Data analysis

Narrative synthesis along with "qualitative content analysis" based on mixed approaches of inductive and deductive was used for analyzing data through the identification of the themes emerging from the evidence [17, 18]. The steps of "qualitative content analysis" were organized according to Renz et al. (2018)
include of: "(a) preparing the data, (b) reading transcripts repeatedly to achieve immersion and obtain a sense of the whole, (c) making notes on the transcripts listing the different types of information found in the text, (d) defining the unit of analysis using themes as the unit of analysis versus linguistic units, (e) developing a coding scheme to organize data in a comprehensible way, (f) code all text, (g) make conclusions from coded data, and (h) describe and interpret findings"[27].

The aim of this study was to investigate the current body of research on ecological aspects of "active ageing". As defined by WHO, active ageing includes the following attributes [28]: 1) autonomy: controlling, coping and making personal decisions based on the personal rules and preferences, 2) independence, the ability to perform functions related to daily living—that is the capacity of living independently in the community with no and/or little help from others; 3) quality of life: an individual’s perception of his or her position in life in the context of the culture and value system where they live, and in relation to their goals, expectations, standards, and concerns. It is a broad-ranging concept, incorporating in a complex way the person’s physical health, psychological state, level of independence, social relationships, personal beliefs, and relationship to salient features in the environment [29]. As the age increases the quality of life the person becomes mainly dependent on their independence and autonomy as well as their healthy life expectancy. Positive subjective well-being, continued involvement in one’s family, peer group, and community, good physical, social, and mental health, good functional ability and fitness, are among the dimensions mentioned to define active ageing [4, 5].

The concept of active ageing is the result of several factors which help us identifying the subjects to risk ageing and active ageing at the same time. The
ecological approach was offered which focused on multiple effective levels and helps to factor physical activity in the total population and the elderly as separate groups [30]. This provides the authors with an inclusive approach in order to understand the effective factors on physical activity based on which influential interventions could be offered for behavioral change [31].

Figure 2 shows the study selection process and exclusions. Our search identified 1500 studies, and of the 92 articles were eligible to be included in this review. Of them, 48 articles included quantitative and mixed methods while the remaining 45 studies applied for qualitative methods and reviews. The two co-authors (AL and PR) performed independently data extraction, theme identification, and narrative summarization while discussions with the other co-author (HB) led to the resolved discrepancies. Data synthesis begins with an initial narrative evaluation of study characteristics (Table 2). Data synthesis is completed with data reduction and comparison.

| References | Definition | Codes | Sub-Themes |
|------------|------------|-------|------------|
| [7, 23, 32-35] | Age | Gender | Personal characteristic/determinants |
| | Level of education | | |
| | Ethnicity | | |
| | Residential tenure | | |
| | Marital status | | |
| | Home ownership | | |
| Factor                                      | Description                                               |
|---------------------------------------------|-----------------------------------------------------------|
| Household size                              |                                                           |
| Current driving license                      |                                                           |
| Employment                                  |                                                           |
| Eating and drinking habitat                 | [23, 36, 37]                                              |
| Family support                              | [23, 38]                                                  |
| SELF-CARE                                   | [23, 39]                                                  |
| SELF-PROMOTION                              | [23, 39]                                                  |
| Mutual-help                                 | [23, 39]                                                  |
| Self-esteem                                 | [23, 39]                                                  |
| Life satisfaction                           | [23, 40]                                                  |
| Travel behavior                             | [23, 41]                                                  |
| Cigarette smoking                           | [40]                                                      |
| Behavioral attitude/determinants            | [23, 42]                                                  |
| Alcohol consumption                         |                                                           |
| Practicing exercises/ kind/frequency/length of activity | [23, 42]                                                  |
| Reference | Description |
|-----------|-------------|
| [23, 34, 43-45] | The arrangement of activities and the impact between trip origin and destinations. Amount of activity in a given area. The proximity of different land uses. |
| [23, 46] | Service proximity |
| [23, 34, 47] | Public facilities |
| [34, 43, 45, 48-51] | Amenities and facilities, such as library, community center, local shops, traditional clinics, community outreach projects. |
| [52] | Facilities management |
| [53, 54] | Exercise, Sport, recreation facilities |
| [45, 55-57] | Connectivity and inter-linkages: Layering and sequence from private zone to community gathering zone and neighborhood. Directness and availability of alternative routes through a neighborhood. Directness and availability to different areas in a region, composed of street system, sidewalk network, pedestrian volumes, and directness of route. |
|          | | |
| References | Description                                                                 | Category                                    |
|------------|-----------------------------------------------------------------------------|---------------------------------------------|
| [7, 34, 37, 50, 56, 58–65] | The proximity of the home block and its neighborhood amenities Systems that provide connections between activities | Accessibility services |
| [32, 34, 43–45, 50, 51, 53, 55–58, 60, 61, 65–79] | Pavements and roads; safe pedestrian crossings Pedestrian infrastructure, good sidewalks, surface area of open space, | Physical Activity/ Walkable Environment/ |
| [41, 54, 55, 57, 60, 67, 73, 80–83] | Exterior and interior accessibility Ease of activities, convenience, disabled facilities, comfortable movement | Mobility |
| [7, 34, 59, 60, 62, 70, 73, 77, 81, 84] | Adequate and affordable public transport; bus stops | Transportation (public) |
| [45, 64] | The number of noticeable differences in a street; also defines the level of the complexity of an environment, and, thus, the interest in the pedestrian | Neighborhood Characteristics | Physical form |
| --- | --- | --- | --- |
| [45, 85, 86] | Lack of nuisance, free from crowds | Urban Block: density |
| [7, 32, 34, 43, 50, 65, 70, 77] | Safety: Traffic/speed, volume |
| [7, 43, 44, 46, 55, 56, 62, 87, 88] | Perceived safety, access to protection, environmental support, close environment satisfaction, care, and support from family, social support, and Medicare | Security: Crime/personal security/Fall Prevention Architectural Elements |
| [55-57, 81, 89] | Contact with nature, green spaces, parks, gardens, micro-climate | Access to nature and green spaces |
| [23] | Topography / slope |
|  | Perceived distance | Cityscape/City Image |
| [66] | Way finding, understanding, and legibility of directions | Legibility/Image |
| [32, 34, 45, 48, 50, 57, 65, 77, 87] | Attractiveness and appeal of a place | Perceived Aesthetic/environmental attractiveness |
|-----------------------------------|-------------------------------------|-----------------------------------------------|
| [34, 43]                         | Natural scenery                    |                                               |
| [34, 55, 59, 90]                  | Outdoor lighting                   | Street lighting                               | Public open spaces |
| [9]                              | Pedestrian Safety                  |                                               |
| [91]                             | Area of green and open spaces      |                                               |
| [92]                             | Recreation Public open spaces      |                                               |
| [45, 56, 57, 77, 87]             | Physical comfort: Cleanliness, visual attractiveness, | Cleanness/lack of Littering/vandalism/decay |
| [56, 66]                         | Maintain structural and planting quality, upkeep of scenic beauty | Sufficient maintenance and management |
| [58]                             | fresh air, free from noise and congestion | Pollution (air, visual, noise, litter…) |
| [56]                             | pleasant environment               |                                               |
| [45, 55-57, 59, 66]              | Outdoor seating/urban furniture/ spatial setting Seating area for rest, communal spaces, special seating, talking Spaces/ | Landscape |
| Reference Range | Category Description | Domain |
|------------------|----------------------|--------|
| [49, 70, 93, 94] | Universal design/ Housing quality variable | Housing |
| [9]              | Neighborhood Safety |        |
| [43, 49-51, 95]  | Residential density/density of housing |        |
| [72]             | Older Residential Care Facility |        |
| [58, 96]         | Outdoor gardens      |        |
| [97-99]          | Type of housing      |        |
| [46]             | Life expectancy      | Social Environment |
| [1, 36, 54, 60, 72, 74, 95] | Quality of life / wellbeing |        |
| [7, 14, 56, 62, 81, 100] | Community and social participation/interaction/ relation, sense of community, community building, sense of belonging | Social interaction/ network |
| [101]            | Happiness            |        |
| [46]             | Affordability        |        |
| [43, 46, 55, 62, 65, 81, 85, 102] | Ability to participate in economic and social activities (paid/volunteer work) | Social inclusion |
| [71]             | Social Inequalities  |        |
| [32, 103] | Social Demography |
| [43, 104] | Social democracy |
| [7, 33, 41, 44, 67, 81, 82, 85, 88, 105-108] | The sense of community ownership and involvement in site planning and management, social activities | Participation (in the planning, implementation and evaluation process, civic participation) |
| [37] | Social Class |
| [42, 53, 56, 65] | Social Support/ community life facilities and services |
| [42] | Education, learning, employment and volunteering, |
| [65] | Social capital/ social trust/ Social cohesion |
| [44, 55, 59, 82, 87, 89] | Religious activity | Cultural Environment |
| Forms of recreation, such as walking and other exercises | Cultural events/Rituals/social activity |
| Heritage, sense of place, the importance of local identity, cultural components integrated into the planning and management of the site | The sense of place: Place attachment/ place identity |
| Reference | Description                                           | Category                   |
|-----------|-------------------------------------------------------|----------------------------|
| [7, 42, 59, 88] | health care services | Economic Environment |
| [42]      | limited income/pension                                |                            |
| [42]      | insurance coverage                                    |                            |
| [32, 43]  | Socioeconomic status                                 |                            |
| [7]       | Affordable housing                                   |                            |
| [43]      | Car ownership                                         |                            |
|           | Economic security                                     |                            |
| [1]       | Homeownership                                         |                            |
| [23]      | Household income                                      |                            |
| [23, 43, 72] | Living situation                                     |                            |
| [23]      | Employment                                            |                            |
| [93, 109–115] | Effective collaboration and political commitment to the elder | Good Governance |
| [63, 72, 75, 114–116] | Managers /Independence and autonomy /Local Policies Planning and Governance | Performance orientation |
|           | Openness, transparency and integrity governance        |                            |
Disability

Physical Health

The sense of health, emotional well-being, relaxation and avoiding distress, happiness

Public Health / health environment

Incidence of disease

Pain feeling

Functional ability

Risk of institutionalization

Self-reported falls

Self-reported health

Physical activity

Activities of daily living

Genetic factors.

Body mass index  obesity

Sleep hygiene
[39] Personal hygiene

[23, 41, 59, 67, 90, 95] Personal esteem, autonomy, and empowerment, independence, self-efficacy, attachment to the place from stress; PE: positive emotions; AC: attention capacity; CC: cognitive capacity. Depressive symptoms Mental Health

Cognitive functioning

Psychological distress

Psychological wellbeing

Anxiety

Anger

Restorative activity

Spiritual activity

[55, 81, 117] Provide opportunities for learning, gaining knowledge Self-actualization

[41, 43, 72, 118, 119] 1) family, (2) work, (3) community involvement, and (4) social life Social Health

2.4 Identification of studies

Qualitative and quantitative data were extracted from one of the mixed method articles (e.g. Barnett, et al. (2017)) while the other article was used for its
qualitative data, as it was not adherent in its data. In order to apply the approach of iterative search, some other articles underwent screening following key author searches, reference search, and citation search. Then the full studies were analyzed based on the inclusion/exclusion criteria as shown in Table 1. While the lead author (AL) organized the data extracted from each study in larger sub-themes and themes, the other members of the research team verified the process.

Results

A matrix was offered which included an outline containing the year, population, country, research method and aspects of active ageing concept (Table A – B / Appendix). The eight articles at the end of the process were published during the time period from 2002 to 2018 among which a great number were recent (e.g. Ko & Yeung (2018)). Also, most of these articles were placed in the U.S. while most of the quantitative ones used either surveys or second data analysis as well as follow-up methods. However, quantitative studies most frequently focused upon social engagement, physical and mental well-being and built environment while qualitative ones emphasized life satisfaction. Figure 2 demonstrates the flow chart adapted from Preferred Reporting Items [28, 120].

3.1 Thematic analysis

Different aspects of active ageing based on "qualitative content analysis" were coded and categorized during the process of data analysis the results of which are shown in Table 2 in the form of codes, sub-themes, and themes through qualitative content analysis. Different aspects have also been presented as summarized in a matrix which consists of 15 sub-themes and 5 themes called 5P model as follows: person (personal status), process, and place (built environment), policy-making and
prime as shown in the ecological model demonstrated in Figure 3. Below, themes that were emerged from the data while applying the quotes and statistics of the final group of studies were described in more detail.

3.2 Themes

Person
One of the core themes is “person” which can be divided into two sub-themes: personal characteristics and their behavioral attitude. Most studies conducted on active ageing provided an analysis of the effects of personal aspect including health, age, shared genetic attributes, educational level, personal socio-economic status, ethnicity, self-efficacy and exercise history [23]. In addition to this, many studies included diet and lifestyle factors which are related to the person’s behavior such as adoption of a balanced diet and food restrictions [40]. These restrictive diets and eating habits appear to be aimed for a balance between the imposition of the ageing physique and the limitations resulted from disease and sickness. Therefore, in order to maintain active ageing, a healthy diet must be considered as a major component for older people to provide themselves with strong levels of health and well-being leading them to the possibility of a different experience at maturity [40]. Another component in relation to behavior aspect to maintain active ageing is the attitude towards these behaviors because it can be modified at any point leading to a considerable increase in active ageing [40]. Therefore, several studies found that those elderly who have never smoked or drank had a considerably enjoy active ageing compared to those with such habits [40]. Evidence also suggests that physical activity is a significant factor in active ageing [23, 40].

Prime
The ecological model described by Stocks in the context of Healthy Environments is a broad framework which takes into account the physical environment and the
psychosocial environment [121]. The proposed ecological model demonstrates the functional relationships between the ageing person and the micro, meso, and macro-system levels of the environment along with the unstable equilibrium between environment and individual competence in very old age [120].

“Prime”, in this narrative review, is a reflection of health and components within the concept of health namely physical, mental and social health. According to WHO definition, health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity [122] which shows that several factors must be taken into account in order to grasp the idea of health which could include biological, social and psychological factors, to name a few.

The environment includes the natural and the man-made components alongside each other which significantly affects the health state of an older person. Strong evidence supports the fact that living in an environment of low quality results in decreased physical health, associated with high prevalence of degenerative disease, incidence of falls, cardiovascular mortality and reductions in longevity and increased disability, poor quality of life and poor self-reported health [23, 37, 44, 55, 56, 59, 69, 79, 89, 90]. Several mental health issues were also examined in the literature including depression, anxiety, anger, psychological wellbeing and cognitive functioning (mental processing, speed, and working memory) [23, 55, 59, 67, 81, 89, 90, 95, 117]. Social health [100]and well-being literature, on the other hand, focuses on the quality issues such as interpersonal relationships between the members of society and the amount of their involvement in their community. Several studies conducted on social well-being were assessed as a result of which it was found that in order to propose the level of social well-being for a group of people their performance must be studied in the following areas: (1) family, (2)
work, (3) community involvement, and (4) social life or sociability of individuals (e.g., friendships) [119].

However, community health and psychological health are the results of the efforts contributed by epidemiologists and environmental psychologists which include the sense of community identity; community empowerment; social capital; and culture [118].

**Process**

“Process” as the core ecological theme in active ageing includes the three sub-themes of social, economic and cultural environments which are significantly important in the lives of an ageing older person as these can be barriers for their life activities and thus health outcomes [23]. We focused our literature search on those activities in an active ageing policy framework by WHO which outlined key items as physical, social, cultural, civic, spiritual and economic activities [2]. Many researchers have decided to study the role of social environment which includes proximate social networks, social capital (norms of reciprocity and trust) and incidental social interactions [23]. Also, the important components of social environment that affect an increased active ageing include different social contacts, increased social involvement, wide social network, living children, ethnic homogenity, increased sense of neighborliness, increased literacy, increased social and economic status, increased workforce involvement, time spent with friends as well as an age-specific community [1, 7, 32, 33, 36, 37, 42-44, 46, 53-56, 60, 62, 65, 67, 71, 72, 74, 81, 82, 85, 89, 95, 102-108, 123].

There are some specific characteristics of the social environment that necessitates the elderly to meet specific demands leading to sub-optimal active ageing. These may include family’s financial problems, a partner with health problems, unrealistic
expectations from the person themselves to their friends and families, weak social and economic status of the area which is recognized as economic environment [1, 7, 23, 32, 42, 43, 72, 80, 88]. In addition to these, there is also the cultural environment which consists of religious activity, cultural events/rituals/social activity and sense of place [44, 55, 56, 59, 82, 87, 89]. We found that there is strong evidence to support a powerful and supportive social network enhances the well-being and longevity of the elderly in society. However, the composition of this supportive network may differ from one society/person to others [23]. The extent of poverty is also among the commonly mentioned factor that affects the activity involvement of the people. Yet, several studies maintained that lower social and economic status of an area is linked to the physical activity of individuals which of course, as later mentioned by the authors, maybe the case due to these peoples’ need for work and transportation. In fact, active ageing includes social, cultural, civic, spiritual and economic elements, which potentially contribute to health and wellbeing in later life [2, 23].

**Place**
The theme of “place” consists of land use, physical form, housing themes, access, public space quality, and city image/townscape. There are several reported environmental characteristics which enhance the elderly’s well-being including the proximity to and density of public open space and recreational facilities, high-quality facilities (social and leisure facilities, age-appropriate facilities), peacefulness, cleanliness, safety of public areas and street crossings, frequent rubbish collection, access to health services, transport availability, closeness to shops and places for walking, living in a retirement village, living in a hillside area, living in an area with high rainfall and living in a residential environment [23] and
lack of Littering/vandalism/decay[41].

Furthermore, we identified literature which assessed features of “place” that effectively contribute to active ageing. These included measures of land use characteristics (area deprivation or poverty, neighborhood degradation) [23, 34, 43, 44, 46-53], physical form (neighborhood degradation, accessibility to services and facilities, accessibility of public greenspace, walkability or pedestrian friendliness) [3, 7, 32, 34, 37, 43, 44, 50, 51, 53-81, 83, 84, 124], physical form as security of perceived crime and anti-social behavior, safety to traffic conditions [7, 32, 34, 43, 44, 46, 50, 55-57, 62, 64, 65, 70, 77, 81, 85-89, 125], quality of public space [23] as aesthetics and architecture, landscape (lighting and furniture) [34, 55-59, 66, 77, 87, 89-92], pedestrian-friendly features and availability of benches/sitting facilities[41], trip hazards in the home and neighborhood, home and environmental adaptations, climate and topography [23] along with favorable physical attributes such as trees and green areas which provides a sense of well-being while supporting resilience. Other positive factors include favorable street design, access to public transportation system as well as several retail outlets which would motivate people for more community involvement which provides a strong supportive social network for them while encouraging more physical activity [10, 34, 55-57, 59, 66, 77, 87, 89-92]. Recognizing such the diverse kinds of environment for careful analysis helps the assessment of home or care centers, the typologies of land use including rural and urban uses, categorization according to population density, defining areas based on time/distance, defining the neighborhood by its members. Interestingly, we found most of the articles in this review, however, provided the researcher-based definitions of a place as-built environment [23, 43, 49-51, 58, 70, 72, 79, 93-99].
Policy-Making

Studying environments in the previous body of literature also included government-defined administrative areas as census tracts or postal codes [23] which focused on the key concepts of tolerance, fairness, social justice and good governance (Effective collaboration and political commitment to the elder Performance orientation, Openness, transparency and integrity governance, Equity/Inclusiveness) [63, 72, 75, 93, 109-114, 116, 126, 127] as necessary elements in sustainable development of urban planning. While physical and social environments are both important aspects for the elderly’s health state, favorable governance and planning of the environment are also of great significance in building an age-appropriate community. For this several models have been proposed to date. However, the results show that consensus planning using meaningful community involvement is significantly needed for these complex areas. Collaborative governance efforts with different players and sectors through the stages of building a community are also of great importance as the public was considered as a body to consult with rather than active members in creating knowledge, space or governance centers [128].

3.3 Study quality

A considerable number of the included articles provided clearly set out objectives and methods compatible with their aims of the research. We provide comprehensive details of study quality in Appendices. In brief, since many of these articles applied a self-selected sampling the findings, the results were hugely influenced by their selection and information bias which could affect their internal validity and, probably, the quality of quantitative studies and, to a lesser extent, qualitative studies. In addition to this, there were some observational studies which could not
be considered as transferable and generalizable in their findings due to their small sample sizes and specific methods used in these studies. Due to this heterogeneity, we provide narrative review encompassing all relevant literature to derive themes to accommodate smaller qualitative pieces of work which may have specific implications to international communities, small or large, with diverse societal, cultural, religious belief systems.

Discussion

This narrative review systematically conducted with the aim of defining the concept of active ageing based on an ecological model. Based on our findings, a 5P model based on five themes including a person, prime (health), process, place, and policy-making as the main framework of an ecological model of active ageing, along with 15 sub-themes developed. This framework provides the notion of the active ageing concept as Multidimensionality, Multilayered (environment) and Contextual concept from an ecological standpoint. Several results were obtained the first of which included the specifications of the ageing sample of the previous research most of whom were about 65 years old while, based on WHO (2002), ageing is defined from 60 years of age and older. In addition to this, the age of the sample members in different studies varies considerably which deters the data comparison while not having a mutual base for a functional definition of this concept.

The Multidimensional concept of active ageing does not merely focus on the physical activity of the older person alone, instead, it consists of individual, social, physical and policy-making and environments with regard to physical activity, health, and the context in which such activities occur. This is in fact in line with the previous body of research considering active ageing as a multidimensional concept
The findings of this study according to the multilayered environment nature of active ageing represents a notion which begins with an individual layer (person) which includes individual characteristics and behavioral attitudes, social or physical environment layer and higher-level like policy-making environment. It is important to note these are not separate but closely linked and all elements need to function harmoniously to achieve active ageing in the context of societal, cultural and religious belief systems. Indeed, this concept represents an ecological model [47, 129, 130], which focuses on the relationships between the environmental levels of ageing person within the 5-P model we proposed here taking into account of micro(person), meso-(process) and macro-system (place and policy-making) based on health (prime) dimension, along with the unstable equilibrium between environmental and individual competence in old age [120].

Active ageing with Contextual nature as a cultural and social notion [131] has its roots in diverse environmental contexts in order to clarify the ways a person reacts to and interacts with the environment they live in [130, 132]. According to Baltes’ theory of lifespan development (1987) define as, throughout life, development always consists of the joint occurrence of gain (growth) and loss (decline)[51]. Considering the findings of this narrative review, active ageing is a fruit of both personal and socio-cultural environments which are strongly linked to the themes of policy-making and place according to the definition of health (prime). Perhaps the most important issues are that the ageing older persons should be equipped with the necessary support to maintain an equilibrium between their decreased physical ability and increased transcendence which is significantly obtained through access to personal, environmental and social resources. This equilibrium includes the physical and mental health at the micro level (personal) as well as social well-being,
and spirituality/transcendence (process) at the meso level while living in a favorable and appropriate environment the policy-making a level for better support as shown in Figure 3.

This review, for the first time in the literature, highlights a lack of composite framework which is multi-disciplinary and meta-disciplinary concepts are included in the definition of active ageing and its interventions. As the notion of active ageing is a vast concept it is necessary to provide a multi-disciplinary approach which covers its different aspects. This is desirable because focusing on the elderly’s needs including their active life in healthy behaviors results in their long term outcomes which are of low cost and high value [133]. In order to reach such goal, the authors defined active ageing as trying to maintain the components of health through participation in activities consistent with the individual’s objectives, abilities, and opportunities using the ecological model. This, of course, should include four pillars of active ageing for elderly: their goals in life, their abilities, their opportunities, and their activities. This narrative review held the assumption that the concept of active ageing, in fact, enhances the health state of individuals [5] while facing a few issues regarding its methodology. This methodological issue included the heterogeneity of the final studies and selecting only mapping factors of active ageing while focusing on the built environment. However, this review aimed to explore the socio-ecological approach which is motivational enough to create lifestyle changes in the elderly. Also, in different occasions, there are several contradictions between the reviewed studies which of course could be due to the new area of research in environmental gerontology, limited survey tools, or the fact that there is no diversity of theories on the potential combination of effects influencing well-being and activity in ageing years. Several personal effects on
health and activity of the elderly were recognized leading to the realization of a mixed model of effects which could be an interesting topic to be examined in future research.

In this study, a large amount of studies and literature written in English language contributed to a broader understanding of the dimensions of “active ageing”. Nevertheless, conducting an integrative review is no guarantee for finding all relevant articles on the subject of investigation, even because there could be papers published in other languages than English. A further limitation restricting the findings’ generalizability is the dearth of any conceptual base in the majority of the studies. Only the study of WHO (2002), sought to conceptualize models of different aspects of active ageing.

Conclusion

This narrative review describes the aspects of active ageing on a voluminous body of research conducted on the active ageing concept using an ecological approach. Results show that personal characteristics, socio-cultural and economic environments, place and policy-making according to favorable governance lead to health and activity in the elderly (active ageing), a 5-P model. The greatest number of the reviewed articles which were finalized through the systematic process of review proposed that environmental states (built, natural, social, cultural, and economic) are among the major factors affecting the elderly’s active ageing. However, there were a few studies which claimed that there were no links between environment and active ageing as described in health and activity life. Yet, these articles necessitate attention to the effects of the environment in diverse micro, meso and macro levels as described in the ecological model. This is while the
factors of strength, direction, and experience of environmental elements may be different among individuals, communities and health outcomes in ageing years. Future research may focus on the broad topic of environmental gerontology to provide a piece of comprehensive knowledge of the links between environment, ageing, health, and activity. These future research may include the following: attention to qualitative or mixed methods to allow a more detailed exploration, higher levels of collaboration with elderly stakeholders through the research stages and policy-making environment, a more focused consideration of activity participation not only for physical aspects, creating new socio-ecological models and theories in order to explain the personal and environmental effects on health and activity, more attention to the active ageing and relationships between the significant areas of activity participation.

We propose the following definition for active ageing process for an individual as

“trying to maintain the components of health through participation in activities consistent with the individual’s objectives, abilities and opportunities in communities which could be described as what they want to do, what they can do, their opportunities to do the activities they enjoy”.

We propose a 5P model which provides a comprehensive knowledge of diverse aspects of active ageing which could be used to benchmark the successful active ageing and also provide a framework for future research that can be applied in further studies and interventions on this topic.

Abbreviations

UN: United Nation
Declarations

Ethics approval and consent to participate:
This review is claimed just through desk study. Thus, the need for ethics approval is deemed unnecessary.

Consent for publication:
Not applicable.

Availability of data and materials:
Not applicable.

Competing interests:
The authors declare that they have no competing interests.

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AL and PR have made substantial contributions to the conception of the review to extract the sub-themes and themes by reviewing all materials. P.K.M and H.R.B authors have read and approved the version of the manuscript.

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Additional Files

Appendix1-Quantitative and mixed studies of active ageing
Appendix2-Qualitative and review studies of active ageing

Figures
Figure 1

Search strategy summary with keywords
Figure 2

Flow chart of paper selection.
Figure 3

5-P Ecological model of “active ageing”

Supplementary Files

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