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Near-Collapse Buildings and Unsafe Sidewalks as Neglected Urban & Public Health Issue: A Qualitative Study

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Abstract: Public health and city planning are highly interconnected; however, the nexus between the urban state of buildings and sidewalks and corresponding public and urban health issues is lacking in Greece. In a case study in Athens, Greece, we evaluated unsafe buildings, facades, balconies, and sidewalks during a 15-year follow-up. We manually inspected (a) if the building/location's condition had worsened and (b) any effective intervention by the state. Of the 400 initially selected buildings, 251 nonoverlapping buildings were analyzed. Overall, ~20% of the buildings posed a subjectively perceived severe risk for collapse, 35% had near-to-fall objects, and 45% had other minor issues. Fifteen years later, ~85% of the buildings were at the same or higher risk of complete or partial fall, and in only 15% had the risk of collapse been reduced or removed by private or public intervention. We detected uneven and dangerous parts of sidewalks hindering walkability and increasing the risk of falling or tipping. Our assessment revealed that Athens' historical center harbors plausible safety and health risks for pedestrians and dwellers due to entire or partial building collapse and poor-condition sidewalks, which can potentially act as stress factors. Collectively, the issue of near-collapse buildings and risky sidewalks as an urban health determinant appears neglected by municipal authorities in their urban planning priorities; thus, future studies are needed in the field.

Keywords: urban design; unsafe buildings; pedestrian safety; near-collapse buildings; urban health; public policies; Greece

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1. Introduction

Road and pedestrian injuries represent a major global health issue and are the most frequent cause of urban injuries [1]; however, other urban injuries, including those due to poor-quality sidewalks and near-collapse unsafe buildings, are barely examined, either in relation to injury causality or to urban health [2,3]. Healthy urban planning and urban design are increasingly recognized as important to citizens' health alongside with maintaining environmental standards, while issues of spatial equity are also crucial [4–6] (for further discussion on the theoretical framework of urban planning extending beyond our study, see: [7–11]).

Building collapse can be attributed to structural defects in addition to the lack or inflexibility of legal context (for further discussion on the legal framework of the built environment, see [12]), corruption in the public sector [13–15], outrageous bureaucracy or taxation (even for historic buildings of the 19th or early 20th century), absence of coordination among regional competent authorities [16,17], and unskilled construction workers [18]. Historically, several episodes of building collapse have taken place (among which the collapse of the World Trade Center on 11th September 2001 in New York represents a well-studied arena, even though it refers to bomb attacks and not deterioration through time [19,20]), along with significantly deteriorating sidewalks in many countries, including those in Greece (discussed in the literature review below); nonetheless, this topic otherwise remains largely unexplored, particularly in regards to how these structures represent an urban and, more broadly, public health issue.

Therefore, based on the above and in alignment with the recent focus on promoting urban and regional health [21–23], we conducted a qualitative case study and an accompanying literature review by leveraging the city of Athens, Greece [24]. Instead of focusing on structural aspects, we aimed to (a) summarize relevant studies on the Athenian urbanistic evolution, the broader structural issues of facades, balconies, masonries, and near-collapse buildings, and the dangers that are plausibly associated with sidewalks and then assess any available existing data and (b) conduct a regional health case study in Greece's capital, depicting the sidewalks' poor quality and the high public and urban health risk of near-collapse buildings. Although safety standards of a different nature apply to near-collapse buildings and unsafe sidewalks, these issues are the most crucial ones regarding how citizens' health relates to urban design. Finally, we critically analyze this neglected topic's importance for urban and public health (despite the recent interest of policymakers in addressing this issue [25,26]) and advocate a call-for-action for intensifying appropriate public health policies and public authorities' flexibility and efficacy in confronting this urban problem, so that the outcome is a policy implementation success and not failure. This will allow appreciation of the fact that a city's near-collapse buildings and unsafe sidewalk infrastructure are a major public (e.g., risk factor for hip fractures) and urban health issue (e.g., quality of urban life), as well as a risk to health equity between neighborhoods in the cities of both resource-poor and resource-rich countries [27].

2. Literature Review

2.1. National, European, and Global Burden of Disease Studies

An initial search revealed that no information was practically available from the major data sources for injuries, i.e., the Global Burden of Disease metrics and the European Statistics Authority. Additionally, we could not extrapolate data from relevant ICD codes (Table S1) based on pertinent international databases (File S1) because of the high cost of obtaining access. Although we obtained data regarding cases of femoral neck bone and hip fractures and falls on the same level from the Greek National Statistics Authorities (Tables S2–S4), no information was available on whether these falls occurred due to poor-condition sidewalks. Thus, hip fractures, which are well known to represent the most frequent injury from falls, could not be used as a proxy to understand the approximate measure of falls on the same level linked to poor-condition sidewalks. Broken wrists, another frequent injury from falls, were not considered, as they were outside the scope of our study; however, they should be considered in future studies. Moreover, considering the lack of electronic health records in Greek hospitals' databases, it was impossible to identify the extent of serious injuries and falls occurring in Athens annually because of uneven or broken sidewalks or crumbling buildings. Collectively, our search reveals the lack of data on accidents related specifically to buildings and sidewalks. In this context, it is even harder to assess the pre-fall record of the patient's stability, especially as any post-fall record would not be reliable as to the possible cause of the fall.

2.2. Historical Aspects of Urbanism and City-Specific Particularities

Athens' metropolitan region has undergone uneven cycles of urban expansion [28] and a vast increase in urban population (from ~39% to ~64% during 1951–2011) [29,30] In addition, a vertical growth has been documented (from an average of 1.5 to an average of 2.8 floors during 1919−2010) [28]. Today's Athens was rebuilt around 1950–1960, a period called Reconstruction [31], to characterize the tremendous multiapartment buildings in a struggle to maintain national architectural elements and embrace international ones, mainly based on a system called antiparochi (literally, anti-provision). According to this system, a landowner would give his property to a contractor in order for the latter to construct a building and in turn compensate the owner with one, two, or more apartments [32].

2.3. The Structure of Facades, Balconies, and Masonries

Vulnerable buildings, a subcategory of technological risks in the WHO Task Force on Vulnerability Reduction [33], constitute a major public health issue in Athens' metropolitan region. Old buildings often serve as a temporary, unsafe home (shelter) for poor or homeless people, migrants, immigrants, and refugees (Figure S1) and a place of waste dropping [34], with the latter causing the infestation of buildings with mice and rats. Upon building collapse, the microbial load in walls or inside the buildings (including Legionella species in aged pipes) due to humidity and that of aerosols are directly released to the environment, leading to various health problems ranging from dermatological irritation to serious respiratory defects and even pneumonia from Aspergillus species in immunosuppressed patients [20,35].

Facades are structures primarily designed to deliver comfort to the buildings' occupants, as they help regulate inner climatic conditions (temperature, lighting, air flow) [36]. Nevertheless, such building parts do not always offer security for pedestrians [37,38]. Notably, several elements such as localized strain, uniform dirt, color change, runoff, and graffiti can lead to their total or partial destruction. Moreover, biofilms from cyanobacterial and algal species have been noted on the facades of historic buildings [39], with many of these often near-collapse.

2.4. Near-Collapse Buildings: General and Athens-Specific Issues

Athens has experienced diverse cycles of urban growth across decades [18], with a recent pattern of fringe urban sprawl that made the security gaps of its buildings and other urban equipment evident. Poorly maintained parts of the city, old buildings remaining amidst deregulated land planning [40], and frequent records of facades, balconies, and other pieces of building ruins (e.g., the buildings constructed as part of compensation from World War One) all make up the current image of the city. According to a previous study [32], more than 1500 abandoned buildings are present in the historical center of Athens; however, this number is based on estimates, as it is unclear whether municipal authorities regularly record such information. The high risk for partial or total building collapse increases the likelihood of accidents involving pedestrians. Expectedly, building falls have recently been reported in certain neighborhoods [41]; apart from material damage, lives were lost in building collapses. For example, a 200- and 133-year-old building in the center of Athens collapsed in February and November 2019, respectively, while another partial collapse was recorded in February 2021. In one of these cases, there was a visible fault prior to the collapse, as the building had no roof and trees were growing within its shell. According to previous newspaper-based unofficial estimations, at least six accidents have been caused by partial building collapses in Greece, including the deaths of two adolescents (15 and 17 years old) in 2020 due to a post-earthquake collapsed building in the island of Samos.

2.5. Sidewalks

Literature on the impact of the built environment on falls among adults is limited [42]. The main causes of outdoor falls are linked to uneven or wet surfaces, footpath condition, material obstructions, crossing roads, getting out of a vehicle, lack of lighting, crowded places, inappropriate footwear, and lack of attention or walking too fast [42,43]. In addition, it is long known that several factors—both on (a) the individual level, such as gait, gender, age, education attainment level, employment status, comorbidities, and use of drugs (e.g., antihypertension drugs), and (b) the urban design and operation level, such as poorly designed and managed transportation systems, pedestrian flow vs. vehicle flow, lack of signs or light, and density of pedestrians' population, to name a few examples—are major sources of sidewalk-related injuries. Apparently, hip fractures are frequently associated with falls on the same level (amidst, of course, several other reasons) which are, in turn, associated with unsafe sidewalks rather than with near-collapse buildings; this well-known fact is unlikely to be different in the region under study. Nevertheless, apart from obvious pavement defects, which may be avoided when walking, the real danger lies within smooth surfaces that are slippery when wet or within only seemingly smooth surfaces that have slightly uneven parts. For example, older people do not lift their feet as high as needed and may therefore stumble on such unseen imperfections. Attributes of the built environment need to be considered for promoting healthy walking density [43], land use diversity, destinations' availability and proximity, transiting distance, design, and connectivity [38,44,45]. Besides sidewalks, street facades' characteristics, walking, and contextual built environment also influence pedestrians [46]; thus, well-conserved sidewalks and facades are concurrently factors of attractiveness and safety for pedestrians. Despite scarce data, it is clear that falls while walking through sidewalks may cause diverse morbidities, activities' reduction, or even mortality, jeopardizing mainly older adults, who account for 19% of pedestrian fatalities, with 75% of falls in public spaces occurring on sidewalks [47,48].

2.6. Building Inspection Method

Many methods for building inspection have been developed, some of which are specific for facades [48–52], whereas others are mostly relevant to buildings in their entirety or for specific parts [53,54]. A method of Building Medical Records for constructions was created by Chang and colleagues [54] based on the Problem-Oriented Medical Research, as originally proposed by Lawrence Weed in 1964. This method employs analogies between human health and building diagnosis and involves life cycle costs and causes of anomalies, such as humidity, excessive load, stress, deformation, extreme temperatures, dirt, and pollution, as well as exposure to salts, bacteria, plants, mold, insects, and birds.

3. Materials and Methods

3.1. Methodology Rationale

The above-mentioned analogy between human health and building diagnosis prompted us to develop our methodology based on a broader concept according to which a building in a near-collapse status is similar to an individual suffering from a disease. This notion does not reflect a mechanistic approach to human pathology or an organismic theory of building but is rather a functional metaphor. In doing so, we paralleled a building's structure with the DNA double-helix to schematically represent the above analogy; although not discussed below, this scheme was presented in public exhibitions and press releases of our work (Figure 1).

To address whether unsafe, near-collapse buildings in a city's metropolitan region represent a threat to perceived urban and public health and to investigate the components of the regional urban environment that affect the quality of urban health and well-being, we chose Athens, the capital city of Greece, as an example meriting further investigation, and we focused on central Athens (with a population of 500,000–600,000 citizens), which serves as catchment area for the broader city. This was because of our deep experience and knowledge of Athens both as citizens/residents and as academic specialists in medicine/public health and engineering (following similar approaches by Mandeli [55]) and because central Athens harbors a multitude of ill-conserved buildings and facades, as well as sidewalks in poor condition, making pedestrians' walkability difficult.

Although we carefully considered previous well-established methods that harness advanced statistical approaches, we opted to employ a qualitative and not quantitative (inferential) approach. This included (a) a brief visual inspection and empirical assessment of the visible building exterior, excluding the roof (as this would require the use of drones), and (b) a collection of photographical material used for a posteriori assessment. Specifically, rather than creating a schedule of faults and risks as baseline to identify the level of risk, we performed a qualitative recording of the subjective, self-perceived feeling of threat to urban and public health (i.e., as a determinant of unsafety) as an initial approach to determine whether the current state of unsafe buildings is a potential health hazard. This can serve as an impetus for similar future studies. In that context, our investigation was inspired by the methodologies of Mandel [55] and Agency [56] for epidemiological and safety assessments, respectively. Specifically, we considered the gaps in the country's public policies (besides the outdated Seismic code of 1959) [57], which have not been explored in previous studies, to our knowledge, and specific scientific literature regarding the assessment of entire urban buildings and their elements, focusing not so much on safety but on health and safety perception perspectives.

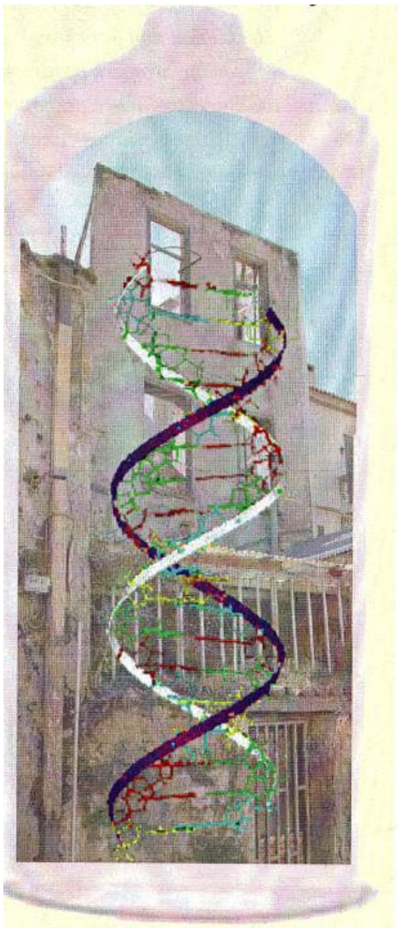

Figure 1. Schematic representation of an analogy between a building's structure and the DNA double-helix.

3.2. *Assessments*

In alignment with promoting the societal dimension of medicine and medical education [58], 22 academic physicians and engineers (Real Medicine Study Group) evaluated 400 unsafe, near-collapse buildings selected randomly during a field study in Athens' historical center (Figure 2). Associated photographic material was obtained in a time-wise, two-step approach: first assessing all buildings within a year-long period after the Olympic games and during the period of citizens' collective enthusiasm to restore the city's urban design (October 2004 to October 2005), and then assessing a smaller, randomly picked sample of these buildings after 15 years (October 2019). Each member of the Real Medicine Study Group was asked to mark 20 unsafe buildings and other unsafe locations identified during the preliminary assessment. The second analysis was conducted by two group members (A.F.A.M., and J.S.P.) based on the same scope and purpose, recorded notes, and similar methods and standards as those in the original study.

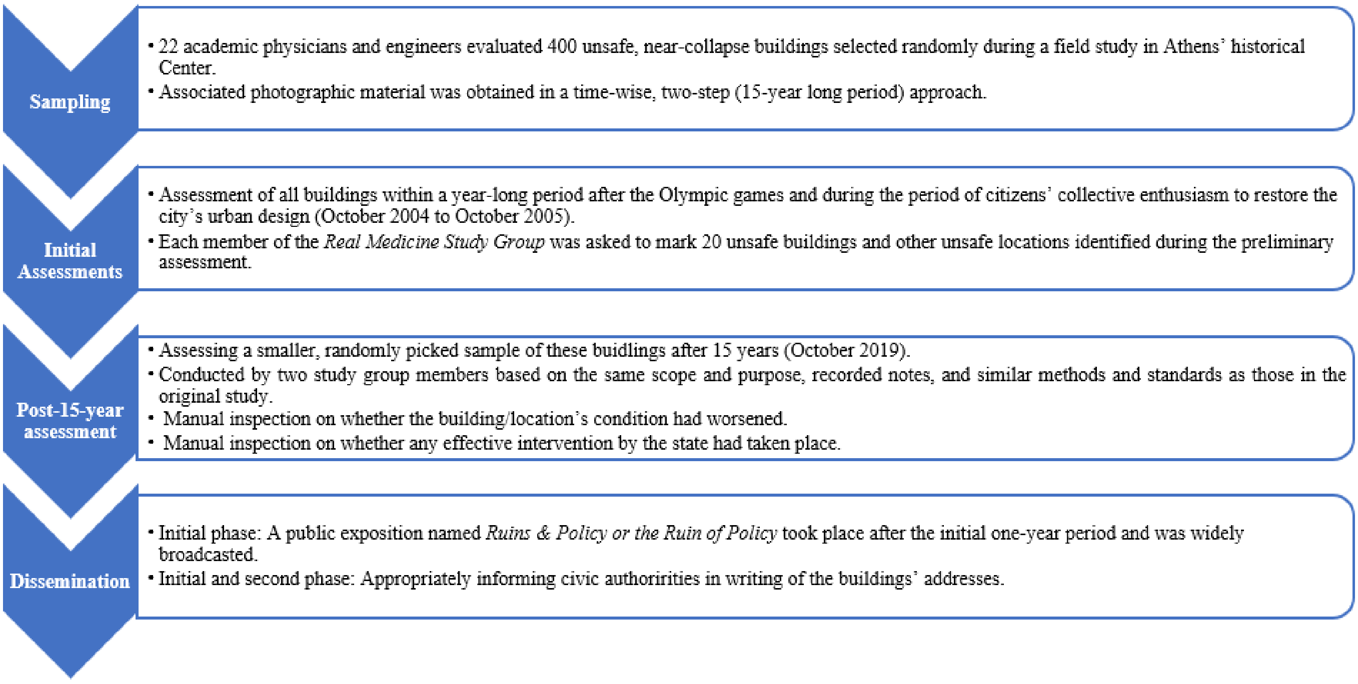

Figure 2. Schematic representation of our study's methodology.

We focused on manually inspecting (a) if the building/location's condition had worsened and (b) any effective intervention by the state. Civic authorities were appropriately informed in writing of the buildings' addresses, and a public exposition named "Ruins & Policy or the Ruin of Policy" took place after the initial one-year period and was widely broadcasted.

4. Results

Analysis of Case Study

Overall, 400 unsafe buildings and urban environments were initially identified by the Real Medicine Study Group, of which 149 overlapped among the study assessors (highlighting that many of these settings were perceived as unsafe by more than one assessor); hence, we finally chose to assess 251 locations as an indicative sample for our qualitative study. Our initial survey during 2004−2005 indicated that ~20% of the assessed buildings posed a subjectively perceived severe risk for collapse, 35% had near-to-fall objects, and 45% had other minor issues (e.g., coating damage, easily removable surface finishes, or interior decay due to waste-dropping and humidity (further discussed in [38])), yet presented the feeling of temporary safety. Major issues in buildings with severe risk for collapse included, among others, (a) the presence of the front wall as the only remaining element of the building before total collapse, (b) diagonal or vertical cracks in columns, (c) near-collapse roofs, (d) failure at beam-to-column joints, and (e) houses in a state of dereliction for more than 30 years and totally exposed to weather conditions. Moreover, around 35% of the inspected constructions had near-to-fall objects, including balconies, awnings, or exposed casings. Several examples of unsafe, near-collapse buildings are depicted in Figure 3.

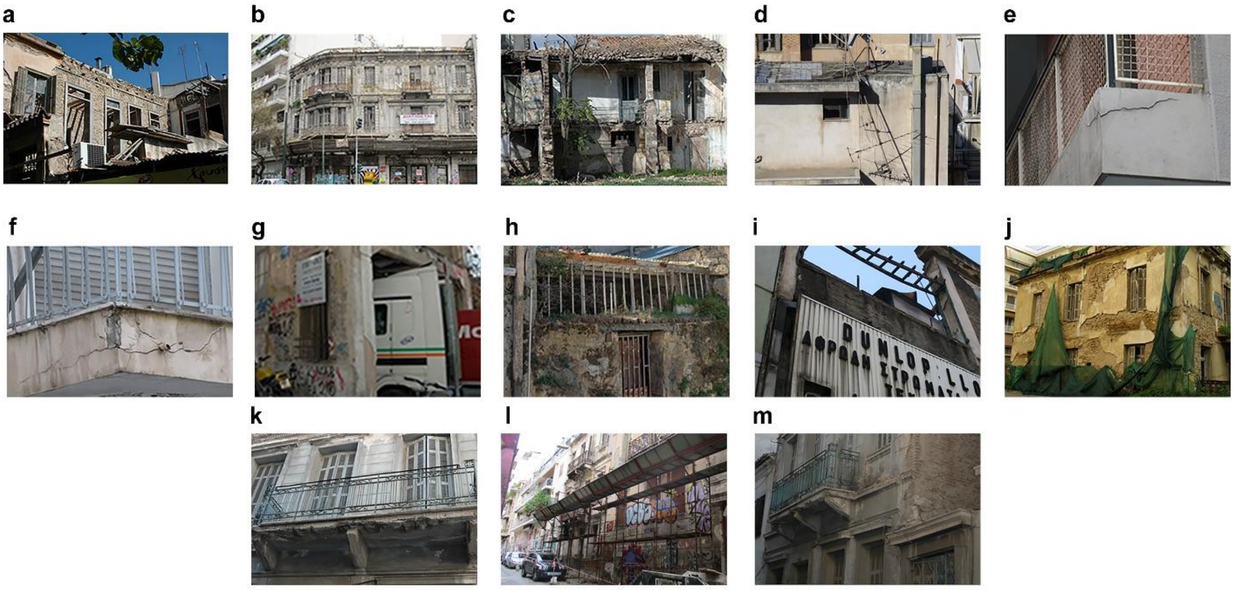

Figure 3. Examples (**a**–**m**) of unsafe, near-collapse buildings in Athens, Greece.

Based on our reassessment in October 2019, the vast majority (~85%) of the unsafe buildings were at the same or higher risk of complete or partial failure as that observed in the earlier inspection (at least in subjective terms), probably due to natural ageing and weather effects, i.e., typical rains and high summer temperatures [51]. A major earthquake (5.1 Richter) in July 2019 might have also contributed to the observed deterioration. Only in 15% of the buildings had the risk of collapse been reduced or removed by private or public intervention, ranging from facade coverage (oft-accompanied by scaffolds) to complete demolition. However, the scaffolds did not guarantee pedestrian safety [50,59]; for instance, Figure 3a illustrates the precarious structures of demolition posing risks to pedestrians.

In every case, an average of three neighboring buildings to those examined were found to be in a similar condition (although not further evaluated in our study), suggesting that more than 750 (~3 × 251) unsafe buildings may exist in the center of Athens. This represents 62.5% of the cases estimated by the public municipal authorities, indicating the great extent of near-collapse buildings in Athens, the center of a country classified as resource-rich [60]. Notably, most buildings were concentrated in certain regions of the historical center of Athens (i.e., Psyrri, Eksarxeia, Monastiraki, and Metaksourgeio) (Figure 4); this region's buildings have been abandoned mostly by previous residents and have yet to be reconstructed.

Besides the risk of totally collapsing buildings, we found additional risks, including the partial collapse of buildings or objects falling from buildings (Figure 3b–k) [37,38]. The fire service, responsible for dealing with partial collapses and object removal in Greece, reported a mean of only 192 interventions per year in the broader Athens prefecture (encompassing 5–6 million inhabitants) for total or partial collapse or object removal (personal communication). We also observed sidewalks oft-covered by unsafe scaffolds, which could damage their surface by exercising pressure, thus exposing pedestrians to a significant risk for injury either due to lack of enough sidewalk space or due to the risk of exposure to road margins (further discussed in [42,61–63]). No specific localization pattern was observed for risky sidewalks, as they appeared to be scattered across central Athens. Figure 5 shows examples of uneven and dangerous parts of sidewalks with poor cleanliness [57,64,65] and of obstacles hindering walkability and increasing the risk of falling or tipping [61–63]. Moreover, Figure 3l,m depicts additional examples of major constructive deficits and the extended use of scaffolds, which, along with the refreshment of the facades of several buildings before the 2004 Olympic Games, implies a facade-centered approach by civic authorities,. Notably, we did not investigate whether these locations of perceived risk were also police-reported crash locations, a distinction that should be considered [59]. Other sources of risk included falling pieces such as plaster, unscrewed marble plaques, old advertisements, and rusty nearly falling TV antennas (remarkable examples are presented in Table 1), all denoting that sidewalks in Athens pose a major public health risk.

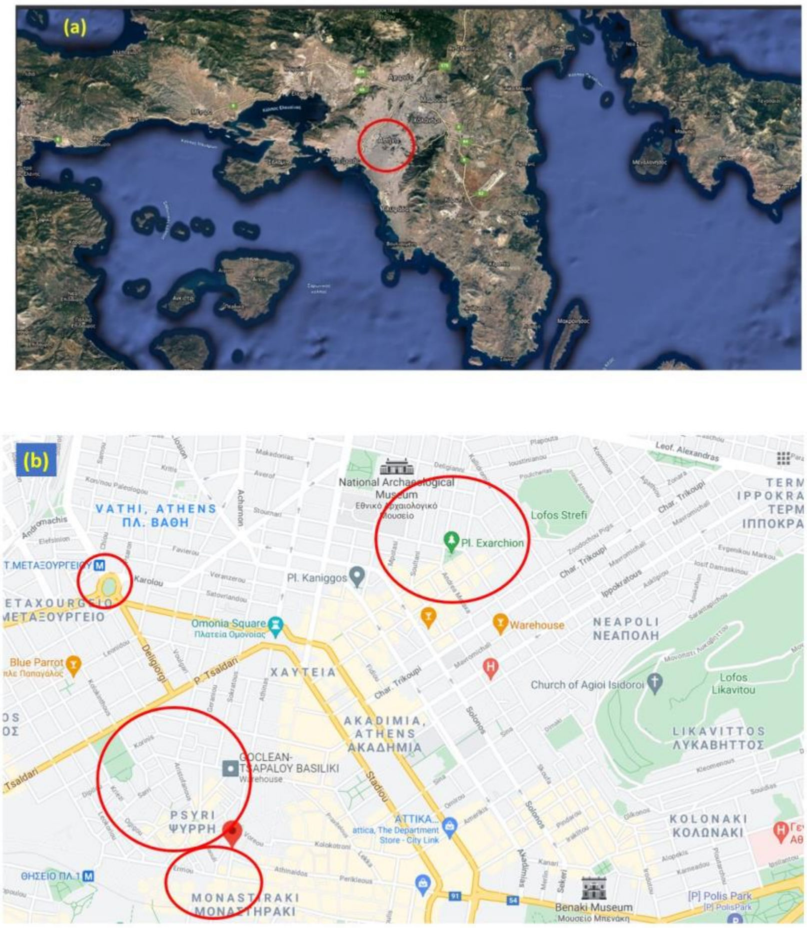

Figure 4. (**a**) Google Earth map of Attica. Central Athens is delineated by the red circle. (**b**) Google Map of the center of Athens where most of the near-collapse buildings studied are located. Larger and smaller circles indicate higher and lower concentration of near-collapse buildings.

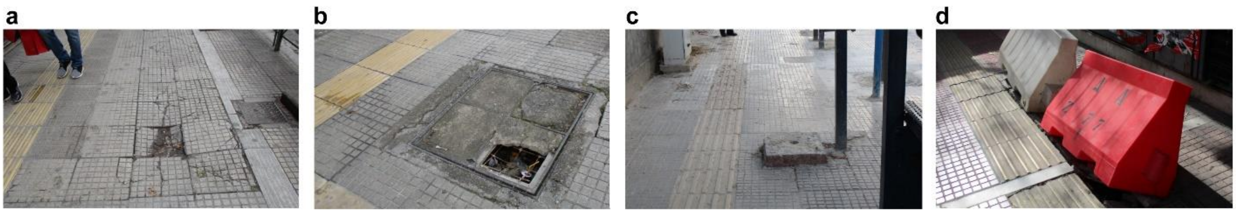

Figure 5. Examples (**a**–**d**) of uneven and dangerous parts of sidewalks with poor cleanliness and obstacles hindering walkability and increasing the risk of falling or tipping.

Table 1. Key findings of our case study.

Falling buildings or pieces
Pieces of loose balconies
Pieces from long-term uncontrolled tubes used to remove throwing bass in dangerous constructions, which remained unattended and unchecked for years
Hanging pots outside balconies (risk of falling).
Rotten railings of balconies
Various pending accessories (advertisements, signs, hovering light bulbs, or hovering windows) from dilapidated buildings
Hovering air conditioners that are near-collapse and placed on the outside of windows, without maintaining any kind of fastening
TV antennas
TV antennas not fixed to the roof rails
No application of the concept of one antenna for the whole building → Indirect results for e-waste oft-exploited by Roma populations—collectors, when the rusty material is placed in the garbage around these buildings
No standard fastening of antennas against wind pressures, even though, for example, the air is often strong on the rooves of six-story buildings
No care for technical services for the maintenance of antennas
Metal mounting rods often become rusty
Falls on the same level
Poor construction and maintenance of sidewalks
Great delay in repair
No standardization of constructions with specific objectives (e.g., nonslippery surfaces, duration of construction, ease of repair and maintenance)
Slippery ground (unsuitable tiles)
Water dripping from balconies (when cleaned), pots (when watered), or attached air conditioners
Raised tiles posing great danger for falls due to poor fastening, destruction by car parking or by continuously expanding tree roots
Fecal samples from pets that cause sliding
Remains of metal poles after their removal by the police
Car parking barriers
Illegally parked motorcycles - Machine oils causing sliding. - Clothes hooked on motorcycles
Garbage (trash bags)—Abandoned glass or furniture
Tree pits
Presence of exhibited goods in the road (urban markets)
Tables from coffee shops & restaurants
Theft of tops of water system counters (where metal is used in old metal trade) causing holes in the sidewalks (with no action from the police)

Importantly, it was not apparent if and how public authorities included the above issues in their urban planning priorities; our observations suggested that this topic is ranked very low in the local municipal agenda and is only restricted to the antiseismic building code.

5. Discussion

Far from being a rigorous, quantitative, data-driven, or clinically oriented approach assessing the seriousness of injuries that are plausibly associated with unsafe buildings and sidewalks experienced by Athens' residents, this two-period investigation aimed to offer a qualitative appraisal of the condition of buildings and sidewalls in Athens as a potential link between poor urban planning, public health, and urban well-being. To this end, we assessed around 250 near-collapse buildings (many with fallen elements, such as render, copings, and sections of decorative moldings), which were deemed an indicative and adequate sample for our qualitative study, representing ~15–20% and ~2.5% of all collapsing or near-collapse buildings in the historical center of Athens and in Greece, respectively, according to estimations by public authorities [66]. Our study provides initial evidence that the city and its neighborhoods harbor safety and health risks for pedestrians and dwellers due to frequent episodes of entire or partial building collapses and immense dangers from poor-condition sidewalks. It also pinpoints the lack of research linking urban infrastructure and medical records of related injuries, as well as to how the whole system of civil protection (e.g., fire service) can be disturbed as a result of such near-collapse and/or collapsed buildings.

Without the additional task of rehabilitation, the character of municipal interventions should have been structural and in an equilibrium between the buildings' historicity and injury avoidance [28]. We found that the structures of facades, balconies, and masonries often represent menaces to passers-by, as they lack conservation and repair. Sidewalks in the surroundings are additional reasons of concern to pedestrians, due to the presence of scaffolding structures that increase danger. Similar findings have been observed in other countries [51,67].

Notably, Athens does not lack public policies and appropriate regulations for building safety; however, based on our assessments as well as previous studies [68], it seems that these policies are fragile and ultimately not implemented, even though they could have been supported by solid existing public health evidence. Similar to the civil authorities of other cities in Europe, Athens' civil authorities should create, continuously update, and monitor neglected or vacant buildings, in parallel with having a functional housing code. If these buildings are empty and thus dangerous for more than 10 years, they should be demolished, following prior notice to the owner to act accordingly [69]. Their replacement by pocket parks can also be explored as an efficient way to increase the city's green space in alignment with sustainable development goals, health promotion principles, and the need to increase physical activity (especially during leisure time) and well-being, particularly in societally deprived neighborhoods [70–72]. If such actions are not performed, then near-collapse, abandoned buildings will continuously be the so-called blight and contagion points for disorder in neighborhoods [41], particularly considering that derelict buildings are used as hot spots for crime, prostitution, drug dealing and using, squatting, and theft [72].

Should unsafe, abandoned, and near-collapse buildings and destroyed sidewalks be examined and tackled per se? We contend that they should be examined interdependently with other urban settings and legislative contexts since, in most cases, they are found in streets with low-quality features [64]. Moreover, the Municipality of Athens has consistently had great difficulties in finding the owners of abandoned buildings, the number of whom, in worst-case scenarios, may reach two digits (12–15, according to unofficial reports) because of the so-called equal heritage of a deceased family member. The role of the local municipality and regional authorities is also crucial, e.g., by creating a dedicated office to which urban environment risks and plausibly associated dangerous situations can be reported by citizens either via physical presence or online submissions. Last, based on our perspective, the Municipality should also undertake several steps towards mitigating the issue in question (Table S5) (further discussed indicatively in [73–77]).

Although our work pertains to assessing region-specific health risks, our results could be of broader value by underscoring similar urban settings as underappreciated urban and environmental health determinants posing a threat to public health and to the feeling of being part of an healthy neighborhood urban designwise [78]. Analogous recommendations may be applicable to countries similar to Greece, such as Italy, Bulgaria, Cyprus, Turkey, Spain, and so on. Thus, both action by municipality authorities and public awareness are required for addressing these risks. Moreover, unsafe, near-collapse buildings should be included as a factor in the Urban Livability Index [79] of the so-called disrupted cities (in a broader sense than in transport) [80]. Future studies could use computational tools such as the QGIS and AutoCad to explore if there are geospatial patterns regarding near-collapse buildings and sidewalks, and in doing so, offer more precise urban health approaches.

From a medical perspective, assessing the risk of falls (e.g., by the Timed Up and Go test [81]) and implementing preventive strategies (including medication review, management for orthostatic hypertension, physical therapy, and group exercises) can be helpful towards preventing falls from dangerous sidewalks. In addition, Electronic Health Records of chart entries at the country's largest trauma hospitals or other hospitals should include the ICD-9 and ICD-10 codes for falling of buildings and falling off buildings, so that relevant data can be mined for future studies. From a medical education perspective, and in light of current interest for a broader emergency training of medical students, the assessment of vulnerable buildings can help prepare for disaster mitigation. Knowledge about potential collapses might prove effective in a first rapid estimation of disaster consequences, such as those after an earthquake. Lastly, the symbolic nature of sidewalks as a public space in which society in both formal and informal societal norms and even democracy are expressed should not be forgotten.

The protection from unsafe buildings and surrounding environments should be inscribed on the same list of urgent priorities for urban health (e.g., from the Partnership for Healthy Cities) as creating smokefree environments, taxing unhealthy and sugar-overloaded food, and increasing injury prevention actions. Conceptually, the strong ties between urban planning and public health policies, as exemplified herein, cannot be overstated. Putting aside the weight of evidence, it is high time we, both practically and conceptually, appreciate unsafe buildings and their external factors, not only the internal ones, as a threat to urban wellbeing (formally expressed as sustainability) and promote the collective and individual safety, citizens' dignity, healthy aging, brain training and cognitive aging [82], cardiovascular health, community engagement, feeling of companionship, and healthy childhood development in diminished neighborhoods, all composing (either directly or indirectly) the WHO's definition of health. Of note, it is reasonable to expect that the vulnerability of these buildings to collapse will be higher because of severe weather phenomena in light of the climate crisis [83]. Moreover, mayors and policymakers would be much more motivated to take measures if they were more aware of the significant issue of injuries occurring because of the city's crumbling infrastructure, a concern that health informaticians should consider; however, major social factors, such as poverty and social inequality, which could have contributed to the injuries, should also be explored.

Especially on the conceptual level, the notions of health in all policies, health in all urban policy, leaving no one behind, and place shaping to create health and wellbeing should always permutate urban planning, including the cases of unsafe buildings and surrounding environments [84–87]. Thus, there is an urgency to integrate the issue of unsafe buildings with the municipal government's agenda for urban research and policy making and enhance municipal cross-sectoral collaborations with the private sector (e.g., real estate agencies). Together with global experts, we urge the need of political commitment, vision and strategy, institutional change, and networking, recognizing health as a core city value [88,89]. Whole-of-city approaches attributing unsafe buildings to the list of a healthy city's quality aspects (discussed in [88]) can be key for demonstrating that a healthy city is constantly conscious of itself and in need of continuous improvement [21].

6. Research Limitations

This study has certain limitations. First, we mostly evaluated buildings built before the implementation of the Seismic Code of 1959. Nevertheless, our findings are consistent with other countries' studies, where buildings constructed before the introduction of antiseismic policies (e.g., during the 1970s in California) posed an increased relative risk for earthquake-related injuries [55]. Second, our self-perceived approach, albeit crucial from a public health lens, might appear as technically obscure from an engineering perspective, especially as the second analysis was not performed by all members from the first study. Moreover, in strict civil engineering terms, no association between the location of the injuries and the quality of the buildings in that location was performed to address cause-and-effect (e.g., mapping injury details, building, damage, and risk by marking the unsafe buildings on a street map, akin to the classical study of Snow on the Cholera outbreak in 1866). Therefore, the perceived vulnerability used in this study may lack strict objectiveness simply because subjectivity can be interpreted or measured in different ways; however, this perception was made according to common-sense feeling, coupled with a posteriori assessment of photographical material, collectively highlighting the importance of field, qualitative studies even in our big-data-driven era. Third, the short period (one year) of our initial assessments could have introduced bias, since contributing factors such as natural ageing, weather effects, and earthquakes must be considered prospectively and longitudinally. Fourth, an assessment of the incidence and frequency of injuries due to unsafe buildings would have been more objective regarding public health assessment, if not for the scarce data in Greece; nevertheless, we focused on examining the flexibility and efficacy of public authorities in confronting this urban problem rather than merely on the structural aspects of collapses [90]. Fifth, we did not consider the types of health-harming agents appearing due to building collapse nor did we explore if buildings of specific size produce a certain amount of aerosol dust when collapsing, and we did not provide an estimation on health risks. Sixth, no a priori measures were applied to divide the metropolitan region of Athens so that each study group member could inspect a different area. In addition, we did not conduct any interviews with key officials, which would have allowed us to explore the officials' viewpoint; however, as in many cases in this country, officials' reluctancy to admit responsibility and prolonged inaction are obstacles. This is in potential contradiction with the safety culture that has existed in previous decades in Greece, following major earthquake events [91]. Therefore, to better capture the effects of unsafe urban settings on self-perceived health, future qualitative and quantitative studies would be essential. Importantly, as there could be independent and joint (additive) effects due to construction, building codes, and disasters (e.g., earthquakes), future studies should assess the generalizability of these findings to areas not prone to earthquakes. Furthermore, our study did not assess several key factors at both the individual (e.g., demographic details) and structural level (e.g., neighborhoods' characteristics), a process that would have allowed the extrapolation of much more data for statistical analysis. For instance, we did not consider if and to what extent a region with better street and building conditions, such as lighting conditions, might pose different risks for injuries than other regions in the same neighborhood. Thus, any association is not definite but rather plausible. Further, this study did not address any visual questions using tools, such as the QGIS and AutoCad, in order to explore any potential geospatial patterns; this issue could represent a major limitation of the study. Lastly, a major regional issue is the lack of adequate recording of data; therefore, it is quite impossible to analyze specific injuries caused by the specific buildings or specific unsafe sidewalks. Additionally, this study is a 15-year-long study aiming to raise awareness of poor-condition sidewalks and near-collapse buildings as threats to public health/preventive medicine rather than to conduct extensive quantitative analyses and apply sophisticated inferential statistical analyses. Therefore, future studies are needed in this regard.

7. Conclusions

In conclusion, ensuring broad perspectives in urban health (including equity between different neighborhoods) as part of fostering social health determinants should always be high on the agenda. Overall, because the public health safety issue of unsafe buildings and sidewalks is neglected, it is high time that content analysis of such policies and interviews of key stakeholders occur. Ultimately, our study opens avenues for improving the deeply underestimated issue of urban building safety.

Supplementary Materials: The following are available online at https://www.mdpi.com/article/10.3390/urbansci5020047/s1, Figure S1: Old buildings often serving as a temporary, unsafe home (shelter) for poor or homeless people, migrants, immigrants, and refugees; File S1: International databases and their key feature; Table S1: ICD-9 and ICD-10 codes for accidents and injuries caused to persons from falling of buildings, falling off buildings, and falls on the same level; Table S2: Statistics on femoral neck bone (including hip) fractures (Code 473), 2004–2012, Greece; Table S3: Statistics on fractures in the hip and neck area (S70, S71, S72, S73 codes), 2013, Greece.; Table S4: Statistics for falls on the same level in Greece, 2013′ Table S5: Suggested policies and measures to be taken by the Municipal authorities.

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