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Inside an Urban House - A Cross Sectional Study on Urban Housing Standards

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Abstract

Introduction: Poor housing can increase the risk to people due to structurally deficient housing, poor construction or maintenance, can increase the chances of fall and risk of injuries. Indoor environment refers to the quality of air inside the dwelling. From different sources indoor air pollution can occur, mainly from inappropriate building materials can cause cracks, crevices, moulds and dust. **Objective:** To assess the housing standards in urban field practice area under Department of Community medicine, Sri Devaraj Urs Medical College, Tamaka, Kolar. **Materials & Methods:** A community based cross-sectional study using universal sampling technique conducted in urban Kolar Karnataka. Among all households living for at least minimum of 1-year duration under Gandhi Nagar P.H.C urban field practice area of Department of Community Medicine, SDUMC, Kolar were approached and house to house survey was done. Interview was done to Head of the family or the most senior member available in the family on the survey day. The data was analysed by using licensed SPSS version 22. Descriptive statistics like frequencies, proportions and confidence intervals were used. Chi-square test applied test the significance difference. **Results:** Among the 608 houses surveyed, 96.1% houses have independent access to street, 65.3% of houses are away from breeding places of flies, 79.9% of houses are away from the nuisance such as smoke, smell excessive noise and traffic. Around half of the houses (48%) have obstruction to lighting and ventilation, 44.2% houses doesn't have open space all around the house and 50.5% houses have overcrowding. **Conclusion:** Housing conditions in urban areas failed to meet the requirements for health with a substantial range of hazards present. Housing conditions have to improve on lighting, Ventilation, sewerage system, waste disposal and closing open drainages around the houses.

Keywords: Housing; Housing standards; Urban

Introduction

Healthy housing gives a feeling of home, which includes a sense of belonging, security and privacy. It depends on the several factors like the physical structure of the dwelling, and the extent to which it enables physical health, including by being structurally sound, by providing shelter from the elements and from excess moisture, and by facilitating comfortable temperatures, adequate sanitation and illumination, sufficient space, safe fuel or connection to electricity, and protection from pollutants, injury hazards, mold and pests. Improved housing conditions can save lives, prevent disease, increase quality of life, reduce poverty, help reduce the effects of climate change and contribute to the achievement of the Sustainable Development Goals (SDGs), including (SDG 3) addressing health and (SDG 3) sustainable cities¹.

The physical structure of housing depends on building materials and design which is an important part of the built environment. Examples of construction material impacts are: formaldehyde emissions from fiberboard materials; the release of asbestos from textured ceilings; and fibers from glass insulation material, which are all hazardous for human health².

Indoor environment refers to the quality of air inside the dwelling. From different sources indoor air pollution can occur, mainly from inappropriate building materials can cause cracks, crevices, molds and dust. Another main source of indoor air pollution is from busy roads and intersections — outdoor air contaminants from motor vehicle exhaust get entered through the gaps between the frame of windows and doors. Contaminants from work and waste sites can be trapped inside on footwear. Incomplete combustion of fossil fuels in gas cookers, un-flued gas heaters, and cigarette smoking generates harmful contaminants like nitrogen dioxide, Sulphur dioxide, hydrocarbons, carbon monoxide and particulate matter. Exposure to nitrogen dioxide inflames airways and increase blood lead concentrations in children from lead pipe water, ingestion of flaking lead paint can affect kidneys, reproductive organs, nervous system, and cognitive functioning³.

In 2012, India recorded over 2600 deaths and 850 of various casualties occurred due to collapse of about 2700 buildings⁴. In 2016, 3.8 million deaths globally reported in low- and middle-income countries due to household air pollution from the use of solid fuels for cooking⁵.

Pradhan Mantri Awas Yojana launched by the Narendra Modi government in 2015, it aspires to eliminate urban housing shortage in India by the year 2022. This Yojana is being executed through four verticals: *In-situ* slum redevelopment, Credit Linked Interest Subsidy, Affordable Housing in Partnership, Affordable Housing in Partnership⁶.

To understand the factors influencing housing standards and problems faced in urban area, so that can access about overcrowding, lack of space for open air living

between houses, sanitary problems and role of urbanisation in housing. Limited number of studies are done about housing standards in an urban India. Objective of our study is to assess the housing standards in urban field practice area under Department of Community medicine, Sri Devaraj Urs Medical College, Tamaka, Kolar.

2. Methodology

A community based cross-sectional study was conducted in urban Kolar Karnataka. Among 4 primary health centres (Rahmath nagar, Durga Mohalla, Municipal hospital and Gandhi Nagar) in urban Kolar, Gandhi Nagar PHC was selected by simple random sampling (Lottery method). The total population of the Gandhi Nagar as per 2011 Census is 6807 and the total no of houses is 1370⁷. All the people living for at least minimum of 1-year duration under Gandhi Nagar P.H.C, urban field practice area of Department of Community Medicine, SDUMC, Kolar were included. (Figure 1) Locked houses during the time of survey were excluded after two visits. House to house survey was done under Gandhi Nagar PHC to assess the housing standards and factors influencing the housing conditions. The survey team were comprising Assistant professor, Postgraduate from the Department of Community Medicine. Each day about 20-30 houses were covered with the help of pre-tested, semi-structured questionnaire. Data was collected using interview method by using a pre structured questionnaire which lasted less than 10 minutes. Interview were done to Head of the family or the most senior member available in the family on the survey day. Data obtained was compiled in Microsoft excel and SPSS statistical licensed software version 22 used for analysing the data. Descriptive statistics like frequencies, proportions and confidence intervals were used.

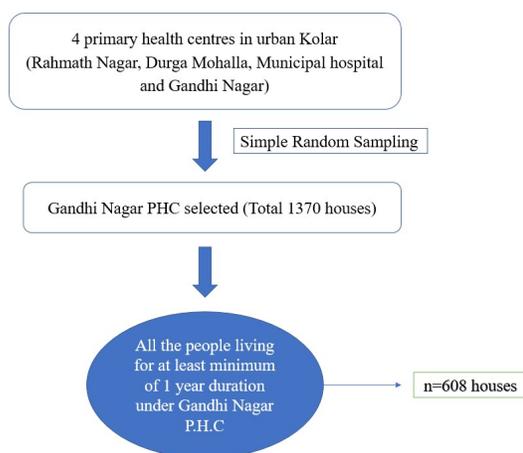


Fig 1. Flow diagram of Sampling

Results

A total of 608 houses included in the study using Universal sampling method under Gandhi Nagar P.H.C, urban field practice area of Department of Community Medicine, SDUMC, Kolar.

Table 1. Factors associated with external housing environment

Variable	Frequency (n)	Percentage (%)
Family structure		
Nuclear family	431	70.9%
Joint family	177	29.1%
Elevated from surroundings		
Yes	468	77%
No	140	23%
Independent access to street		
Yes	584	96.1%
No	24	3.9%
Away from breeding place of flies		
Yes	397	65.3%
No	211	34.7%
Away from nuisance such as smoke, smell, excessive noise and traffic		
Yes	486	79.9%
No	122	20.1%
Soil should be dry and safe should be well drained		
Yes	548	90.1%
No	60	9.9%
Waste dumping area nearby houses		
Yes	484	79.6%
No	124	20.4%
Built up area should not exceed 1/3rd of total area		
Yes	375	61.7%
No	233	38.3%
Obstruction to lighting and ventilation		
Yes	292	48%
No	316	52%
Open space all around the house		
Yes	269	44.2%
No	339	55.8%

Among 608 houses, 468 (77%) houses are elevated from surroundings, 584 (96.1%) houses have independent access to street, 397 (65.3%) houses were away from the breeding place of flies, 486 (79.9%) houses are away from nuisance such as smoke, smell, excessive noise and traffic, 548 (90.1%) houses have dry soil and well drained safe. 484 (79.6%) houses have waste dumping area nearby house, 375 (61.7%) houses have built up area should not exceed 1/3rd of total area (Table 1).

Around half of the houses (48%) have obstruction to lighting and ventilation, 44.2% houses doesn't have open space all around the house and 50.5% houses were overcrowded. Among 608 houses surveyed, 483 (79.4%) houses are attached houses and 125 (20.6%) houses are detached houses, 456 families owned their house and only 151 families lived in rented house and 1 family lived in leased out home, 589 (96.9%) houses were pucca houses, 15 (2.5%) were kaccha houses. Majority of houses (96.9%) have cemented floor, 539 (88.7%) have RCC roof, 95.7% houses surveyed were plastered walls, only 101 (16.6 %) houses have cracks and crevices on the walls, 412 (67.8%) houses have ratio of the window space to 1/5th of the floor area is present, 310 (51%) houses have cross ventilation, 351 (57.7%) houses were having adequate lighting, 569 (93.6%) houses have separate kitchen, 589 (96.6%) houses are using LPG for cooking. Majority of houses 20 (3.3%) don't have advance smoke outlet 218 (35.9%) houses have smoke outlet on the kitchen, 170 (28%) have smokeless chulha (\$).

Discussion

We found that housing conditions do not meet requirements for good health and well-being, with significant hazards present and kutchha dwellings experiencing the most limiting conditions. In general, the housing investigated had poor ventilation for the removal of pollutants, used hazardous materials and was poorly constructed, experienced overcrowding and had poor natural lighting. Dumping of solid waste around the settlement is widely practiced, attracting rats, stray dogs and other pests.

Interventions to improve housing need a multisectoral approach and the involvement of different stakeholders. Capacity building and financial support are needed to improve construction practices and dwelling design, to ensure safe construction to design codes and support access to better materials and clean cooking fuels.

A survey conducted in urban Ibadan, Nigeria by Olusola Oladapo Makinde in 2020 showed that 74.5% were house owners, while 22.7% are renters and 2.8% inheritors and government allottees⁸. Similarly, in this study 74.8% were house owners, 24.8% are staying in rented house.

In a study conducted by Sharma et al. in urban Delhi on 2022 found that majority (63%) of houses doesn't have adequate lightning and ventilation. Open space around the house is not there for 58% of houses⁵. Ventilation depends on the setback area of house, in this study setback area is absent in 48% of houses it is because of cost of the land in urban areas and lack of lands availability. Improving the lighting and ventilation will decrease the chances of getting infections from in and around the surroundings because light and air is a natural agent for disinfection.

Table 2. Factors associated with internal housing environment

Variable	Frequency (n)	Percentage (%)
Type of house		
Attached	483	79.40%
Detached	125	20.60%
Construction of house		
Own house	456	74.80%
Rented house	151	24.80%
Leased out home	1	0.40%
Construction of house		
Pucca	589	97%
Kaccha	15	2.50%
Semi-pucca	3	0.50%
Floor		
Mud	19	3.10%
Cement	589	96.90%
Roof		
Thatched	68	11.30%
RCC	539	88.70%
Walls		
Non-Plastered	26	4.30%
Plastered-Mud/Cement	582	95.70%
Cracks and crevices		
Yes	101	16.60%
No	507	83.40%
Overcrowding		
Yes	307	50.50%
No	301	49.50%
Ratio of the window space to floor area (1/5th of the floor area)		
Present	412	67.80%
Absent	196	32.30%
Doors and Window Space Combined to the Floor Area (2/5th of the Floor area)		
Yes	399	65.60%
No	209	34.40%
Cross Ventilation		
Present	310	51%
Absent	298	49%
Lighting		
Present	351	57.70%
Absent	257	42.30%
Kitchen		
Separate	569	93.60%
Not separate	39	6.40%
Fuel used for cooking		
LPG	589	96.60%
Others	18	3.20%
Smoke outlet		
Present	218	35.90%
Absent	390	64.10%
Smokeless chulha		
Yes	170	28%
No	438	72%
Advanced smoke outlet		
Yes	20	3.30%
No	58	96.70%

Ventilation improves the air circulation and reduces the indoor pollutants and thereby low chance of respiratory tract infections especially among children. In 2020, study conducted by Emily Nix et al. in resettlement colony, Savda Ghevra, located on the North-West edge of Delhi reported that walls of the houses are made with brick and cement mostly⁹. A study conducted by Naz et al. found that majority of houses are having separate kitchen for cooking. Liquefied petroleum gas (LPG) was the predominant fuel for cooking and exhaust fans were present in 38% of houses. 83% of households practicing the dumping of solid waste around the settlement similar findings were observed in this study.

Most of the families staying in the urban area in our study belongs to nuclear family. For better lifestyle and higher education of their children they migrated from small villages to urban areas. The households invested to make a house with low budget, it makes them to own less area of land and construction of small dwellings which leads to overcrowding. In this study majority of the houses are overcrowded. Overpopulation leads to tremendous pressure on infrastructural facilities like housing, electricity, water, transport, employment, etc. Similar studies conducted by Lopez et al., Emina et al., Riley et al., Corburn et al., done in different parts of country found that people in urban slums are highly susceptible to COVID 19 infection due to over population and overcrowding because physical distancing and self-quarantine is impractical and this led to rapid spread of an infection¹⁰⁻¹⁵.

Conclusions

We found that housing conditions in urban areas failed to meet the requirements for health with a substantial range of hazards present. Housing conditions were revealed to significantly affect daily practices, which in turn is likely to limit socio-economic development and gender equality. We recommend for strengthening the local leadership. Local leaders need to be made aware of the importance of urban planning and public policies. Their participation helps in integrated development, help mobilize finances and build affordable housing. Housing solutions need to consider the systemic impacts, local perspectives and, in particular, the needs of women and girls to be inclusive, effective and desirable. Another recommendation is about sewerage problems and waste disposal. Water pipes run in close proximity to sewer lines, its leakage can lead to contamination of water which results in the spread of several water borne diseases. Landfills are hotbeds of disease and innumerable poisons leaking into their surroundings. Another suggestion is to improving the drainage system by closing all open drainage with concrete slabs without any gaps in between, so that vector breeding places can be reduced.

Ethical considerations

The study protocol was approved by the Institutional ethical committee for human studies and approval number is DMC/KLR/IEC/102/2022-23.

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