Health and wellbeing Benefits of Urban Agriculture Practice in Kathmandu Valley

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ABSTRACT

Background: Urban areas are occupied with dense population and green spaces are hard to find. Urban agriculture solves food security problems as well as has important positive health outcomes. The aim of this study is to determine health and wellbeing Benefits of Urban Agricultural Practice.

Methods: A cross-sectional study was conducted from December 2022 to June 2023. Random selection of three study sites from Kathmandu valley was done. The total sample size was 230 which was grouped into involved in agriculture (115) and non- Involved in agriculture (115). Those groups were recruited from different wards of Kathmandu, Lalitpur and Bhaktapur. Questionnaire regarding socio-demographic variables, SF-12 health survey, perceived stress scale, satisfaction with life scale were used. KoBo Toolbox was used for data collection.

Results: The involved in agriculture groups differed from non-involved in terms of gender, ethnicity, occupation, marital status, education and ownership of the house ($p<0.05$). Participants engaged in urban agriculture reported significantly lower levels of perceived stress compared to those not involved in urban agriculture. Similarly, the data shows that life satisfaction was significantly higher among the group involved in urban agriculture.

Conclusions: Urban agriculture was associated with lower perceived stress and higher life satisfaction among the study participants who were involved in urban agriculture compared to the group not involved as compared to the group of study participants not involved in urban agriculture.

Keywords: Agriculture; cities; healthcare; urban population.

INTRODUCTION

Urban agriculture refers to "a dynamic concept that encompasses various livelihood systems, ranging from subsistence production and household-level processing to more commercialized agricultural practices".[1] Currently, 55% of the global population resides in urban areas.[2] Projections suggest that by 2050, urban population will increase by 2.5 billion globally with 90% increase in Asia and Africa, which poses challenges to ecological equilibrium and the relationship between nature and humans.[3]

Urban agriculture contributes to mitigate environmental issues, enhancing community functions, and developing urban food systems[4] and has been suggested to provide urban residents with opportunities to alleviate stress, connect with their community members, and engage in physical activity.[5] Epidemiological studies show good links between people's health and well-being and urban green spaces.[6]

However, the extent to which these relationships apply to urban agriculture specifically remains unclear. Therefore, it is crucial to directly examine the health benefits of urban agriculture among those involved in such practices.

METHODS

A cross-sectional study was conducted in Kathmandu valley from December 2022 to June 2023.Random selection was done from three districts Kathmandu, Lalitpur and Bhaktapur. (Fig.1)

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The study was approved by the institutional review committee of Kathmandu Medical College (Registration No. 04122022/07). Witten consent was taken from the participants prior to the study. Objectives and purpose of the study was explained clearly to participants. Privacy and confidentiality of information about the individual was strictly maintained. In all respects autonomy of the research participants was fully respected and ensured.

Those who are involved in urban farming and above 30 years are included in the study. Exclusion criteria in the study includes above 70 years of age and commercial farming in large area.

The systematic random sampling technique was used to select the households. Participants consisted of involved groups (n=115) who were involved in urban agriculture and non-involved groups (n =115) who were not involved in urban agriculture. They were matched in terms of age and gender to within 10%. Participants were also closely be matched in terms of main occupation, with the majority of participants in each group identifying themselves as employed.

Involved groups were recruited from different wards of Kathmandu, Lalitpur and Bhaktapur. Approximately 38 participants were recruited from each ward in the involved group.

Participants in noninvolved groups were recruited from nearby shopkeepers (grocery, meat shop, garment, stationary, tea shop, on rent) and neighbors. This group consisted of participants who did not take part in any gardening or agricultural activities. These participants were identified by asking the question 'do you garden?' and informing potential participants that the study required participants 'those not involved in the garden or farms.

The field data of urban agriculture practices in Kathmandu valley was collected using KoBo Toolbox. A Kobo Toolbox[8] is a free and open-source tool, having an easy-to-use graphic user interface used for data collection like google form. It is a digital data collection tool for quantitative surveys and allows users to collect and store data offline. This toolbox permits repetitive questions and skip logic method and has an advanced mode of questions, including photos, collecting GPS coordinates, and video recordings.[9] It is most handy in challenging environments and demanding contexts, useful for research and humanitarian activities. Thus, it is a one-stop solution for collecting, analysing, and managing data acquired from the field.

A free account was created on the Kobo website and an open-ended and closed-ended pretested questionnaire were prepared to collect the information from the respondents. The locations of the sample households were traced through the collected GPS coordinates as shown in figure below. The raw data collected from KoBo toolbox were downloaded in the excel sheet format. The geographic visualization and spatial analysis of data was conducted on the GIS platform.

The Questionnaire comprised information regarding socio-demographic variables, general health aspects, which was assessed using standardized and validated scales. Perceived general health was assessed by asking respondents to estimate their general health on a five-point scale, ranging from 1 = bad to 5 = excellent. This indicator originates from the SF-12. [10] Physical constraints were assessed by the physical functioning subscale of the SF-12. Well-being was assessed by perceived stress scale.[11] The perceived stress scale is important because it gives the perception of what is happening in life. This is the tool to assess the level of stress. Individual scores ranged from 0-40 with higher scores indicating higher perceived scales. Satisfaction with life scale [12] is a 5-item scale designed to measure global cognitive judgments of one's life satisfaction (not a measure of either positive or negative affect). Participants indicate how much they agree or disagree with each of the 5 items using a 7-point scale that ranges from 7 strongly agree to 1 strongly disagree.

Data collection was done online using KOBE tool. The data collected in excel spreadsheet was later exported to SPSS version 20 and coded for analysis. The analysis included both descriptive and inferential statistics.

Descriptive statistics (frequencies, means, and standard deviations) was used to describe the variables of interest. Chi-square was used to calculate and compare baseline descriptive. Group differences in mean scores on health, well-being and physical activity measures were analysed. In all statistical tests $P< 0.05$ or less was considered statistically significant.

RESULTS

The study had a total of 230 participants. The participants were divided into two groups: those involved in agriculture and those not involved in agriculture. Each group had 115 participants. The mean age of the participants was 38.14 ± 12.7 years. The oldest participant was 70 years old, and the youngest was 18 years old. The largest ethnic group among the participants was Janajati, comprising 66

(57.3%) of the involved group and 54 (46.9%) of the non-involved group. All of these participants were followers of Hinduism. Employment status varied between the two groups. In the involved group, 88 (76.5%) participants were employed, while in the non-involved group, 104 (90.43%) were employed. Educational attainment also differed between the groups. In the involved group, 64 (55.7%) participants had completed higher secondary education or above. This percentage was higher in the non-involved group, where 82 (71.3%) had achieved this level of education. In both groups, the majority of respondents lived in urban areas. Those who were involved in agriculture owned their house and practiced kitchen gardening 87(75.7%) whereas 28(24.3%) practiced rooftop gardening. The mean years of involvement in agriculture was 7.84±6.7.

Involved groups did not differ from non-involved groups with respect to their religion, living environment and income. In general, the involved groups differed from non-involved in terms of gender, ethnicity, occupation, marital status, education and ownership of the house. (Table.1)

When asked about their involvement in urban agriculture, 50.30% of the participants indicated that it was their hobby, 20% said they wanted to see a decrease in grocery costs, and 10.50 % said they wanted to eat healthy, clean veggies free of pesticides. (Fig. 2)

Table 2 shows the association between involvement in urban agriculture and perceived stress and life satisfaction. The findings indicate that participants engaged in urban agriculture reported significantly lower levels of perceived stress compared to those not involved in urban agriculture. Similarly, the data shows that life satisfaction was significantly higher among the group involved in urban agriculture compared to the group not involved. The difference in mean scores (2.01 vs. 1.98) suggests that involvement in urban agriculture may have a positive impact on physical health or well-being. The higher standard deviation among urban agriculture participants (1.01) suggests a wider range of experiences or perceptions regarding their physical health compared to non-participants (0.9). Similarly, individuals engaged in urban agriculture report a lower level of mental health (well-being) problems compared to those who do not participate. Both groups have the same standard deviation of 1.7, indicating that the variability in mental health scores is similar for both groups.

Table 1. Sociodemographic characteristics of the participants.

Sample characteristics	Involved groups (n= 115)	Non-involved groups (n=115)	P-value (chi-square)
Age (mean±SD)	42.03±12.68	34.26±11.5	
Sex			0.02*
Male	56(48.7)	73(63.5)	
Female	59(51.3)	42(36.5)	
Ethnicity			
Brahmin	20(17.4)	32 (27.8)	
Chettri	17(14.8)	19 (16.5)	
Janajati	66(57.3)	54(46.9)	0.002*
Madhesi	4(3.5)	5(4.3)	
Others	8(7.0)	5(4.3)	
Religion			
Hinduism	92(80)	87(75.7)	0.5
Buddhism	19(16.5)	25(21.7)	
others	4(3.5)	3(2.6)	
Occupation			0.001*
Employed	88(76.5)	104(90.43)	
Unemployed	22(19.2)	11(9.5)	
Education			
Literate	14(12.2)	6(5.2)	0.01*
Elementary	37(32.2)	24(20.9)	
Higher secondary	64(55.7)	82(71.3)	
Bachelor/above	-	3(2.6)	

Table 1. Sociodemographic characteristics of the participants.			
Marital status			
Married	91(71.1)	66(57.4)	
Single/others	24(20.9)	49(42.6)	0.001*
Living environment			
Urban			
Periurban	96(83.5)	94(81.7)	0.72
	19(16.5)	21(18.3)	
Ownership of house			
Own			0.001*
Rent	93(80.9)	44(38.3)	
	22(19.1)	71(61.7)	
Income (NRs)			
≤50000	84(73.04)	69(60.0)	------
>50000	31(26.9)	46(40.0)	

Table 2. Association of perceived stress and life satisfaction with urban agriculture.			
	Urban agriculture		P value
	Yes	No	
Total score perceived stress			
Low stress	78(67.8)	27(23.5)	0.000
Moderate stress	36(31.3)	85(73.9)	
High perceived stress	1(0.9)	3(2.6)	
Life Satisfaction scale			0.000
Extremely satisfied	18(15.7)	2(1.7)	
Satisfied	60(52.2)	35(30.4)	
Slightly satisfied	25(21.7)	42(36.5)	
Neutral	3(2.6)	4(3.5)	
Slightly dissatisfied	7(6.1)	23(20.0)	
Dissatisfied	1(0.9)	9(7.8)	
Extremely dissatisfied	1(0.9)	-	
Physical domain (mean±SD)	2.01±1.01	1.98±0.9	
Mental domain (mean±SD)	2.5±1.7	3.2±1.7	

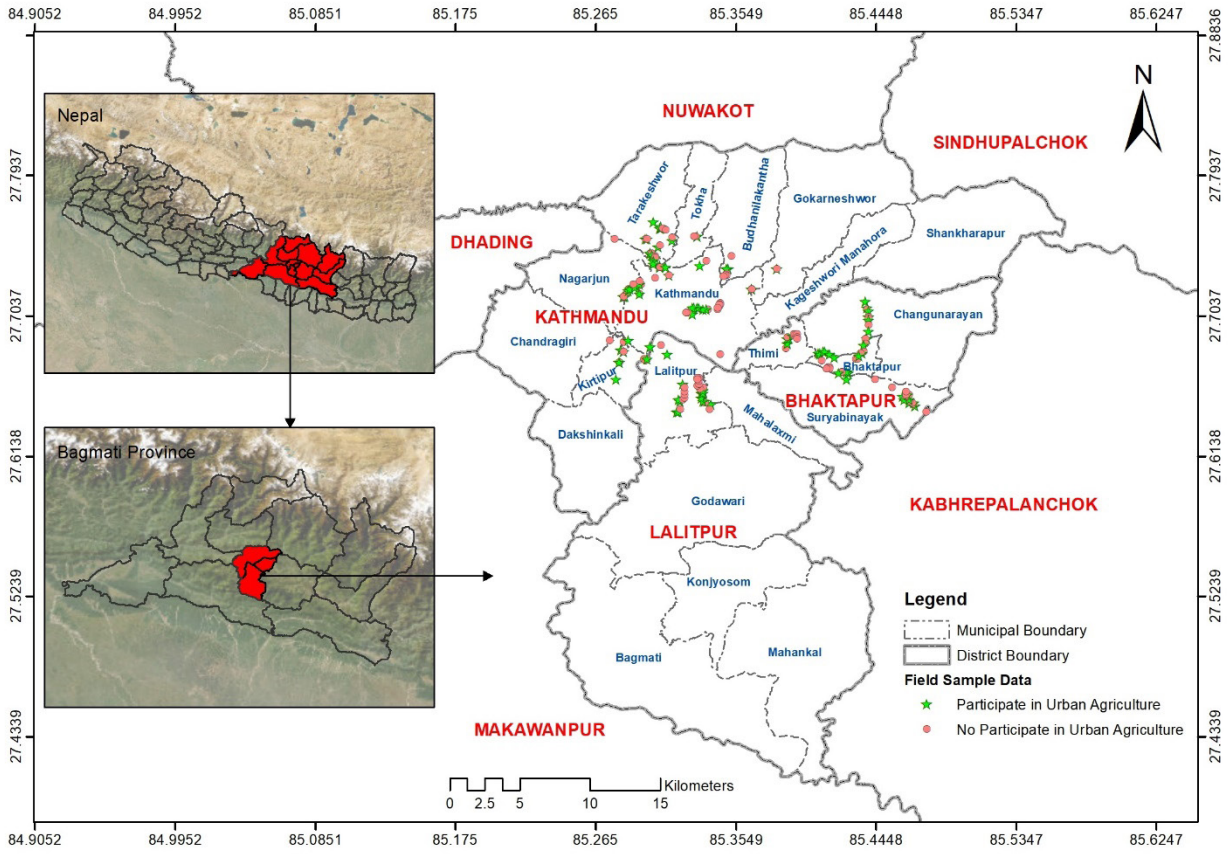
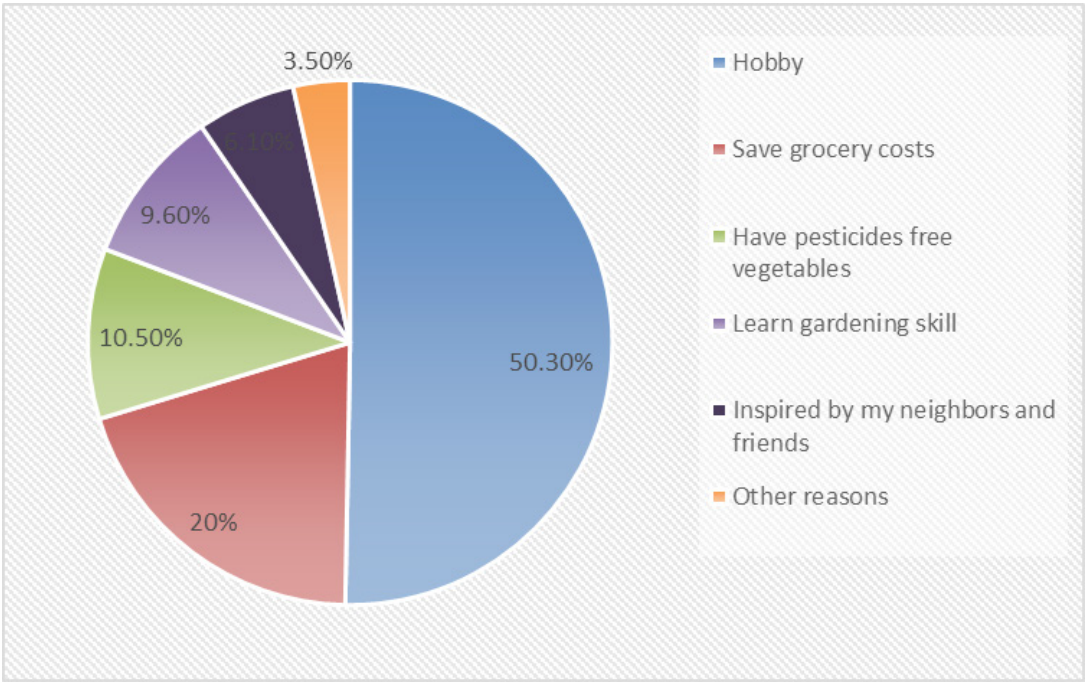


Figure 1. Map of the Study Area with sample data collection locations.



Figures 2. Reasons for involving in urban agriculture.

DISCUSSION

In contrast to previous studies[7, 13] wherein age groups over 60 were more interested in urban farming, the younger age group (<60 years) in this study appeared to be involved in urban agriculture. According to the study's findings, the two main motivations for participating in urban farming were to save money on groceries and to enjoy the activity; nevertheless, another study highlights the importance of stress alleviation and being in close proximity to nature.[7]

When compared to non-participants, the outcomes of the study validated that those who engaged in urban agriculture witnessed improvements in their physical and mental activities. These findings are consistent with earlier research.[7,13,14] Nonetheless, the Japanese case study[13] shown that the type of urban farming determines how much physical and mental activity is improved, and Berg's study[14] focuses particularly on elderly participants who profited from allotment gardening.

The study showed a significant association between agriculture involvement and perceived stress. Those participants who were involved in urban agriculture perceived less stress in comparison to those who were not involved. None of the studies referenced above had indicated about the perceived stress and its outcome in their study.

Some of the studies had indicated about perceived stress and its association also. In the article "Perceived stress reduction in Urban public garden", Bennett[15] had used a paired sample t test and Anova which revealed statistically significant differences among the means. Moreover, this study revealed about garden not urban agriculture. In this study, life satisfaction was also satisfactory among the participants who were involved in urban agriculture. Urban agriculture and life satisfaction were not related in any of the articles.

The present study represents only a first attempt at quantifying the benefits of allotment gardening in an objective manner. Therefore, caution is warranted in the generalization and interpretation of results. Future longitudinal prospective or large-scale matched-pair cross-sectional studies will be needed to identify possible causal relationships of urban agriculture with health, well-being, and physical activity.

CONCLUSIONS

This study examined the difference in health changes between participants involved and non-involved in urban farming. Participants who were involved in urban farming showed improved physical and mental domain compared with those nonparticipants. Similarly perceived stress and life satisfaction was statistically significant among those who were involved in urban agriculture.

The study provides direct quantitative evidence of the health benefits of involving in Urban agriculture than those who were not involved. This is the first known study to comprehensively evaluate the health benefits of urban agriculture using quantitative methods and comparative non-involved groups. The findings indicate that urban agriculture can play an important role in promoting and improving well-being and that it could therefore be used as a long-term tool for combatting ill-health. Therefore, the policy recommendation of this study is to promote urban agriculture activities in the urban areas of Nepal and similar developing countries, with incentive measures aimed at not only reaping the health benefits but also enjoying fresh and healthy food and a green urban environment.

ACKNOWLEDGEMENTS

The authors would like to express my gratitude to Ms. Kalpana Waiba and Ms. Alina Maharjan for their invaluable support in collecting data for this research study. Sincere thanks also go to the participants of the study; without their help, this research would not have been completed.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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