

## Correlates of Willingness to Engage in Residential Gardening: Implications for Health Optimization in Ibadan, Nigeria

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ARTICLE INFO	ABSTRACT
<b>Article type:</b> Original Article	<p><b>Background:</b> Gardening is a worthwhile adventure which engenders health optimization. Yet, a dearth of evidences that highlights motivations to engage in gardening exists. This study examined willingness to engage in gardening and its correlates, including some socio-psychological, health related and socio-demographic variables.</p> <p><b>Methods:</b> In this cross-sectional survey, 508 copies of a structured questionnaire were randomly self administered among a group of civil servants of Oyo State, Nigeria. Multi-item measures were used to assess variables. Step wise multiple regression analysis was used to identify predictors of willingness to engage in gardening</p> <p><b>Results:</b> Simple percentile analysis shows that 71.1% of respondents do not own a garden. Results of step wise multiple regression analysis indicate that descriptive norm of gardening is a good predictor, social support for gardening is better while gardening self efficacy is the best predictor of willingness to engage in gardening (<math>P &lt; 0.001</math>). Health consciousness, gardening response efficacy, education and age are not predictors of this willingness (<math>P &gt; 0.05</math>). Results of <i>t</i>-test and ANOVA respectively shows that gender is not associated with this willingness (<math>P &gt; 0.05</math>), but marital status is (<math>P &lt; 0.05</math>).</p> <p><b>Conclusion:</b> Socio-psychological characteristics and being married are very relevant in motivations to engage in gardening. The nexus between gardening and health optimization appears to be highly obscured in this population.</p>
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### Introduction

Unhealthy diet and physical inactivity are among the greatest threat to human health in the 21<sup>st</sup> century and gardening is a simple, cost-effective way of improving diet and ensuring physical activity. The problems of unhealthy diet and physical inactivity manifests in high rates of obesity and subsequently, chronic illnesses worldwide. Obesity is a chronic disease, largely precipitated by an imbalance between energy intake and ex-

penditure. Many apparently healthy Nigerians have been found to be obese, reaching up to 21.3%<sup>1</sup>. Obesity remains a major risk factor for the development of chronic illnesses, otherwise referred to as non-communicable diseases (NCDs) which were strongly associated with economic development<sup>2</sup>, but, the scenario appears to have changed dramatically. Africa is at an early stage of epidemiological transition from

communicable to non-communicable diseases<sup>3,4</sup>. These contentions have negative consequences for morbidity and mortality in the developing world, whose under-developed healthcare institutions are overwhelmed by several health conditions, including the under-nutrition related diseases. Already, 80% of chronic-disease related deaths occur in low- and middle-income countries<sup>5</sup>. By the year 2020, chronic illnesses will be the cause of 7 out of every 10 deaths in developing countries<sup>6,7</sup>.

Gardening represents a formidable tool for preventing and managing chronic illnesses as well as general health optimization. It is popular for improving fruit and vegetable consumption<sup>8</sup>; and associated with improved mental health<sup>9</sup>; improved physical health<sup>10</sup>, improved food consciousness and eating habit among young people<sup>11</sup>. When communally practiced, it also enhanced access to food and better nutrition<sup>12-14</sup>, engender greater physical activity<sup>14,15</sup>; improved mental health<sup>15</sup>; and predisposed the development of networks and social support<sup>16</sup>. It is not surprising then that Page, 2008<sup>17</sup> advocated gardening as a therapy. However, gardening may predispose access to harmful physical and biological agents that may impair health<sup>18,19</sup>.

Gardening appears to agree with the African spirit given the agricultural predominance of African occupation. However, this agreement can hardly be assumed in the urban-Africa context, due to the growing concentration of people, and the consequent competition for scarce land resources. There is a seeming dearth of data assessing the strength of this spirit in African sub-populations. Yet, this spirit is a good indicator of how the potentials of gardening will invariably manifest. For instance, the benefits and constraints to gardening were examined in a Nigerian neighborhood<sup>20</sup>. Further, profitability of vegetable gardening was examined in Imo, Nigeria<sup>21</sup>. The contribution of urban crop agriculture in Enugu, Nigeria was also assessed<sup>22</sup>. The scant literature also ignores the socio-psychological aspects of gardening. Hence, the assessment of willingness to en-

gage in residential gardening in a Nigerian sub-population is of importance. In addition, the assessment of correlates of this willingness, including socio-psychological, socio-demographic and health-related are important aims of this study. This was accomplished among non-garden-owning respondents.

## **Materials and Methods**

### ***Participants & Procedures***

The design of this study was a cross-sectional survey, targeting only civil servants of Oyo State, South Western Nigeria in April, 2012. The purpose and intent of study was well explained to each respondent, and their consents were sought. They were required to sign an informed consent column in the questionnaire to signify same. Largely structured, self-administered questionnaire were utilized in data collection. The introductory part was swiftly followed by items probing socio-demographic variables. Then, respondents were asked if they owned a garden. An answer in the affirmative implied that respondents would decline to respond to the remaining part of the questionnaire. Oyo State is a Yoruba land and the people predominantly speak Yoruba. However, a good majority, such as civil servants is largely bilingual, speaking both English and Yoruba. Civil servants constitute a microcosm of the larger society; findings among them can be extrapolated. Ministry workers are specifically targeted as the civil service is made up of other worker groups like health workers, teachers and higher institution lecturers. This is to ensure that findings are not influenced by job related dynamics. The work of ministry workers does not involve specialized form of training like health workers' and it also does not predispose to access to information like teachers' and higher institution lecturers'. Hence, ministry workers are more representative of the larger society. Data accrued from the Ministry of Finance indicates that the total population of the staff of the 16 ministries of the State is 4740. The required sample size at 95% confidence

level and confidence interval of 4 is 533. This was increased to 600 to give room for problematic questionnaires. Four ministries with the highest number of staff were selected for the study. The sampling frame was made up of the lists of these staff from where 600 respondents were randomly drawn. Of the 512 copies of the questionnaires that were retrieved, 508 were finally analyzed.

### ***Definition of variables***

Willingness to engage in residential gardening is the dependent variable of this study, operationally defined as not objecting, having no reason for not engaging in small or large scale gardening. Gardening is defined as the growing of plants like varieties of vegetables, usually on a small scale, which is distinguished from farming. Health consciousness, social support, response efficacy, self efficacy and descriptive norms are independent socio-psychological realities considered as capable of exposing this willingness. The premium that individuals place on health is the thrust of health consciousness. *Health consciousness* refers to “individuals’ comprehensive orientations toward health”<sup>23</sup>. Health consciousness predicts many health attitudes and behaviors<sup>24-27</sup>. Since “healthy activities define the health conscious individual”<sup>28</sup>, it is apt to assume that the more health conscious individuals are, the greater their willingness to engage in gardening. *Social support for gardening*, another independent variable, is the perceived embracement of gardening among societal members. Perceived social support from family and friends has a protective effect on health<sup>29</sup> and has been found to be positively related to quality of life<sup>30</sup>. Since individuals generally desire social acceptability, it is hypothesized that the higher the social support for gardening, the greater the willingness of individuals to engage in gardening. *Gardening response efficacy* is defined as perceived role of gardening in health optimization. Response efficacy is a construct of the protection motivation theory (PMT). PMT argues among other things that, the probability of taking

up recommendable health behaviour is positive function of response efficacy. Response efficacy is the belief that a recommended behaviour will be successful in reducing a threat<sup>31,32</sup>. This argument is naturally appealing. Hence, the higher the gardening response efficacy, the greater the willingness to engage in gardening. *Gardening self-efficacy* is contextually defined as the extent of belief in one’s ability to engage in gardening. Self-efficacy is “beliefs in one’s capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands”<sup>33</sup>. “...persons with strong efficacy beliefs are more confident in their capacity to execute a behavior. Beliefs about self-efficacy have a significant impact on our goals and accomplishments by influencing personal choice, motivation, and our patterns and emotional reactions”<sup>34</sup> ...and therefore makes a difference in how people feel, think and act”<sup>35</sup>. Self efficacy has broad application in health promotion studies and is as one of the most widely researched concepts<sup>36</sup>. Engagement in gardening requires confidence in one's ability to engage in gardening or gardening self-efficacy. Hence, the higher the gardening self efficacy, the higher the willingness to engage in gardening. *Descriptive norm of gardening*, i.e., perceived prevalence of gardening is another independent variable. Descriptive norm is a variable in the theory of normative social behaviour<sup>37</sup>. Since individuals will normally want to associate with social trends, it is apt to expect positivity between descriptive norm of gardening and willingness to engage in gardening.

Gender, age, education and marital status are the independent socio-demographic characteristics that are also expected to influence willingness to engage in gardening. Socialization theories support the expectation of gendered differences in gardening. These theories concord that females are predisposed toward the caregiver role, making women to be more compassionate, nurturing and protective than men<sup>38</sup>. This mentality may be extended to gardening, as it is a protective and care-giving option. Hence,

females are expected to be more willing to engage in gardening. Increasing age and marriage usually comes along with increasing sense of responsibility. Older and married individuals are expected to be more willing to engage in gardening because gardening is a responsible option that is even traditionally associated with older people. Besides, it may require getting married and having one's home and its antecedent sense of freedom before one may be able to engage in gardening. This makes it plausible to expect increasing willingness with increasing age and marriage. Education improves life chances and access to information, health information inclusive. Hence, there is an expectation of positivity between education and this willingness.

### **Measures**

**Willingness:** An 8-item willingness-assessing rating scale was used to measure willingness to engage in residential gardening (e.g. "I wish to have a garden of my own"; "gardening can fit well into my daily activities"). Cronbach's alpha was 0.84.

**Health consciousness:** Health consciousness was assessed with 11-item health consciousness scale<sup>23</sup>. This scale indicates for example the extent to which respondents are self conscious, attentive, concerned, and think about their health, including how having best possible health is important to them. Cronbach's alpha was 0.83.

**Social support:** Social support for gardening was measured with 5 items, indicating the extent of perceived "love", "acceptance", "respect", "admiration" or "embarrassment" that fellow societal members could express upon respondent's engagement in gardening. Cronbach's alpha was 0.85.

**Gardening response efficacy:** Gardening response efficacy was measured with 6 items indicating perceived role of gardening in health optimization, for instance, "preventing serious illnesses", "improving nutritional status", "promoting physical well being", etc. Cronbach's alpha was 0.87.

**Gardening self efficacy:** Gardening self efficacy was assessed with responses to these 4 items: I— "can engage in gardening", "am capable of establishing a garden", "feel confident in my ability to care for a garden", "would find it easy to suggest gardening to my family". Cronbach's alpha was 0.90.

Five perceived prevalence-assessing items were used to measure descriptive norms of gardening (e.g. "a lot of people have gardens in my neighborhood", "these days, people engage in gardening"). Cronbach's alpha was 0.869.

All items except those of health consciousness were measured on a 5-point scale whose response categories ranged from "not true at all" to "exactly true". The midpoint was "unsure". Items in the health consciousness scale were also measured on a 5-point scale whose response categories ranged from "strongly agree" to "strongly disagree". The midpoint was "undecided". Items could be positive or negative, but were scored such that higher score implied greater willingness, health consciousness, social support, better response efficacy, self efficacy and stronger descriptive norm. Possible score was between 8-40, 11-55, 5-25, 6-30, 4-20 and 5-25 for the scales of willingness, health consciousness, social support, response efficacy, self efficacy and descriptive norms respectively.

### **Demographics**

Gender and marital status were nominally assessed by requiring respondents to tick as it applied to them. Respondents stated their age and highest educational qualification. Eventually, education was assessed as a continuous variable, with a score of 1 to 8 accorded these education attainments respectively: no formal education, primary education, secondary education, Advanced levels (AL)/Ordinary National Diploma (OND)/National Certificate of Education (NCE), Higher National Diploma (HND)/B.Sc., Post Graduate Diploma (PGD), M.Sc., and Ph.D.

### **Data analysis**

Simple percentile analysis and the mode were used to evaluate some profile of respondents. The indexes of all continuous variables were computed for each respondent by simply aggregating the scores accorded their items. One sample Kolmogorov Smirnov test (for normalcy) was used to test whether the data deviate significantly from normal distributions. This shows that data distributions were not significantly different from normal distributions ( $P > 0.05$ ). One way ANOVA was used to assess significant differences in means across sub-groups of marital status. *t*-test was used to test this difference between gender sub groups. Brown-Forsythe's test was used to affirm or refute group differences. Levene's test for homogeneity of variance was used to assess the homogeneity of variance across sub-groups of independent socio-demographic data/variables, as a prerequisite to the validity of significant differences. Eta and  $\eta^2$  were used as measures of effect sizes when significant differences were detected. Step-wise multiple regression analysis, including Pearson's correlation coefficient (*r*), multiple R, multiple coefficient of determination ( $R^2$ ) and beta coefficient ( $\beta$ ) were used to elaborate the relationship between and among willingness to engage in gardening, health consciousness, social support for gardening, gardening response efficacy, gardening self efficacy, descriptive norm of gardening, age and education. All data were analyzed with Statistical Package for Social Sciences (version 15.0, 2006, SPSS, Inc, Chicago, IL, USA).

### **Results**

Males were 51.6% while females were 47% of total respondents. The gender of 1.4% of respondents was not indicated. The mean age of respondents was 37.9, the modal was 40 (min. =20; max. =70). The percentages of those who are married, single, divorced and widowed was 66.9, 29.1, 1.4 and 2.6 respectively. The modal education attainment sub-group is the HND/B.Sc sub-group, as almost half of total respondents

were interestingly graduates (43.1%). Respondents without formal education were 0.8% while another 1% represents doctorate degree holders. Table 1 shows the demographic profile of respondents. The percentage of respondents who owned a garden was 28.5, while 71.1% did not own a garden. Meanwhile, 0.4% of respondents did not respond to this question. Male's mean score on willingness to engage in gardening was 27.68 while females' was 26.94 ( $P > 0.05$ ). Married respondent's mean score was 27.91. The mean score for singles, divorced and widowed respondents was 26.53, 21.83 and 21.37 respectively ( $P < 0.05$ ,  $\eta = 0.158$ ,  $\eta^2 = 0.025$ ). The results obtained on the analysis of the influence of gender and marital status on willingness to engage in gardening is presented in Table 2.

The step-wise multiple regression analysis of the relationship between willingness to engage in gardening and other continuously-assessed independent variables shows that only gardening self efficacy, social support for gardening and descriptive norm of gardening are significantly and positively related to this willingness: gardening self efficacy yielded a Pearson's *r* of 0.675, partial *r* of 0.434,  $R^2$  change of 0.456, and a standardized  $\beta$  of 0.424 ( $P < 0.001$ ). Social support for gardening yielded a Pearson's *r* of 0.618, a Partial *r* of 0.417, a  $R^2$  Change of 0.095 and a standardized  $\beta$  of 0.358 ( $P < 0.001$ ). Descriptive norm of gardening yielded a Pearson's *r* of 0.456, a Partial *r* of 0.146, a  $R^2$  Change of 0.010 and a standardized  $\beta$  of 0.117 ( $P < 0.001$ ).

The multivariate analysis of willingness to engage in gardening on one hand and these three variables (gardening self-efficacy, social support for gardening and descriptive norm of gardening) on the other yielded a multiple R of 0.749,  $R^2$  of 0.560 and an adjusted  $R^2$  of 0.557 ( $P < 0.001$ ).

This shows that 56.0% of the variation in this willingness is accounted by gardening self-efficacy, social support for gardening and descriptive norm of gardening. Health consciousness, gardening response efficacy, education and age demonstrated transient or

no association with willingness to engage in gardening: health consciousness yielded a Pearson's *r* of 0.037 and a standardized  $\beta$  of -0.046 ( $P > 0.05$ ). Gardening response efficacy yielded a Pearson's *r* of 0.365 ( $P < 0.05$ ) and a standardized  $\beta$  of 0.004 ( $P > 0.05$ ). Education yielded a Pearson's *r* of 0.004 and

a standardized  $\beta$  of -0.019 ( $P > 0.05$ ). Lastly, age yielded a Pearson's *r* of 0.000 and a standardized  $\beta$  -0.018 ( $P > 0.05$ ). Result of step-wise multiple regression analysis showing relationship between and among variables is shown in Table 3.

**Table 1:** Demographic characteristics of the respondents (n=508)

Demographic characteristic		n (%)
Gender	Male	262(51.6)
	Female	239(47.0)
	Missing	7(1.4)
Age (yr)	20-30	158(31.9)
	31-40	160(32.3)
	41-50	119(24.0)
	51-60	53(10.7)
	61-70	6(1.2)
	Missing	12(2.4)
Educational level	No formal education	4(0.8)
	Primary education	6(1.2)
	Secondary education	52(10.3)
	NCE/OND/HSC/A Level	180(35.6)
	B.Sc/HND	219(43.4)
	PGD	7(1.4)
	Master degree	32(6.3)
	PhD	5(1.0)
Missing	3(0.6)	
Marital status	Single	147(29.1)
	Married	338(66.9)
	Divorced	7(1.4)
	Widowed	13(2.6)
	Missing	3(0.6)

**Table 2:** Willingness to engage in residential gardening by gender and marital status

Variables		Mean (SD)	Statistics
Gender	Male	27.68 (12.23)	F=649, P=0.405
	Female	26.94 (9.98)	
Marital Status	Single	26.53 (9.84)	F=3.005, P=0.030
	Married	27.91 (12.30)	
	Divorced	21.83 (10.28)	
	Widowed	21.37 (10.12)	

## Discussion

The socio-demographic profiles of respondents reflect an almost bipolar distribution of respondents in terms of gender and a young work force

in terms of age. An overwhelming majority of respondents were married. This speaks quite well of marriage stability in the study area. An overwhelming majority of respondents do not own a garden.

**Table 3:** Result of univariate and step-wise multiple regression analysis showing relationship between and among variables

Predictors	Univariate (Unadjusted) Results				Multivariate (Adjusted) Results
	Pearson's <i>r</i>	Partial <i>r</i>	R <sup>2</sup> change	$\beta$	
Gardening self-efficacy	0.675**	0.434**	0.456**	0.424**	R <sup>2</sup> = 0.560** Adjusted R <sup>2</sup> = 0.557**
Social support for gardening	0.618**	0.417**	0.095*	0.358**	
Descriptive norm of gardening	0.456**	0.146**	0.010*	0.117**	

Dependent variable: Willingness to engage in gardening. /\*\* $P < 0.001$ , \*  $P < 0.05$ /In the multivariate step-wise regression modeling the Health consciousness, Gardening response efficacy, Education and Age were also entered in the beginning of modeling which were excluded from the model (All  $P > 0.05$ )

This implies that the abundant healthful opportunities that gardening provides are yet to be vastly tapped in the study area. Nevertheless, a sizeable percentage of respondents do own a garden, indicating some basis of cheeriness and optimism with regard to the healthiness of the people of the study area. The analysis of the influence of gender on willingness shows that males are more willing to engage in gardening than females. However, this difference was insignificant. Nevertheless, the gendered mean scores shows that males are trivially more willing to engage in gardening. Though this difference is insignificant, the fact that men are even more willing to engage in gardening is contrary to expectation. Given that gardening is a protective, care giving option, whose practice demand some measure of “domestication”, women were disappointingly less willing to engage in gardening. This is probably due to the current global and regional emphasis on gender equity and role generalization rather than differentiation, which encourages women to look beyond their domestic commitments. The analysis of the influence of marital status on willingness shows that married respondents are more willing than singles to engage in gardening. Married people are also more willing than the divorced and the widowed to engage in gardening. This difference was significant. The result of Levene’s test points to the va-

lidity of this significant difference ( $P > 0.05$ ). This shows that marital status has a main effect on willingness to engage in gardening. About 2.5% of the variation in this willingness is accounted by marital status. These findings are quite intuitive; pointing to the rationale that marriage engenders greater willingness to engage in gardening.

The results of step-wise multiple regression analysis are rather interesting. They demonstrate clearly that socio-psychological variables are greatest determinants of willingness to engage in gardening: the extent of individuals’ willingness to “mobilize the motivation, cognitive resources, and courses of action needed”<sup>33</sup> to engage in gardening is the best predictor of this willingness. On an optimistic note, this singular finding implies that people may be able to control the quality of their health: gardening is a healthful option and willingness to engage in it is largely determined by individuals’ belief in their ability to do so. Social support for gardening is next to the best predictor. This suggests that perceived social constraints, in terms of acceptance and otherwise is very important in willingness to engage in gardening. Descriptive norm of gardening is another important factor in willingness to engage in gardening, implying that social trends, and indeed prevalence of gardening is an important motivator to engage in gardening. Hence, descriptive norm of garden-

ing is a good predictor, social support for gardening is a better predictor while gardening self-efficacy is the best predictor of willingness to engage in gardening. However, health-related constructs are not important in willingness to engage in gardening: health consciousness demonstrated an insignificant association with this willingness, implying that individuals do not link gardening with health. This is also somewhat true of gardening response efficacy. However, gardening response efficacy may still be of a trifling importance, since it yielded a significant co-variation with this willingness. Continuously assessed socio-demographic variables (education and age) are also of no importance in willingness. This either implies that increasing education does not necessarily accrue increasing access to health information, or health information is not necessarily important in predisposing greater willingness to engage in gardening. It is quite counter intuitive to find that age is not related to willingness to engage in gardening, since growing older is traditionally associated with gardening. This is simply indicative of changing trends.

## Conclusion

Socio-psychological characteristics and being married are very relevant in motivations to engage in gardening. The nexus between gardening and health optimization appears to be highly obscured in this population.

## Competing interests

The authors declare that there is no conflict of interest.

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