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Dietary Supplement Use and Associated Factors Among Adults Working in Urban Settings in Tanzania: A Cross-Sectional Study

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ABSTRACT: Dietary supplements are products consumed to provide nutrients or other substances that the user may not consume in sufficient amounts through normal diets. Despite their increased global popularity, there is still scant information regarding the use of dietary supplements and associated factors among adult populations in Tanzania. This study aimed to assess the extent of dietary supplement use and factors associated with use among adults working in urban settings. This was a cross-sectional study involving 419 adults working in public and private institutions within the Ilala District of Dar es Salaam who were selected using stratified and simple random sampling techniques. The study's data was collected using quantitative methods through a self-administered questionnaire. Data analysis was done through descriptive statistics for frequencies, means, standard deviations, and proportions; cross-tabulations with chi-square tests for comparing observed differences in supplement use; and multivariable logistic regression for identifying factors associated with supplement use. A *P*-value of <.05 was considered statistically significant in the analysis. The prevalence of dietary supplement use among working adults was 46.5%, where 36.9% reported regular and 63.1% occasional supplement use, respectively. Seven types of dietary supplements were identified to be consumed, of which 45.1% of the respondents consumed more than one type of dietary supplement. Multivitamins (64.1%) were the most frequently reported type of supplement consumed, followed by Mineral (34.9%) and Herbal/Botanical (26.7%) supplements. The most commonly reported reason for dietary supplement use among working adults was to improve overall health (67.1%). A third of the users (35.9%) admitted to self-prescribing dietary supplements without seeking professional medical advice. The use of dietary supplements was significantly associated with being female (AOR = 2.243, 95% CI 1.415-3.555, *P* = .001) and knowledgeable of supplements (AOR = 6.756, 95% CI 4.092-11.154, *P* < .001). Overall, the use of dietary supplements is popular among adults working within urban settings, but its use is exacerbated by perceived knowledge and self-prescription instead of health professional advice. Therefore, there is a need for further studies to explain better the underlying drivers for perceived knowledge on decision-making. There is also a strong need for extensive health education to prevent inappropriate or excessive use of supplements which might lead to potential adverse events.

KEYWORDS: working adults, dietary supplements, urban settings

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Introduction

Tanzania has continued to encounter increasing malnutrition, particularly under-nutrition and over-nutrition, and diet-related non-communicable diseases. The National Nutrition Survey shows that the prevalence of overnutrition (overweight or obese) among women aged 15 to 49 years has increased in the past 2 decades from 11.3% in 1992 to 31.7% in 2018, and it is higher among wealthier populations and those living in urban areas.[1] The sub-Saharan Africa (SSA) region has also experienced an increase of 67% in the burden of non-communicable diseases in the past 3 decades, where the most affected populations are of economic and social working age and situated in urban settings.[2]

Worldwide, consumers desire good health and improved nutrition amid a demanding working environment and increasing healthcare costs, particularly in developing countries. The emergence of consumers adapting to healthy lifestyles has influenced them to seek alternative forms of medicinal and nutritional products.[3] Dietary supplements are products consumed to provide nutrients or other substances that the user may not consume in sufficient amounts through normal diets. They are considered alternative forms of medicine and nutrition because of their dietary composition and the expected health promotion benefits that come with their consumption.[4]

The regulation of dietary supplements differs across many countries where they are either produced or imported. In Tanzania, dietary supplements are regulated under the Food, Drugs, and Cosmetics Act of 2003 and the Standards (Imports Registration and Batch Certification) Regulations of 2021. These legislations safeguard public health interests by ensuring the safety and quality of dietary supplements before their distribution, including directions on their safe and appropriate use because they can potentially cause high health risks to vulnerable groups with impaired physiological conditions.[5,6]

The global demand for dietary supplements has recently increased because they were initially consumed by athletes, gym attendants, and bodybuilders. However, they have extended to consumers of working-age groups who seek well-being and vitality and are influenced by their socio-demographic and lifestyle characteristics.[7] The dietary supplements

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currently in the global market and widely consumed are segmented but not limited to vitamins, fish oils, minerals, proteins, herbs, or botanicals like Ginseng, Ganoderma, and the like.[8,9]

Globally, over the past 40 years, there has been an observed increase in dietary supplement use from 25% to 70%.[10-13] These proportions are higher among people with non-communicable diseases, the elderly, women, and university students.[11,12,14,15] The increase in dietary supplement use can influence consumers to abandon conventional diets and medically approved treatments, thus leading to adverse reactions. Dietary supplement use is of public health concern because excessive, inappropriate, or unsupervised consumption can lead to adverse reactions and ailments.[16,17]

In Sub Saharan Africa context, studies reported the prevalence of dietary supplement use in Ghana among stroke survivors (29.4%), in Kenya among urban adults aged 18 to 64 years (14.4%), in Uganda among professional athletes participating in individual and team sports (13.4%), and in South Africa among university dietetics students (23.0%). These studies further reported that dietary supplements were used to improve inadequate diet, maintain overall health, manage weight and build muscle, and prevent diseases through a strengthened immune system.[18-21]

In Tanzania, studies have been done primarily on using micronutrient supplementation to prevent nutrition deficiencies among pregnant women and school children.[22-24] However, there is limited information with regard to dietary supplements and the factors associated with use among adult populations in Tanzania despite their increased popularity, particularly in urban settings, where inappropriate or unsupervised use can lead to adverse reactions or worse.[25]

Hence, this study aimed to assess the extent of dietary supplement use among the working population within urban settings and the factors associated with this consumption because limited studies have researched this population. It is vital to acknowledge that urban adults have access to vast information that can drive them to make decisions on their health and lifestyle choices.

Methods

This cross-sectional study was conducted in Ilala District, 1 of the 5 districts in Dar es Salaam region, located in eastern Tanzania. The district has 3 divisions, namely, Ukonga, Ilala, and Kariakoo, which are subsequently divided into 26 administrative wards. The population of the district is estimated at 1 775 049 people. There are 611 412 and 92 162 adults aged above 25 years employed in the private and public sectors, respectively in Ilala District.[26]

Sampling

Probability sampling techniques were employed in this study. The primary sampling units for this study were institutions in the service industry within Ilala District. Separate lists of public and private institutions were obtained from the Ilala District council offices. Stratified random sampling was employed on both lists of public and private institutions, which served as a sampling frame for this study, and a total of 28 private and public institutions were selected for the convenience of the study.

In each selected institution, a list of full-time staff was obtained from the respective administrative/human resources officer, and the employees were selected through simple random sampling. Only pre-selected employees available for work on that particular day were considered for the study, and other employees replaced those who were pre-selected but absent. The study participants were proportionately sampled from each institution to reach the estimated sample size of respondents. The employees' weight and height measurements were taken in each institution before leaving the questionnaires with them.

Due to limited information on dietary supplement use in Tanzania, the prevalence of dietary supplement use reported from other studies conducted in Sub-Saharan Africa could not be used because they were from different target groups (eg, elderly adults, gym attendants) to this study. Therefore, sample size estimation considered an expected prevalence of 50%, power of 90%, and 0.05 precision yielding 427 as the sample size.[27]

Data Collection

The Research and Publication Committee of the Muhimbili University of Health and Allied Sciences (MUHAS) gave the study ethical clearance.

Field data was collected using a pretested, self-administered questionnaire (with closed and open ended questions) developed in English and translated into Kiswahili. This tool was adapted from a 2015 study reported by Valentine[28] from Illinois State University due to the similarities in study approach and research topic.

The questionnaire gathered information on the sociodemographic and economic characteristics, lifestyle/behavioral characteristics, perceived knowledge of supplement use, supplement consumption patterns, and social-environmental characteristics. The weight and height measurements were taken using SECA scale by trained research assistants before leaving the questionnaires with the respondents to determine their respective Body mass index (BMI).

Permission was obtained from local authorities in Ilala District and Executive directors in selected organizations before conducting any measurements on consenting respondents. All the respondents were measured without shoes and heavy clothing like suit coats and jackets. The respondents filled out the questionnaires in person within their organizations and were not required to provide their names or telephone contacts. All information was treated as confidential.

Before their participation, the study's aim and benefits were explained thoroughly to the respondents, including their right

to voluntary participation. Each respondent was requested to provide consent; only those who consented were included in the study.

Data management and analysis

The completed questionnaires were checked for consistency and completeness on the day of data collection, and errors were corrected in the field. Data cleaning was done and then followed by sorting, coding, and entering into SPSS version 18.

Dietary supplement use was the outcome variable where respondents who used any supplement within the past 12 months were coded as 1, and those who did not were coded as 0. Independent variables included socio-demographic, socio-economic, lifestyle/behavioral, self-perception issues, and perceived knowledge of supplement use.

Descriptive statistics were done to generate frequencies, means, and standard deviations to describe the sample population. The proportions of dietary supplement use by categories of independent variables were compared using cross-tabulation with chi-square tests to determine the significance of their observed differences. Multivariable logistic regression was used to identify factors associated with dietary supplement use among the adults working in Ilala District. The statistical significance level was set at *P*-value of .05 or less.

Results

The study analysis involved 419 respondents working in diverse institutions within Ilala District who were successfully approached. A large proportion of respondents (60.1%) were from public institutions while the rest were in private organizations. More than half (56.6%) of these respondents were female. Three quarters of the respondents (76.6%) had a bachelor's degree or a higher level of education (Table 1). Two thirds of the respondents (66.1%) were between the age of 20 and 39 years, and the mean age of the respondents was 37.5 ± 10.58 years. A large proportion (72.1%) of the respondents reported earning a monthly income of more than Tshs. 800 000/= (approximately $344). The mean BMI was 27.46 ± 0.25 kg/m^2, where about a quarter (25.8%) of the respondents were obese, and more than a third (39.9%) were overweight.

In total, less than half (46.5%) of the respondents reported having consumed any dietary supplements within the past 12 months before the study, where a third (36.9%) reported regular use and three fifths (63.1%) reported occasional use of dietary supplements. The use of dietary supplements was higher among respondents working in private institutions (53.9%), females (53.6%), and those who considered themselves knowledgeable on supplement use (62.9%), compared to those who were not (Table 2). These observed differences were all statistically significant ($P < .05$).

Based on the responses provided and collected, 7 types of dietary supplements were identified in this study: multivitamins; singular vitamins; minerals; herbal/botanical; amino acid/protein; fatty acids/lipid based; and fiber supplements. Less than half (45.1%) of the respondents consumed more than one type of dietary supplement, and this was higher among respondents aged 60 years and above (70%), married (53.8%), and those who considered themselves to be knowledgeable on supplements (58.8%). These observed differences were statistically significant ($P < .05$). The most frequently reported type of dietary supplements consumed were Multivitamins (64.1%) which was higher among respondents working in private institutions (65.6%) compared to public institutions (62.9%), but this difference was not statistically significant (Figure 1). The least reported dietary supplements consumed were Fatty acids/lipid based supplements (7.2%), which was also higher among respondents working in private institutions (11.1%) compared to those in public (3.8%), and this difference was statistically significant ($P < .05$).

The most cited reason for the use of dietary supplements was related to improving their overall health (67.2%), which was highest among respondents working in private

Table 1. Demographic characteristics of study respondents.

VARIABLE	CHARACTERISTIC	N (419)	%
Institution	Public	252	60.1
	Private	167	39.9
Sex	Male	182	43.4
	Female	237	56.6
Age (y)	20-39	277	66.1
	40-59	127	30.3
	60 and above	15	3.6
Education level	Low	13	2.6
	Medium	84	20.8
	High	322	76.6
Marital status	Not married	140	33.4
	Married	279	66.6
Income level	Low	17	4.1
	Mid	100	23.8
	High	302	72.1
Family size	Small	212	50.6
	Medium	114	27.2
	Large	93	22.2
Religion	Christian	214	51.1
	Muslim	205	48.9
BMI	Obese	108	25.8
	Overweight	167	39.9
	Normal	143	34.4

Table 2. Distribution of respondent characteristics by dietary supplement use.

VARIABLE	CHARACTERISTIC	N	SUPPLEMENT USE (%)	CHI-SQUARE	*P*-VALUE
Institution	Public	252	105 (41.7)	6.034	.014*
	Private	167	90 (53.9)		
Age (y)	20-39	277	125 (45.1)	2.690	.261
	40-59	127	60 (47.2)		
	60 and above	15	10 (66.7)		
Sex	Female	237	127 (53.6)	10.891	.001*
	Male	182	68 (37.4)		
Marital Status	Not married	127	65 (46.4)	0.001	.974
	Married	271	130 (46.6)		
Education level	High	322	155 (48.1)	5.459	.065
	Medium	84	38 (45.2)		
	Low	13	2 (15.4)		
Income level	High	302	144 (47.7)	0.614	.736
	Mid	100	44 (44.0)		
	Low	17	7 (41.2)		
BMI	Normal	144	61 (42.4)	1.655	.437
	Overweight	167	80 (47.9)		
	Obese	108	54 (50.0)		
Perceived knowledge of supplements	Knowledgeable	256	161 (62.9)	70.715	<.001*
	Not Knowledgeable	163	34 (20.9)		
Perception of own health	Excellent	106	53 (50.0)	3.028	.220
	Good	250	108 (43.2)		
	Average	63	34 (54.0)		
Perception of own weight	Undesired weight	166	74 (44.6)	0.425	.514
	Desired weight	253	121 (47.8)		
Preexisting medical condition	Yes	92	48 (52.2)	1.332	.248
	No	324	147 (45.4)		
Alcohol use	Yes	160	78 (48.1)	0.262	.609
	No	259	117 (45.6)		
Tobacco use	Yes	15	10 (66.7)	2.533	.111
	No	404	185 (45.8)		
Duration of physical exercise	Regular/Frequent	100	46 (46.0)	2.353	.308
	Occasional	211	105 (49.8)		
	None	108	44 (40.7)		

*Statistically significant at 95% level of confidence ($P < .05$).

institutions (67.8%) compared to those in public institutions (66.7%); however, this difference was not statistically significant (Figure 2).

When further examining the main reasons for using dietary supplements, the results show that the common reasons for using dietary supplements differed by supplement consumed.

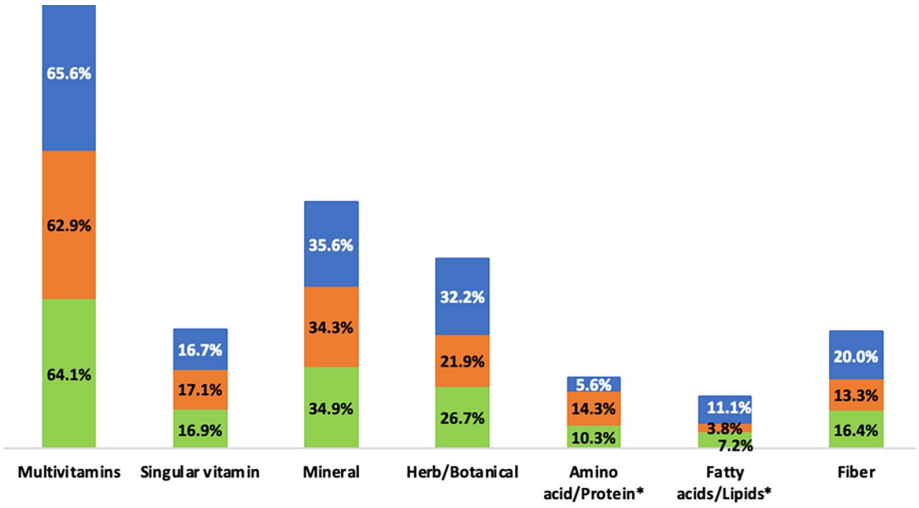


Figure 1. Types of dietary supplements used among adults working in public and private Institutions in Ilala District. *Statistically significant at 95% level of confidence ($P < .05$).

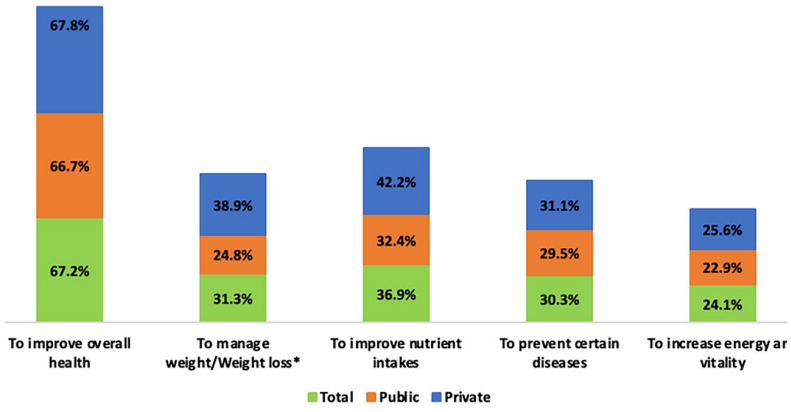


Figure 2. Main reasons for using dietary supplements among adults working in public and private institutions in Ilala District. *Statistically significant at 95% level of confidence ($P < .05$).

Table 3. Main reasons for the use of dietary supplements among adults working in Ilala District.

	MULTI VITAMINS (N = 125) (%)	SINGULAR VITAMIN (N = 33) (%)	MINERAL (N = 68) (%)	HERB/ BOTANICAL (N = 52) (%)	AMINO ACID/ PROTEIN (N = 20) (%)	FATTY ACIDS/ LIPIDS (N = 14) (%)	FIBER (N = 32) (%)
To improve overall health	74.0 (97)	16.8 (22)	36.6 (48)	29.8 (39)	13.0 (17)	7.6 (10)	17.6 (23)
To manage weight/ weight loss	60.7 (37)	18.0 (11)	47.5 (29)	45.9 (28)	18.0 (11)	13.1 (8)	29.5 (18)
To improve nutrient intakes	70.8 (51)	18.1 (13)	36.1 (26)	22.2 (16)	12.5 (9)	13.9 (10)	19.4 (14)
To prevent certain diseases	67.8 (40)	13.6 (8)	50.8 (30)	37.3 (22)	13.6 (8)	10.2 (6)	23.7 (14)
To increase energy and vitality	68.1 (32)	8.5 (4)	51.1 (24)	31.9 (15)	19.1 (9)	10.6 (5)	21.3 (10)

Improving overall health was the main reason for Multivitamin supplement use (74.0%). Improving nutrient intake was the main reason for Singular vitamin (18.1%) and Lipid based (13.9%) supplement use. Increasing energy and vitality was the main reason for Mineral (51.1%) and Amino Acid/Protein (19.1%) supplement use. Weight loss and management was the

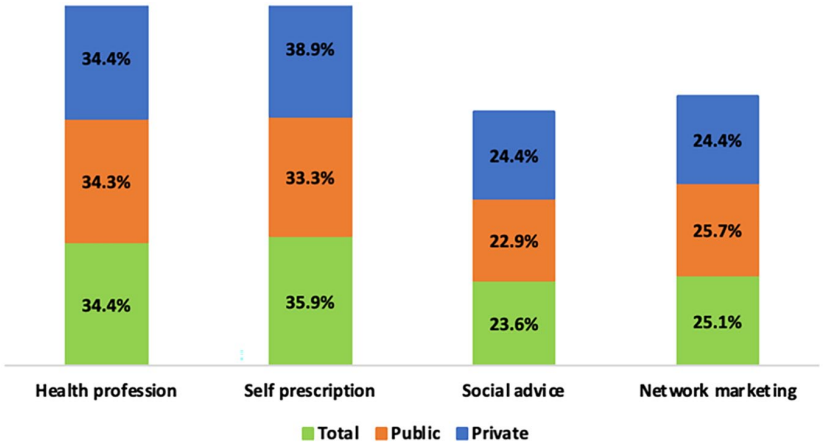


Figure 3. Recommendation for the use of dietary supplements among adults working in public and private institutions in Ilala District.

Table 4. Recommendation for the use of dietary supplements among adults working in Ilala District.

	MULTI VITAMINS (N = 125) (%)	SINGULAR VITAMIN (N = 33) (%)	MINERAL (N = 68) (%)	HERB/ BOTANICAL (N = 52) (%)	AMINO ACID/ PROTEIN (N = 20) (%)	FATTY ACIDS/ LIPIDS (N = 14) (%)	FIBER (N = 32) (%)
Health profession	80.6 (54)	13.4 (9)	35.8 (24)	16.4 (11)	10.4 (7)	4.5 (3)	9.0 (6)
Self-prescription	60.0 (42)	12.9 (9)	37.1 (26)	42.9 (30)	11.4 (8)	7.1 (5)	21.4 (15)
Social advice	54.5 (25)	23.9 (11)	52.2 (24)	34.8 (16)	15.2 (7)	8.7 (4)	13.0 (6)
Network marketing	63.3 (31)	18.4 (9)	32.7 (16)	34.7 (17)	14.3 (7)	8.2 (4)	30.6 (15)

main reason for Herbal/Botanical (45.9%) and Fiber (29.5%) supplement use (Table 3).

Furthermore, self-prescription was the most reported recommendation for dietary supplement use (35.9%), which was higher among respondents working in private institutions (38.9%) compared to those working in public institutions (33.3%); however, this difference was not statistically significant. Social advice was the least reported recommendation for dietary supplement use (23.6%) which was higher among respondents working in private institutions (24.4%) compared to those in public institutions (22.9%), but this difference was not statistically significant (Figure 3).

When further examining the recommendation for the use of dietary supplements, the source of advice differed according to the dietary supplement consumed. Health/medical professionals were the most cited source of recommendation for use among multivitamin supplement users (77.6%). Self-prescription was the most mentioned source of recommendation for use among herbal/botanical supplement users (80.6%). Network marketing was the most reported recommendation among singular vitamins (18.4%) and fiber supplement users (30.6%). Social advice was the most reported source of recommendation for use among mineral (52.2%), protein (15.2%), and lipid based (8.7%) supplement users (Table 4).

After adjusting for confounding variables, in the multivariate logistic regression model, analysis results presented in Table 5 show that sex and perceived knowledge of supplements were significantly associated with dietary supplement use among adults working in Ilala District. Female respondents were twice as likely to use dietary supplements as male respondents (AOR = 2.243, 95% CI 1.415-3.555, $P = .001$). Respondents who considered themselves knowledgeable of supplements (AOR = 6.756, 95% CI 4.092-11.154, $P < .001$) were more likely to consume dietary supplements than those who were not.

Discussion

To the best of our knowledge, this study is the first of its kind to determine the prevalence of dietary supplement use among adult working populations within Tanzania. In this study, less than half (46.5%) of the respondents working in urban settings in Tanzania reported having consumed any dietary supplements within the past 12 months, and it was higher among those working in private institutions (53.9%), women (53.6%), and those aged 60 years and above (66.7%). This finding is similar to the study reported by Keshavarz et al,[29] which found that men (38%) and women (53%) in Canada used dietary supplements. This prevalence is lower compared to studies reported by Mishra et al[13] which found more than half (57.6%) of adults aged 20 years and above in the United States used any dietary supplements, and Soukiasian et al[30] which reported that 55.5% of Greek adult consumers accounted for the history of dietary supplement use. However, this study's finding is higher than the study reported by Dlamini et al[19] which found that only 14.4% of the adult population in urban Kenya had taken

Table 5. Multivariable logistic regression model for factors associated with dietary supplements among adults working in Ilala District.

VARIABLE	CHARACTERISTIC	AOR	95% CI		*P*-VALUE
			LOWER	UPPER	
Institution	Public	Ref			
	Private	1.542	0.956	2.489	.076
Age (y)	20-39	Ref			
	40-59	0.973	0.533	1.775	.929
	60 and above	3.086	0.751	12.675	.118
Sex	Female	2.243	1.415	3.555	.001*
	Male	Ref			
Marital status	Not married	Ref			
	Married	0.908	0.527	1.563	.727
Education level	High	4.911	0.752	32.087	.097
	Medium	5.959	0.928	38.284	.060
	Low	Ref			
Income level	High	0.529	0.137	2.040	.355
	Mid	0.600	0.157	2.293	.455
	Low	Ref			
BMI	Normal	Ref			
	Overweight	1.406	0.802	2.463	.234
	Obese	1.401	0.704	2.786	.337
Perceived knowledge of supplements	Knowledgeable	6.756	4.092	11.154	<.001*
	Not Knowledgeable	Ref			
Perception of own health	Excellent	0.736	0.334	1.622	.447
	Good	0.676	0.341	1.342	.263
	Average	Ref			
Perception of own weight	Undesired weight	Ref			
	Desired weight	1.132	0.662	1.936	.651
Preexisting medical condition	Yes	1.005	0.531	1.902	.987
	No	Ref			
Alcohol use	Yes	Ref			
	No	0.960	0.598	1.541	.866
Tobacco use	Yes	Ref			
	No	0.286	0.080	1.028	.055
Duration of physical exercise	Regular/Frequent	1.419	0.732	2.750	.300
	Occasional	1.649	0.943	2.885	.079
	None	Ref			

Abbreviations: AOR, adjusted odds ratio; Ref, reference group.
*Statistically significant at 95% level of confidence ($P < .05$).

dietary supplements in the past 12 months. In our study, the overall prevalence of regular and occasional supplement use was 36.9% and 63.1%, respectively. Regular dietary supplement use in this study is similar to the study reported by Adegboye et al[31] among African and Caribbean Women Living in the United Kingdom, which was 33.2%. The prevalence of dietary supplement use in this study may be attributed to several notable factors, including the high increase in overnutrition (obesity and overweight) among adult populations, which is a significant risk factor for some chronic diseases, including diabetes, cardiovascular diseases, and cancer.[1,2]

Among respondents who reported supplement use, multivitamins (64.1%) and mineral supplements (34.9%) were the most frequently consumed. However, it should be noted that the definitions and categorization of dietary supplements are not standardized and vary from study to study. Therefore, comparison with other studies in some instances may be difficult with similar populations. For this study, multivitamins were categorized as types containing 2 or more vitamins with or without adding some kind of mineral, irrespective of potency. The findings of the study are similar to other numerous studies which reported the consumption of multivitamin supplements to be the most prominent used among adult populations.[13,18,21,31,32] Mishra et al[13] reported that Multivitamin-mineral supplements were the most common dietary supplement used by U.S. adults in all age groups and Dlamini et al[19] found that multivitamins were the most commonly used supplements by urban adults in Kenya when considering the categorization similar to this study. This preference may be attributed to the notion that multivitamins can help meet nutrient needs when desirable intakes are not achieved through food alone.[33]

The most common reason that respondents reported for using dietary supplements in this study was to improve overall health (67.2%). However, when examining each dietary supplement type identified, the common reason for use differed by supplement consumed. Multivitamins were primarily used to improve overall health, while herbal/botanical supplements were used for weight loss. This study finding is similar to other studies reported by Bailey et al,[34] Dickinson et al,[35] and Abdulla et al,[36] in which the most common reason for dietary supplement use was to improve or maintain overall health and where Multivitamins were the most commonly used dietary supplements by adult populations.

The most reported recommendation for dietary supplement use in this study was self-prescription (35.9%). It was highest among herbal/botanical supplement users, contrary to multivitamin supplement users, who health professionals mostly advised. These findings are consistent with studies that report on dietary supplement use without health professional advice or recommendation. A study conducted by Al-Fuad et al[37] among adult populations in southern Bangladesh found that 33% of supplement users initiated use without any physicians' prescription. Gardiner et al[38] reported that 69% of adult prescription medication users in the United States did not discuss non-vitamin dietary supplement use with a conventional medical practitioner. This self-prescription may be attributed to respondents perceiving themselves as knowledgeable of supplements and their use hence not feeling the need to seek professional medical advice. Additionally, dietary supplements are similar to conventional drugs because they are not safe for every individual and are equally capable of causing adverse effects or potential interactions in susceptible consumers if not used appropriately.[39] Therefore, health education efforts are needed to leverage the role of medical professionals in monitoring the safe use of dietary supplements among these populations.

The results of the study show that dietary supplement use was significantly associated with sex, where females were more likely to use dietary supplements compared to males. These study findings echo those reported by Alhashem et al[40] among adults living in Saudi Arabia aged between 18 and 60 years old. This gender difference and association with dietary supplement use may be attributed to women being more health conscious and willing to adopt healthier lifestyles to deal with illnesses.[41]

This study also revealed that perceived knowledge was significantly associated with dietary supplement use. The likelihood of using dietary supplements was significantly higher among those who perceived to be knowledgeable of supplements than those who were not knowledgeable. These findings are consistent with a study reported by Franklin et al,[42] where perceived knowledge was a significant factor associated with supplement use among African American adults. This may be attributed to the effect of subjective knowledge on supplement use decision making where dietary supplement consumers typically identify supplements based on their existing knowledge without needing advice from professionals due to their high level of confidence.[43]

Strength and Limitations

The strength of this study is its design which adopted a rigorous research approach to answer the scientific challenge that was not addressed extensively. Despite the successful completeness of this study, there are several limitations that the authors would like to highlight. In these types of research, response biases are a possibility. Since this was a self-administered questionnaire, data collection largely depended on the respondents' ability to accurately and truthfully recall past events. This study was a cross-sectional design which limits ascertaining causal inferences and drawing causal relationship conclusions between variables. The study could not reach many study respondents from the private sector due to administrative shortcomings, particularly in obtaining permission from their respective firms to conduct interviews with their staff. Some selected respondents who were provided with questionnaires were not reachable during the collection of filled questionnaires hence not reaching the estimated sample size. Additionally, the study's results may not be generalized because it was limited to the specific sample of

adults employed in the formal sector and not the community as a whole. Despite these limitations, we believe that important lessons can be learned from this study. The study provides valuable insights into a field of study that has not been extensively investigated within the Tanzanian context.

Conclusion

Therefore, this study examined dietary supplement use within the urban working Tanzania population and found that it was higher among females, those who perceived to be knowledgeable of supplements, and those working in private institutions. This study also determined that dietary supplement use recommendation is driven by health professional advice, self-prescription, and other social influences. Further research is needed to explain the effect of perceived knowledge on decision making for health products to understand better the in-depth issues associated with dietary supplement use within diverse populations. Health promotion and education are also important to further extend knowledge and awareness to the public regarding the safety and efficacy of dietary supplement consumption to avoid inappropriate use, misuse, or self-prescription among potentially new users.

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Author Contributions

Study concept and design: Lwakatare and Mlimbila. Acquisition of data: Lwakatare. Analysis and Interpretation of data: all authors. Drafting of the manuscript: Lwakatare. Final review and revision of the manuscript: all authors.

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