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Assessing the Hygienic Practices and Handling of Fresh Vegetables by Vendors In Tano North Municipal

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Abstract: *Handling of vegetables by vendors has increasingly raised public concerns due to potential public health risk. One of the main sources of vegetable contamination is market related handling practices among vegetables vendors. In addressing this problem, hygienic practices and handling of fresh vegetables by vendors was assessed. The objective of this study was to examine the hygienic practices and handling of fresh vegetables. Descriptive research designs were used in the study. A semi structured questionnaire was used in the study to collect data from the respondents. Purposive and convenience sampling were used to select 100 fresh vegetable vendors at Tano North Municipal. The study revealed the vegetable vendors age, gender, level of education, food hygiene knowledge and means of storage of unsold vegetables. Respondents were highly knowledgeable in changing water for washing vegetables twice a day (1.68) but not knowledgeable in disposing of damaged vegetables (3.37). Respondents were less knowledgeable in the effect of using contaminated water for washing vegetables (2.46) but not knowledgeable in exposing vegetables to sunlight (3.25). With respect to respondents hygienic practices and handling of fresh vegetables by vendors, respondents were highly knowledgeable (1.95) but less knowledgeable in the means of storing fresh vegetables (2.06). Also, respondents were less knowledgeable in food hygiene knowledge. However, in service training and education of food hygiene should be introduced in order to enhance and improve respondents' food hygiene knowledge; and that there should be a provision of good storage facility at various markets to enhance proper storage of fresh vegetables.*

Key words: Hygienic practices, Vegetables, Vendors, Food-borne illness, Tano North, Ghana

1. INTRODUCTION

Food safety issues have been given much attention in recent times because of increasing food related illness [1] [2] [3] [4. Food-borne illness is defined by [5] as infectious or toxic diseases caused by agents that can enter the body through the ingestion of food. [6] indicated that food is responsible for transmission of over two hundred different diseases. Globally, millions of people are affected by food borne and water borne diseases each year and that outbreak of food borne illness is responsible for 5000 and 500 death each, in the U.S.A, England and Wales respectively [7]. According to [8] food safety measures must be in place during production, processing, storage, distribution and preparation of food to ensure that it is safe, sound, wholesome and fit for human consumption. According to [9] governments, law makers, food manufacturers, caterers, food vendors, farmers, and all consumers have roles to play in making food safe for consumption.

Vegetables are essential food components of human diet and are largely preferred in their fresh state [10]. In several African cities, about 50-90% of fresh vegetables are supplied from urban and peri-urban production systems [11]. In Ghana, the growing population and demand for fresh vegetables by consumers have stimulated vegetables production in urban and peri-urban areas too [12], vegetables also play an important role in food security.

Pathogenic bacterial, viruses and parasites contaminate vegetables at various stages from cultivation to consumption. The use of untreated waste water as well as water supplies contaminated with sewage for irrigation, cleaning and preparation of unhygienic environment in food services and home settings are among the commonly reported sources of vegetable contamination [13], [14], [15]. It has been pointed out that there are microbiological hazards associated with particularly leafy vegetables and the pathways for contamination, survival and persistence of these microbiological hazards start from the primary production of vegetables through to consumers [16]; [17]. In most developing countries, access to clean water for urban vegetables irrigation is a major challenge. Pathogen-laden Sewage water is commonly used [18].

Handling of vegetables in the various Markets have increasingly raised public concerns due to potential public health risks. One of the main sources of vegetables contamination is market related handling practices among vegetables sellers particularly where provision of better sanitary standards such as clean water for washing is lacking [18]. The use of one container of water for washing vegetables the whole day as observed by [10] will not only make them dirtier but can have serious health implications especially when consumed unwashed.

Poor personal and environmental hygienic practices, poor storage system as well as display of foodstuffs on the ground, often near open drains, potentially open vegetables to further contamination. In effect, vegetables sold in the markets are greatly exposed to houseflies and other pathogen-carrying insects [20]. According to [19], the stacking of vegetables into jute sacks, storing

vegetables in open spaces and transportation in open trucks predispose vegetables to physical damage, high temperature and senescence.

There are many factors that account for unhealthy vegetables sellers. The limited knowledge of the health implications of these market women and generally low risk perception could perhaps be some factors sustaining these habits. The objective of this study was to examine the hygienic practices and handling of fresh vegetables.

2. MATERIALS AND METHODS

2.1 Research Design

The study used both qualitative and quantitative approaches. Descriptive design was used to conduct a study on vegetables vendors at Tano North Municipal to ascertain the hygienic practices and handling of fresh vegetables by vendors as this aimed at accurately and systematically described a population situation or phenomenon. Also, a descriptive research design could be used as a wield variety of quantitative and qualitative method to investigate one or more phenomenon. It is useful when not much is known yet about the topic or problem understudy. Descriptive research is an innovative tool for researchers as it presents an opportunity to fuse both qualitative and quantitative data as a means to identify any research problem.

2.2 Research Area

The area for the study is Tano North District in the Brong Ahafo Region of Ghana. The Tano North District is one of the 22 administrative districts of Brong Ahafo Region of Ghana. It was carved out of the then Tano North District in 2004 with its administrative capital Duayaw-Nkwanta. It shares boundaries with Offinso and Ahafo-Ano Districts both in Ashanti Region in the North-East and South –West respectively. Other districts that share boundaries with the Tano North include Tano South in the South, Asutifi in the west and Sunyani municipal in the North. The District lies between longitude $7^{o}00'$ 25 latitude $1^{o}45W$ and $2^{o}15W$ with a total land areas of 876 square kilometres, constituting about 1.8% of the total land area of the Brong Ahafo. The Tano North District has a total population of 78,415 comprising 39,338 males and 39,077 females as at 2010. The District has a population growth rate of 2.4%. The District lies in the semi-equatorial zone which experiences two (2) rainy seasons (major and minor). Agriculture is the main occupation in the District employing about 64.4% of the total work force in the District.

2.3 Population

The population of the study comprises fresh vegetable vendors, at Tano North Municipal.

2.4 Sampling Technique and Sampling Size

Purposive and convenience sampling methods were used in the study. A total of five markets namely Terchire, Afrisipa, Yamfo, Bomaa and Duayaw Nkwanta were purposively selected in the Tano North Municipal. The markets were selected due to the presence of large number of vegetables vendors because of lack of sampling frame on vegetable vendors, inclusion of respondents were based on the availability and willingness to participate. Due to the given reason, a total of 100 vegetable vendors, 20 from each market who were readily available and accessible were selected for the study.

2.5 Instrument for Data Collection

A semi-structured questionnaire was used in the study to collect data from the respondent. The respondents completed the questionnaire in a confidential setting, therefore dimension possible bias connected to researchers' presence and devoid of instant time constrains.

2.6 Data Analysis

Data collected were edited, coded, and fed into the computer using statistical package for social science (SPSS). Data was presented in tables to give visual impression of the data.

2.7 Ethical Consideration

The study is purely for academic purposes and in no way endangered the profession of vegetable farmers, vendors and grounds and environmental health services officers that were included in the study. All the data were treated with high level of confidentiality. Permission to conduct the study was sought from the grounds and environmental service unit at Tano North Municipal in the Ahafo Region of Ghana. Also, individual vegetable vendors and consumers selected were consulted first before involving them in the study.

RESULTS AND DISCUSSIONS

Table 1 Demography of respondents

Variables	Frequency (*f*)	Percentage (%)
Gender		
Male	8	8%

Female	92	92%
Total	**100**	**100%**
Age		
26 – 30 years	22	22%
21 – 25	44	44%
31 years and above	34	34%
Total	**100**	**100%**
Educational Level		
Basic School	55	55%
Secondary School	21	21%
No formal Education	8	8%
Tertiary Education	6	6%
Total	**100**	**100%**
Marital Status		
Married	67	67%
Single	33	33%
Total	**100**	**100%**

The data from table 1as per the gender distribution of respondents indicated that out of 100 respondents, 92% were females whiles 8% were males. This is an indication that vegetables vending business is dominated by females therefore favour them; also, females are more likely to observed good hygienic practices due to the hygienic way of managing their homes. This compares favourably with [10] & [11] who observed marketing of vegetables to be dominated by women in Ghana and Burkina Faso which had improved its hygienic way of handling them.

The age of the respondents play a significant role in adaptation or rejection of hygienic practices and handling of fresh vegetables [21] with regards to age distribution of respondents, it is seen from the table that those within the ages of 26-30 years were 22%, 44% were within 21-25 years and 34% were within 31 years and above, therefore, respondents within 21-30 years were very active and are like to practice hygiene in handling vegetables.

The educational level of the respondents as presented indicate that 55% of the respondents were basic school leavers, 31% had secondary education, 8% with no formal education and 6% had tertiary education. Therefore, respondents with higher level of education as compare to those with lower level of education. However, majority of the respondents 55% were basic school leavers which is likely to affect their hygienic practices.

On the marital status of the respondents, the table revealed that 67% were married whiles 33% were single. Married women are mostly involved in house chores as well as maintaining hygienic condition in their homes, therefore, it is more likely for married respondents to observe higher hygienic practices during vegetables vending since it is always practice in their various homes.

Table 1: Hygienic practice and handling of fresh vegetables

	SA		A		NAD		D		SD		Mean	Total
	f	*%*	*F*	*%*	*f*	*f*	*%*	*f*	*%*	*f*	$\bar{x}$	
Vegetables that are not well washed can cause food poisoning	85	85.0	10	10.0	0	0	5	5.0	0	0	1.23	100
Vegetables should be displayed in a clean environment	15	15.0	38	38.0	19	19.0	20	20.0	8	8.0	2.68	100
Damaged vegetables should be disposed-off by vendors	0	0	22	22.0	22	22.0	53	53.0	3	3.0	3.37	100
Vegetable vendors should not sell vegetables that are stored for over a week	10	10.0	12	12.0	18	18.0	60	60.0	0	0	3.28	100
Vegetables should not be exposed to the sun	10	10.0	16	16.0	13	13.0	61	61.0			3.25	100
Different vegetables should not be mixed by vendors	66	66.0	12	12.0	12	12.0	10	10.0	0	0	1.67	100
Vendors should display vegetables in a flies proof cage	87	87.0	11	11.0	0	0	2	2.0	0	0	1.19	100

All vegetable vendors should go for periodic health screening	69	69.0	21	21.0	0	0	10	10.0	0	0	1.51	100
Vendors should be giving training on how to handle vegetables before and after sales	69	69.0	11	11.0	0	0	20	20.0	0	0	1.69	100
Sellers should wash vegetables with salt solution before displaying for sale	21	21.0	38	38.0	21	21.0	11	11.0	9	9.0	2.49	100
Using contaminated water to wash vegetables can affect its quality	53	53.0	5	5.0	0	0	27	27.0	15	15.0	2.46	100

SA = Strongly Agreed **A**= Agreed **NAD**= Neither Agreed nor Disagreed **D**= disagreed **SD**= Strongly Disagreed

Table 1 presents results of respondent's hygienic practices and handling of fresh vegetables. One of the causes of vegetables contamination is the handling practices of the produce in the market [20]. Good understanding of hygienic practices of fresh vegetables by vendors is a key component in preventing contamination [22].

When respondents were asked if water for washing vegetables should be changed more than twice a day, more than half 52% strongly agreed, 28% responded in agreement and 20% neither agreed nor disagreed with the mean of 1.68. This implies that more than half of the respondents understood the essence in frequent change of water used for washing vegetable to prevent diseases and are likely to practice good hygiene in handling vegetables at market. This finding however is not in line with [10], who observed that, vegetables vendors use only one bucket of water for washing vegetables in a day.

With respect to vendors using pipe-borne water for washing vegetables shows 72% strongly agreed, with the mean of 1.36. Therefore, most of the vendors used pipe-borne water to wash their vegetables which improved their hygienic way of handling their produce.

Respondents were further asked whether vegetables should be displayed either on the floor, dirty rubber or cloth for sale, from table 1, it is seen that, the majority 82% strongly agreed, with 1.34 as the mean. This is an implication that, most vegetables vendors gave least attention on how and where vegetables were displayed for sale therefore hygienically affected their produce. This finding support a study conducted in Accra by [22] Amoah et al., 2014 shows that, it was common to find a market woman displaying vegetables on the ground regardless of their health implications.

Also, improper display of vegetables on the bare grounds, paper sheets, rubber and baskets were still prevalent, a practice that is potentially harmful as it exposes the vegetables to the good contaminants [23] (Beauchat & Ryu, 1997)

With respect to the difficulties in obtaining water for washing vegetables by vendors revealed that the majority 83% strongly agreed, 10% agreed and 7% neither agreed nor disagreed with 1.24 as mean. This implies majority of the vendors struggled to get clean water for washing their produce, therefore, it is more likely for vendors to wash their produce with dirty water due to the difficulties in assessing clean water and would compromised their hygienic practices.

On the issue of vendors using different source of water for washing their vegetables, 81% strongly agreed, 10% agreed and 9% neither agreed nor disagreed with the mean of 1.28, this shows majority of the respondents resort to various sources of water for washing their produce without considering their hygienic nature due to difficulties in getting portable water, this is most likely to affect their hygienic practices as well as their produce, however, this contradict that of [10] Drechael et al (2000) who observed that majority of vegetable vendors used pipe-borne water in washing their vegetables for sale to preserve its safety and hygiene. Respondents were asked if they get their stock of vegetables from different sources, 55% strongly agreed, 15% agreed and 30% disagreed, with 2.05 as the mean. This is an indication that, if vegetables are not handled well by vendors and in case there is a contamination from one source, it can affect the rest of the produce therefore compromised their hygienic practices. This findings is in support to [11] Cofie et al, (2003) who discovered that, in several African countries including Ghana, about 50-90% of fresh vegetables are supplied from urban and peri urban production system. With respect to provision of water for vendors to wash their vegetables and pay later revealed that, 80% strongly agreed, 10% agreed, 8% neither agreed nor disagreed and 2% agreed, with 4.38 as the mean. This implies that, most vendors were not interested in giving potable water for washing their vegetables and pay later, which the amount that would be given to them for payment might affect their profit, some suggested. Therefore, this is likely to affect their hygienic practices in handling their vegetables and support [24] Owusu (2009), who observed that vendors find it difficult to pay for water used to wash their vegetables at the market since they see it to be waste of money.

With respect to respondent's hygienic practices and handling of fresh vegetables revealed from the mean of means which is 1.905. This is an indication that, respondents has high hygienic practices and handling of fresh vegetables. This will positively impact the health of the consumers due to the consumption of hygienically handled of fresh vegetables by vendors

Table 2: Vendors Knowledge on Vegetable Hygiene

VARIABLES	SA		A		NAD		D		SD		Mean $\bar{x}$	Total
	f	%	*f*	%	*f*	%	*f*	%	*f*	%		
Water for washing vegetables should be changed more than twice a day	52	52.0	28	28.0	20	20.0	0	0	0	0	1.68	100
It is always difficult for sellers to obtain water for washing vegetables	83	83.0	10	10.0	7.0	7.0	0	0	0	0	1.24	100
Venders should wash vegetables delivered by farmers before displaying at the market	90	90.0	6	6.0	4	4.0	0	0	0	0	1.14	100
Vendors should be provided with water to wash their vegetables and pay later	10	10.0	2	2.0	8	8.0	0	0	80	80.0	4.36	100
Vendors should inform customers about the source of vegetable before selling	70	70.0	15	15.0	0	0	15	15.0	0	0	1.60	100
The remains of the vegetables after a day's selling should be stored well	14	14.0	22	22.0	15	15.0	48	48.0	1	1.0	3.00	100
Vendors get their stock of vegetables from different sources	55	55.0	15	15.0	0	0	30	30	0	0	2.05	100
Vegetable vendors must use pipe water for washing vegetables	72	72.0	20	20.0	0	0	8	8.0	0	0	1.36	100
Vegetable vendors have different sources of water for washing vegetables	81	81.0	10	10.0	9	9	0	0	0	0	1.28	100
Vegetable vendors should display vegetables either on the floor, dirty rubber of cloth for sale	82	82.0	11	11.0	0	0	5	5.0	2	2.0	1.34	100

SA = Strongly Agreed A= Agreed NAD= Neither Agreed or Disagreed D= disagreed SD= Strongly Disagreed

To further deepen the understanding of vendors on of vegetables hygiene, some questionnaire items were targeted at soliciting their views and hygienic knowledge of vegetables vending. According to [25], the limited knowledge of the market women can greatly affect vendor's practices in handling vegetables. The likert scale scored strongly agreed = 1, Agreed = 2, neither Agreed nor Disagreed = 4 and strongly Disagreed = 5. Mean values smaller than those whose were neither decides indicate higher knowledge on food hygiene by vendors whereas values greater than 3 neither decided indicate lower knowledge on food hygiene by vegetables vendors. When respondents were asked if they should be given training on how vegetables were handled before and after sales, 69% strongly agreed, 11% agreed and 20% disagreed, with the mean value of 1.23 this implies that most of the respondents were ready for further training to upgrade their hygienic knowledge in vegetables vending which is likely to have positive influence on their hygienic knowledge.

Interestingly, more than half 53% with the mean of 3.37 of the respondents disagreed that damaged vegetables should be disposed -off by vendors which indicated some respondents low level of hygienic knowledge on damaged vegetables that, they are likely not to handle their produce well and this will negatively affect the hygienic ways of handling their produce. Moreover, some respondents indicated they consumed their damaged vegetables, justify their claim that they would not consume the damage ones if they had enough food hygiene knowledge. The researcher again sought to know if using contaminated water to wash vegetables affects its quality, to which more than half 53% with 2.46 as the mean strongly agreed whiles 27% disagreed, 15% strongly disagreed and 5% agreed. This shows that, more than half of the respondents had high knowledge on the effect of using contaminated water in washing vegetables, therefore, are likely to observe good hygiene practices by using clean water to wash their vegetables.

Vegetables that were not well washed could cause food poisoning was discussed and revealed that, the majority 85% strongly agreed, 10% agreed and 5% disagreed with the mean of 1.23. This implies that respondents had high food hygiene knowledge and are likely to be very cautious when washing their vegetables in order not to cause food poisoning, therefore, handling their produce well.

According to Monney et al, 2014, most vegetables vendors do not value the need for medical screening due to the involvement of the payment of money and is in contrast to this finding on if vendors should go for periodic health screening, 69% strongly agreed, 21% agreed and 10% disagreed with 1.5 as the mean. This is an indication that majority of the vendors understood the need for periodic health screening and is more likely to positively affect their food hygiene knowledge.

Respondents were further asked if vegetables should not exposed to sun, 61% disagreed, 16% agreed, 13% neither agreed nor disagreed and 10% strongly disagreed with the mean value of 3.25. This indicates respondents' low level of knowledge on vegetables exposure to sun and is most likely to affect their hygienic ways of handling their vegetables. Therefore, this support with a study conducted by [19], who observed that most vegetables vendors gave least attention to the stacking of vegetables into jute or sack, storing vegetables in open spaces, transporting in open trucks predispose vegetables to physical damage exposure to sun, high temperature and senescence.

Also, findings on if vendors should sell vegetables stored over a week shown that, 60% disagreed, 18% neither agreed nor disagreed, 12% agreed and 10% strongly agreed with 3.28 as mean. This implies that more than half of the respondents would sell vegetables kept over a week regardless of their state because they were very much concern about their loss rather than the health implication, hence, are likely to practice and would affect their hygienic practices on handling vegetables which indicates their low level of food hygiene knowledge.

When respondents were asked whether different vegetables should not mixed by vendors, 66% strongly agreed, 12% agreed, 12% neither agreed nor disagreed and 10% disagreed with 1.67 as mean value. This is an indication that, most of the respondents understood the importance of separating different vegetables with high food hygiene knowledge and are likely to practice which will impact positively on their hygienic way of handling vegetables. This is in consonance with [22] who indicated that mixing different vegetables like lettuce, cabbage, onions and the likes are very dangerous especially when they are most often eaten raw. It was revealed that food hygiene knowledge of the vendors from the mean of means is 2.25 which is not extremely high, however, in service training and education on food hygiene should be introduce in other to enhance and improve respondents food hygiene knowledge of respondents.

Conclusion

It can be concluded that vegetable vendors already had a little knowledge about handling and storing of vegetables. Also, vegetables vendors understood that, the remains of vegetables after a day's selling should be stored well so as to prevent the vegetables from contamination by dirt, rodents and any other animals. The study also affirmed that vegetables that were not well washed could cause food poisoning; therefore vendors should wash vegetables either with salt solution or vinegar in order to make it safe for consumption. Additionally, the study confirmed that vegetables vendors should not sell vegetables that were stored over a week since the safety and quality of these vegetables might be compromised. Moreover, it was also confirmed that vegetable vendors should display vegetables in a flies' proof cage as these flies were pathways to contamination.

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