

AWARENESS OF THE BENEFITS OF GINGER USAGE AMONG STUDENTS OF THE NIGERIAN ARMY SCHOOL OF EDUCATION, SOBI-ILORIN, KWARA STATE

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Abstract

The objective of this study was to determine the level of awareness concerning the knowledge of the benefits and use of ginger among students of the Nigerian Army School of Education (NASE), Sobi-Ilorin Kwara State. A descriptive survey design was used to elucidate the awareness, knowledge of benefits and practice of ginger usage. The population included all 350 students from NASE, Ilorin. They were purposively selected, with 337 participating in the study. The instrument for data collection was a validated researcher-structured questionnaire. Test retest reliability was conducted and PPMC coefficient ($r=0.72$) was obtained. Frequency and percentage were used for demographic data while t-test was used for testing the hypotheses at 0.05 alpha level. The result revealed that NASE, Ilorin students were highly aware of the benefits of ginger, 312 (92.6%). There was significant difference between soldiers and officers in; awareness $n=337$, $t(335)=4.94$, $p<0.001$, $\eta^2 .007$; health benefits $n=337$, $t(335)=2.92$, $p < 0.004$, $\eta^2 .002$ and performance purposes $n=337$, $t(335)=2.48$, $p<0.001$, $\eta^2 .002$. It was concluded that the majority of NASE students are aware of ginger, which they mainly consumed in drinks. A further study is necessary to ascertain the size of benefits and the best way ginger usage would enhance the health and job performance of military personnel.

Keywords: Awareness, Ginger, Health, Performance, Supplements

Introduction

Ginger, a natural spice, is commonly used among the populace of Nigeria for several purposes. These include its use as a spice, a herbal remedy, for its flavour and for the treatment of different illnesses. Over the last few years, there has been a substantial rise in the use of natural or alternative medicine among adults. These complementary and alternative medicines in the form of dietary supplements and herbal remedies are subscribed to on the premise that they have beneficial effects without advice from a physician (Cohen, Ek & Pan, 2002). Ginger (*Zingiber officinale* Roscoe, *Zingiberaceae*) has existed for thousands of years and it is one of the most commonly consumed dietary condiments in the world (Surh, Park, Chun, Lee, Lee & Lee, 1999). Ginger contains many bioactive components which are believed to exert a variety of remarkable

pharmacological and physiological benefits like treatment of numerous ailments such as colds, nausea, arthritis, muscle pain, migraine, and hypertension (Nicoll & Henein, 2009; Ali, Blunden, Tanira & Nemmar, 2007).

The major producers of Ginger today are China and tropical/subtropical areas in Asia, Brazil, Jamaica and Nigeria (Osabor, Basse & Umoh, 2015). The ginger plant is approximately 30 - 60 cm tall and is extremely rare to find in the wild. The name ginger is derived from the Middle English *gingivere*, but the term for this spice dates back over 3000 years to the Sanskrit word *srngaveram*, meaning "horn root," based on its appearance. In Greek, it was called *ziggiberis*, and in Latin, *zinziberi*. The Indians and Chinese are believed to have produced ginger as a tonic root for over 5000 years to treat many ailments, and this plant is now cultivated throughout the humid tropics, with India being the largest producer. Ginger was used as a flavouring agent

long before history was formally recorded (Utuk, 2017).

Ginger was an exceedingly important article of trade and was exported from India to the Roman Empire over 2000 years ago, where it was especially valued for its medicinal properties. It continued to be a highly sought after commodity in Europe even after the fall of the Roman Empire, with Arab merchants controlling the trade in ginger and other spices for centuries. In the thirteenth and fourteenth centuries, the value of a pound of ginger was equivalent to the cost of a sheep. During medieval times, it was imported in preserved form to be used in sweets. Queen Elizabeth I of England is credited with the invention of the gingerbread man, which became popular as a Christmas treat (Ferguson, 2014). Ginger is found virtually in every market in Nigeria, either in dried or fresh form. The plant has a high medicinal and nutritional value. It is cultivated in large quantities by many farmers in the northern part of Nigeria (Kaduna, Benue, Nassarawa, Niger and Gombe). The ginger root is used in Nigeria as herbal medicine and in homes as spice for pap, as soup flavouring and in other delicacies, drinks and treatment for various illness (Utuk, 2017).

At least 115 constituents have been identified by a variety of analytical processes in fresh and dried ginger varieties. Gingerols are the major constituents of fresh ginger; gingerols are found to be lightly reduced in dry ginger, whereas the concentrations of shogaols, which are the major products in gingerol dehydration, are more abundant in dry ginger than in fresh ginger (Jolad, Lantz, Chen, Bates & Timmermann, 2005). Ginger contains at least 14 bioactive compounds, including 4-gingerol, 6-gingerol, 8-gingerol, 10-gingerol, 6-paradol, 14-shogaol, 6-shogaol, 1-dehydro-10-gingerdione, 10-gingerdione, hexahydrocurcumin, tetrahydrocurcumin, gingerenone A, 1,7-bis-(4' hydroxyl-3' methoxyphenyl)-5-methoxyheptan-3-one and methoxy-10-gingerol (Koh, Kim & Kim, 2009). Scientists have reported that the proportion of each individual component in a sample of ginger depends on the country of origin, commercial processor and whether the ginger is fresh, dried,

or processed (Bailey-Shaw et al, 2008; Schwertner, Rios & Pascoe, 2006)

The most common and well-established use of ginger throughout history is utilization in alleviating symptoms like nausea and vomiting. Quimby (2007) and Thompson and Potter (2006) reported via several controlled studies that ginger is generally effective as an antiemetic (drug that controls vomiting and nausea). The effectiveness of ginger as an antiemetic has been attributed to its carminative (an herb or preparation that prevent gas formation) effect, which helps to break up and expel intestinal gas. This idea was supported by the results of a randomized, double-blind trial in which healthy volunteers reported that ginger effectively accelerated gastric emptying and stimulated antral contractions (Wu, Rayner & Chuah, 2008). Ginger root contains a very high level (3.85 mmol/100g) of total antioxidants, surpassed only by pomegranate and some types of berries (Halvorsen, 2002). Topic et al (2002) reported that ginger reduced age-related oxidative stress and ethanol induced hepatotoxicity (chemically-driven liver damage). The work of El-Sharaky, Newairy, Kamel and Eweda (2009); Ahmed et al (2008) also noted that ginger protects the levels of reduced glutathione (antioxidant) and suppresses lipid peroxidation (a process by which free radicals steal electrons from cell membranes, thereby causing damage to the cell).

One of the many health claims attributed to ginger is its ability to decrease inflammation, swelling and pain. Young et al (2005) and Minghett, Sosa and Cilurzo (2007) have reported that 6-gingerol, a dried ginger extract and a dried gingerol-enriched extract exhibits some level of analgesic and potent anti-inflammatory effects. Aside from the anti-inflammatory effect of ginger, it is also effective against osteoarthritis and rheumatism (Reginster, Gillot, Bruyere & Henrotin, 2000). There are also *in vitro* and animal data supporting its benefits in alleviating cardiovascular disease, as well as the anti-inflammatory, antioxidant, antiplatelet, hypotensive and hypolipidemic effects of this condiment (Nicoll & Henein, 2009). An aqueous ginger extract was reported to induce a dose-dependent decrease in arterial blood pressure in

a variety of animal models (Ghayur & Gilani, 2005). Furthermore, a ginger extract inhibited airway contraction and associated calcium signalling, possibly by blocking plasma membrane in calcium channels. The dried form of ginger was also beneficial in treating dementia, including Alzheimer's disease (Ghayur et al., 2008). El-Abhar, Hammad and Gawad (2008) reported that in rats, ginger extract alleviated the symptoms of acetic acid-induced ulcerative colitis.

Orally, ginger is usually well tolerated when used in typical doses. However, higher doses of 5 g per day increase the risk of side effects and decrease tolerability. Common side effects of ginger include abdominal discomfort, heartburn, diarrhoea and a pepper like irritant effect in the mouth and throat. Topically, ginger can cause dermatitis in sensitive individuals (Akram et al, 2011). This implies that ginger must not be consumed in excess so that its health benefits will not be compromised.

Nutrients in the form of dietary supplements can improve performance during physical activity. Athletes across Nigeria commonly take different types of supplements to boost their performance during physical activity or competitive sports including local supplements such as Zobo, Kunu and herbs (Amina et al, 2014). These local supplements are virtually found in every market in Nigeria most especially ginger, which is a commonly consumed dietary spice. However, the use of ginger as supplement in boosting performance as well as recovery is supported by limited studies. This was evident in the work of Mashhadi, et al (2013); which revealed that ginger has effects as an anti-oxidative and anti-inflammatory in promoting health and physical activity. Furthermore, this was buttressed by Nafiseh et al (2013), showing that ginger can increase performance in exercise. Melissa, Matsumura, Gerald, Zavorsky, James (2015) also reported that ginger can delay the onset of muscle soreness and enhance the recovery of muscle damage.

Several researches have confirmed ginger to have a beneficial role in the biological system, ranging from the alleviation of respiratory illnesses to enhancing the immune system and

physical alertness as well as performance exercise (Nafiseh et al, 2013). We observed that the use of ginger is not new in NASE Sobi-Ilorin Kwara State Nigeria, which implies some level of awareness among students. Based on this, we assumed that ginger intake might improve their day-to-day activities, since their profession requires physical alertness and optimal performance if they are to survive. However, there is no empirical evidence to support this assumption. Therefore, it became imperative to find out the participants' level of ginger awareness, and the benefits and differences in ginger usage between officers and soldiers.

Methods

A descriptive research survey was adopted. The population included all of the 350 male and female students registered at NASE Sobi-Ilorin, Kwara State, Nigeria. All the students were purposively selected for the study because they possess similar characteristics and met the inclusion criteria of being military personnel, studying and resident at NASE Sobi-Ilorin. The valid sample was comprised of 337 respondents consisting of 232 soldiers and 105 officers with an age range of 18-50 years. A researcher-structured questionnaire which contained 30 items that were divided into sections A and B was used for data collection. Section A dealt with the participants' demographic data while section B dealt with their level of awareness and the benefits of ginger usage. The questionnaire was validated and subjected to test retest reliability which was conducted at the base of 222 Battalion, Nigerian Army Sobi-Ilorin with a two week interval between the first and second administration. The Pearson Product Moment Correlation (PPMC) was used to determine the reliability level and $r = 0.72$ was obtained. The participants were duly enlightened and informed consent was obtained from them before data collection. Frequency and percentage were used for analysis of demographic characteristics and answering of research questions while a t-test was used to test the hypotheses at 0.05 level of significance. All the statistical analysis was conducted using the Statistical Package for Social Sciences (SPSS Version 20.0).

Results

Table 1: Level of Ginger Awareness among NASE Students in Sobi-Ilorin, Kwara State

Variable	All Students N (%)	Officers N (%)	Soldiers N (%)
Have you ever seen ginger?			
Yes	312 (92.6%)	99 (94.3%)	213 (91.8%)
No	25 (7.4%)	6 (5.7%)	19 (8.2%)
Total	337 (100%)	105(100%)	232 (100%)
Do you take ginger drink?			
Yes	274 (81.3%)	91 (86.7%)	183 (78.9%)
No	47 (13.9%)	14 (13.3%)	49 (21.1%)
Total	337 (100%)	105 (100%)	232 (100%)
How often do you use ginger?			
Daily	79 (23.4%)	20 (19.0%)	59 (25.4%)
Weekly	80 (23.7%)	29 (27.6%)	51 (22.0%)
Monthly	52 (15.4%)	19 (18.1%)	33 (14.2%)
Can't remember	99 (29.6%)	37 (35.2%)	85 (36.6%)
Total	337 (100%)	105 (100%)	232 (100%)

Table 2: Benefits of Ginger Use among Students of NASE, Sobi-Ilorin, Kwara State

Benefits	All Students N (%)	Officers N (%)	Soldiers N (%)
Health Benefits			
As a pain reliever			
Yes	173 (51.3%)	38 (36.2%)	135 (58.2%)
No	164 (48.7%)	67 (63.8%)	97 (41.8%)
Total	337 (100%)	105(100%)	232 (100%)
To stimulate appetite			
Yes	198 (58.8%)	47(44.8%)	151 (65.1%)
No	139(41.3%)	57(55.2%)	81(34.9%)
Total	337 (100%)	105 (100%)	232 (100%)
Nutritional Benefit			
As spice			
Yes	280 (83.1%)	91 (86.7%)	139 (81.5%)
No	57 (16.9%)	14 (13.4%)	43 (18.5%)
Total	337 (100%)	105 (100%)	232 (100%)
Performance Benefits			
For boosting stamina			
Yes	198 (58.8%)	49(46.7%)	149(54.2%)
No	139(41.3%)	56 53.4 (%)	83 (35.7%)
Total	337 (100%)	105 (100%)	232 (100%)
To be active and alert			
Yes	195 (57.9%)	51 (48.6%)	144 (62.1%)
No	142 (42.1%)	54 (51.5%)	88 (37.9%)
Total	337 (100%)	105 (100%)	232 (100%)

Results in table 1 revealed that the majority of NASE, Sobi-Ilorin students 92.6% (312) have seen ginger before, 7.4% (25) have not; 81.3% (274) of them take ginger drink while 13.9% (47) of them do not. In addition, 23.4% (79) of them use ginger daily, 23.7% (80) use it weekly, 15.4% (52) use it monthly, while 29.6% (99) cannot remember how often they use it. However, soldiers use ginger products daily while officers use them more weekly and monthly. Further consideration in terms of job status shows that the majority of the officers 94.3% (99) have seen ginger while just 5.7% (6) have not. Among the soldiers, 91.8% (213) of them have seen ginger while 8.2% (19) have not. The majority of officers 86.7% (91) drink ginger while 13.3% (14) did not. For the soldiers, the majority 78.9% (183) of them drink ginger while 21.1% (49) of them did not. This result implies that students of NASE, Sobi-Ilorin have a good awareness level of ginger and its products, and

ginger is a part of the nutrients in the diets they consume.

Table 2 reveals that the respondents used ginger for different purposes such as health (pain relief and stimulating appetite), nutritional (spice) and performance (boosting stamina, activeness and alertness). The majority of the students 173 (51.3%) used ginger as pain reliever, among which 36.2% (38) of them were officers and 58.2% (135) of them were soldiers. The result also shows that the majority of students 58.8% (198) used ginger for boosting stamina. These comprised of 46.7% (49) officers and 149 54.2% (149) soldiers. The majority of the students used ginger for stimulating the appetite; these comprised of 44.8% (47) officers and 65.1% (151) soldiers. Furthermore, the majority of students used ginger to improve alertness and activeness for optimal performance in their job. Among these were 48.6% (51) officers and 62.1% (144) soldiers.

Table 3: t-test Analysis for Difference in Ginger Usage between Officers and Soldiers

Variables and Groups	N	M ± SD	MD	t	df	SED	η^2	Sig
Ginger Awareness:								
Soldiers	232	9.32 ± 1.32	1.67	4.94	335	1.02	.007	0.001
Officers	105	7.65 ± 0.22						
Total	337	16.97 ± 1.54						
Health Benefits from Ginger Intake:								
Soldiers	232	10.60 ± 2.56	0.94	2.92	335	0.32	.002	0.004
Officers	105	11.53 ± 2.68						
Total	337	22.13 ± 5.24						
Performance Benefits from Ginger Intake:								
Soldiers	232	5.13 ± 1.40	0.45	2.48	335	0.18	.002	0.001
Officers	105	5.58 ± 1.54						
Total	337	10.71 ± 2.94						

p ≤ 0.05

Table 3 shows results of t-test analyses conducted to examine the differences in ginger usage between officers and soldiers. There was significant difference between soldiers and officers in all the tested variables: level of ginger awareness ($n=337$, $M \pm SD$ 9.32 ± 1.32, $t(335)=4.94$, MD 1.67, SED 1.02, $p<.001$); health benefits from ginger intake ($n=337$, $M \pm SD$ 22.13 ± 5.24, $t(335)=2.92$, MD 0.94,

$p<0.004$) and performance benefits from ginger intake ($n=337$, $t(335)=2.48$, MD 0.45, $p<0.001$). Despite reaching statistical significance, the magnitude of the differences was very small η^2 .007, .002 and .002 for awareness, health and performance benefits respectively.

Discussion

The study investigated awareness and practice of ginger usage among 337 students of Nigerian Army School of Education (NASE) Sobi-Ilorin, Kwara State. Their awareness level of ginger and ginger products was generally high. The majority of the respondents had seen and consumed ginger in different forms and for different health and performance benefits. Considering the observation of Surh et al. (1999), that ginger is a common dietary condiment that has been consumed for over a thousand years, it was found in this study that few of the students actually used ginger as often as daily, and fewer of them used it weekly or monthly.

It was revealed that the officers had seen and taken ginger drink more than soldiers did. However, more soldiers (25.4%) used ginger daily than officers (19.0%), but on a weekly and monthly basis; the officers (27.6% and 18.1%) used it more than the soldiers (22.0% and 14.2%) respectively. Since ginger is used for diverse purposes, this disparity between soldiers and officers might be due to levels of interaction, their cultural backgrounds and/or nutritional practices in the different units to which they had been posted to serve within the army. This corroborates the assertion of Gosh, (2011) that ginger is used in different ways including boosting appetite, alleviating cold and nausea.

The findings also revealed that more soldiers used ginger for relieving pain (58.2%) and stimulating the appetite (65.1%) than officers (36.2% and 44.8%) respectively. The nature of soldiers' jobs requires them to be always in the fields while officers perform their job mainly from the office, excluding those few on special duties. Since ginger has different bioactive compounds that yield several health benefits, the soldiers could have observed this and used ginger more because of their higher exposure to health hazards while in the fields. The high level of ginger usage as well as the small disparity in use, confirms the postulations of Nafiseh et al. (2013), Nicoll and Henein (2009) and Ali et al.

(2008) that ginger has remarkable benefits for health and treatment of ailments. This was also the case among the students based on their cultural, social, occupational setting and health needs.

The majority of the soldiers preferred to use ginger for boosting stamina, activeness and alertness more than the officers did. It is well established that the physical demands of a military job requires high levels of fitness and alertness for optimal performance at all times. While this is crucial in military training, the soldiers of NASE, Sobi-Ilorin proved to be using ginger more than the officers to minimise fatigue, to boost stamina and alertness which is crucial for their job as revealed in table 3. This finding is similar to the view of Nafiseh et al (2013) and Bentley et al (2012) that ginger intake increases exercise performance among humans. This might be one of the reasons why soldiers whose occupation requires optimal performance, activeness and alertness used ginger and its products daily unlike the officers whose duties are conducted more from the office rather than the field.

Conclusion

The majority of the students had an awareness of ginger and mainly consumed it as a drink. Their frequency of use was generally low: just a few used it daily while even fewer used it weekly or monthly with specific objectives that included relieving pain, stimulating appetite, activeness and alertness. There was a difference in the awareness, knowledge of benefit and use of ginger among officers and soldiers. The officers mostly consumed ginger to derive nutritional benefits, but the soldiers used it for both nutritional and performance enhancement. We recommend that further studies should be carried out to elucidate the specific benefits of ginger on the health and performance of NASE students, general military performance and the appropriate times of the usage and dosage regimen in order to avert possible adverse effects of ginger overuse.

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