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Article

An in-depth investigation correlating lifestyle choices with cognitive well-being: Public health implications of food packaging trends and memory capacity, an intensive research study

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Abstract: This study presents a multifaceted investigation into the interplay between lifestyle choices, cognitive well-being, and potential health risks associated with food packaging materials. Statistical analyses of memory patterns among diverse population groups, including healthy volunteers, addicted individuals, and those consuming roadside food from street vendors or hawkers, reveal intriguing correlations. The study also conducts a rigorous chemical analysis of newspaper packaging, uncovering significant concerns related to lead contamination. The findings emphasise the need for heightened awareness, further research, and interventions to address potential health risks and ensure the safety of packaging materials. Overall, this research contributes valuable, insightful information that has implications for public health initiatives and packaging industry practices. This is a qualitative study correlating lifestyle choices with cognitive well-being and specific food packaging that impacts the memory and health too. Key findings reveal intriguing correlations between lifestyle habits, the type of food packaging used, and memory capacity. The study's chemical analysis of newspaper packaging uncovered significant lead contamination, raising serious public health concerns. These findings emphasise the necessity for heightened awareness and targeted interventions to mitigate health risks.

Keywords: cognitive well-being; food safety and analysis; lifestyle; memory patterns; public health

1. Introduction

Food safety is a science-driven field involving systematic measures and practices with the primary goal of preventing the presence of harmful substances in food that could adversely affect human health. The overarching objective of food safety is to ensure that the food consumed is free from hazards and safe for consumption. Food stands as the third fundamental human requirement, following air and water. Its contribution to our well-being and food security is only realised when it is deemed safe. In the absence of food safety, individuals cannot flourish, and the challenges of hunger and poverty persist, hindering the possibility of a healthy life. Simply put, if it lacks safety, it cannot be considered food [1]. A sufficient supply of nutritious food that is safe to consume is essential for maintaining life and promoting good health. Over 200 ailments, from diarrhoea to multiple cancers, are caused by eating improper food, which may contain hazardous germs, viruses, parasites, or toxic compounds. This dangerous circumstance starts a vicious cycle of illness and starvation that disproportionately affects young children, the elderly, sick people,

and babies. To strengthen food safety and create resilient food systems, governments, producers, and consumers must establish successful collaboration. There is no doubt about the connection between food security, nutrition, and safety—nearly one in ten people worldwide, or 600 million people, get sick from eating tainted food. Sadly, this leads to 33 million fewer healthy life years (DALYs) and 420,000 deaths annually. Twelve 5000 deaths annually and forty percent of foodborne illnesses are caused by foodborne illnesses in children under five. Beyond the death toll, foodborne infections represent a challenge to socioeconomic advancement, taxing healthcare systems, and having a detrimental effect on trade, tourism, and national economies [2].

Divide warm or hot food into multiple clean, shallow containers before placing them in the refrigerator. It's acceptable to refrigerate small portions of hot food as they cool faster. Pathogens responsible for food poisoning can persist in various areas and can easily spread throughout your kitchen. Ensure to wash your hands thoroughly for a minimum of 20 seconds using soap and either warm or cold water before, during, and after food preparation, as well as before eating. Make it a practice to wash your hands after handling flour, or other food substances [3].

The warm and humid environment required for sprout cultivation is conducive to the growth of harmful bacteria like *Salmonella*, *E. coli*, and *Listeria*. Consuming raw or minimally cooked sprouts, such as alfalfa, bean, and clover sprouts, can lead to illness.

To minimise the risk of food poisoning, ensure that sprouts are thoroughly cooked until they reach a steaming hot temperature, effectively eliminating harmful germs. Occasionally, leafy greens can be tainted with dangerous microorganisms such as *Salmonella*, *E. coli*, *Cyclospora*, *Listeria*, and *norovirus*. Consuming these contaminated leafy greens without prior cooking, such as in a salad or sandwich, can result in illness. Severe disease can result from consuming raw (unpasteurised) milk and its by-products, which include ice cream, yoghurt, and soft cheeses such as queso fresco, blue-veined, feta, brie, and camembert. This is because raw milk may contain potentially dangerous bacteria like *Salmonella*, *Campylobacter*, *Cryptosporidium*, *E. coli*, *Listeria*, and *Brucella* [4].

Pasteurisation is a procedure that safely removes hazardous germs from raw milk by heating it to a high enough temperature for a prolonged period of time. Choosing pasteurised milk offers the majority of the nutritional advantages of raw milk without the hazards.

Even though *Listeria* infections are uncommon, they can be particularly dangerous for older persons, babies, pregnant women, and those with compromised immune systems. *Listeria* can result in miscarriages, stillbirths, preterm labour, and severe illness or death in newborns. To minimise these risks, it is advisable to choose pasteurised milk over raw milk and opt for products made with pasteurised milk [4].

The type of germ present in contaminated food, the extent of contamination, the location of contamination, the setting in which the food is given, and the quantity of people consuming it are some of the variables that might affect the scope of a foodborne outbreak. For example:

Localised epidemic: If a tainted casserole is served at a function, it may cause a small-scale outbreak among goers who know one another.

Outbreak on a regional or state level: If a tainted batch of ground food is dispersed among numerous supermarket chains, it may cause diseases in a number of counties or even neighbouring states.

Countrywide outbreak—Hundreds of people could become ill as a result of contaminated produce that comes from a single farm and is supplied to grocery outlets across the country [5].

Maintain the temperature of cooked food at 140 °F (60 °C) or higher to ensure its safety. If you don't plan to serve the food immediately after cooking, prevent it from entering the temperature danger zone (between 40 °F (4 °C) and 140 °F (60 °C)), where bacteria proliferate rapidly. Utilise a heat source such as a chafing dish, warming tray, or slow cooker to keep the food at a safe and elevated temperature [6].

Beyond its toll on individuals, this issue takes a toll on the economy. Consistent advancements in food safety not only result in economic and social advantages but also contribute to the reduction of foodborne illnesses. These benefits encompass a more secure food supply, spanning from the farm to the table, with minimal impact on productivity. There's a consequential decrease in the strain on the country's healthcare system, owing to improved public health. Individually, those affected experience a diminished loss of income and healthcare expenses. Moreover, an increased sense of trust among consumers in the U.S. food supply fosters economic stability throughout the entire food sector [7].

Key programs in NIFA's Food Safety Initiatives NIFA administers several crucial programs aimed at enhancing food safety across diverse aspects of the agricultural and food supply chain.

1.1. Highlighted initiatives and featured projects in NIFA's food safety division

1) A1181 Tactical Sciences for Agricultural Biosecurity,
2) A1332 Food Safety and Defense,
3) A1343 Food and Human Health,
4) A1364 Novel Foods and Innovative Manufacturing Technologies,
5) A1366 Mitigating Antimicrobial Resistance Across the Food Chain,
6) A1402 Plant Microbiome,
7) A1511 Nanotechnology,
8) A1712 Rapid Response to Extreme Weather.

1.2. NIFA's impact on food safety

NIFA's food safety programs are designed to curb the occurrence of foodborne illnesses, ultimately enhancing the safety of the food supply while ensuring a reliable source of nutritious options.

1.3. NIFA actively supports initiatives

Diminish food hazards, encompassing disease-causing microorganisms, toxins, allergens, and chemical and physical threats. Explore alternatives to the use of antimicrobial compounds in agriculture. Develop strategies to mitigate antimicrobial

resistance in agricultural practices. Foster the education and training of the next generation of scientists dedicated to advancing food safety [7].

The National Integrated Food Safety Initiative is committed to funding competitive initiatives that use an all-encompassing, integrated strategy to address critical food safety challenges. The goal of NIFA's integrated food safety programmes is to support cooperative research, extension, and education efforts involving various states, institutions, disciplines, and roles. Notably, programmes with multifunctional components—that is, those that integrate components related to research, teaching, and extension—are given particular attention. Applied food safety research is the main focus of the National Integrated Food Safety Initiative's research component. The educational component focuses on formal classroom environments that can be found in elementary, secondary, undergraduate, or graduate schooling. Concurrently, the extension aspect pertains to imparting knowledge and skills beyond the conventional classroom, expanding its scope to non-traditional environments. Outreach programmes that provide individuals with science-based, educational information in a variety of non-formal contexts are deemed suitable in situations when there is no extension plan in place [7].

1.4. The National Integrated Food Safety Initiative addresses, but is not limited to, the following priority issues in food safety [7]

1) Qualitative and quantitative risk assessments,
2) Control measures for foodborne microbial pathogens,
3) Sources and incidence of microbial pathogens,
4) Antibiotic resistant microbial pathogens,
5) Improving the safety of fresh fruits and vegetables,
6) National coordination of integrated food safety programs and resources,
7) Food handler education and training for consumers and youth,
8) Food handler education for high-risk and hard-to-reach audiences,
9) Food handler education for commercial and noncommercial audiences, including food,
10) Handler certification training and other train-the-trainer programs,
11) Hazard analysis and critical control points (HACCP) model development, testing, and implementation,
12) Home food processing and preservation,
13) Integrating food safety into related agricultural programs,
14) Alternative food processing technologies that improve the safety of food,
15) Food security.

Thus, food safety has been defined as "the biological, chemical, or physical status of a food that will permit its consumption without incurring excessive risk of injury, morbidity, or mortality" [8].

Advancements in food safety present challenges for developing nations as they strive to secure a sufficient and safe food supply for both domestic consumption and global markets. Concerns over food safety have been heightened by food scares and shifts in international trade, prompting adjustments in global food policy. Recent developments encompass a heightened focus on stringent food safety regulations, the

establishment of rigorous standards, a shift towards preventive quality management, and the adoption of process-based standards along with mandatory hazard analysis critical control point (HACCP) protocols. The characteristics of smallholder production systems and the features of small to medium-sized food processing enterprises create obstacles to meeting both domestic and international food safety standards [9,10]. From ancient civilizations to the present day, ensuring the safety of food has been an essential part of human evolution. The common goal of food legislation is always to ensure food safety, even though the specifics may differ between nations due to disparities in economic development, scientific and technological innovation, and religious views. Across the world, countries have passed strict food safety legislation in an effort to protect the world's food supplies [11].

The introduction of food safety objectives (FSO) and performance objectives (PO) represents novel concepts aimed at aiding governments and industries in communicating and adhering to public health goals. These tools complement existing frameworks such as good agricultural practices (GAPs), good hygienic practices (GHPs), and hazard analysis critical control point (HACCP), which serve as the mechanisms for achieving the levels specified by POs and FSOs. It is important to note that FSOs and POs enhance, rather than replace, the current practices and concepts in food safety [12].

These innovative outcome-based risk management approaches provide operational flexibility, a crucial factor when determining the most effective control measures in specific regions or operations. The paramount consideration in these advancements, particularly concerning global food-borne diseases, is whether they enable the swift development and implementation of food safety control measures and regulations. Given the increasingly complex nature of contemporary food safety issues, which often demand a comprehensive through-chain approach and the deployment of multiple control measures, the effectiveness of these new approaches is critical [12].

1.5. Food safety and quality system (FSQS) [13]

1) Establish clearly defined strategic food safety/quality objectives.
2) Define the scope of the FSQS.
3) Develop a food safety/quality policy.
4) Commit to compliance (and certification, as evidence of compliance).
5) Develop a FSQS communication plan.
6) Explore various food safety/quality standards, pertinent legislation, and customers' requirements.
7) Select an appropriate food safety/quality standard/scheme. a
8) Establish a food safety/quality team.
9) Appoint a food safety/quality team leader.
10) Provide the required resources to the food safety/quality team. b
11) Conduct an official launch of the FSQS.
12) Provide appropriate training for the food safety/quality team.
13) Create food safety/quality awareness across the company.

14) Conduct a gap analysis to benchmark the company's current status and identify gaps. c
15) Evaluate the elements of the gap analysis and ensure full understanding of the findings, their implications, and their importance by the ownership/management of the company.
16) Establish an approach to the development of a comprehensive FSQS.
17) Develop a project plan for development (documentation of policies, procedures, and work instructions) and implementation of the FSQS.
18) Approve the project plan.
19) Execute the project plan (development and implementation of policies and procedures and work instructions).
20) Develop an internal auditing capability.
21) Periodically communicate the status of development and implementation of the FSQS to key stakeholders.
22) Monitor conformance to and effectiveness of the documented policies, procedures, and work instructions through periodic audits.
23) Conduct periodic scheduled management review meetings.
24) Develop a corrective action plan and implement corrective actions based on the results of the internal audits and management review.
25) Arrange and external audit of FSQS for certification.
26) Conduct a certification audit.
27) Develop a corrective action plan and implement corrective actions based on the results of the certification audit.
28) Maintain certification.
29) Continuous monitoring.
30) Continually improve the FSQS.

In addition to the World Health Organisation's widely accepted "five keys to safer food," which outline basic guidelines universally necessary for safe food handling procedures and the avoidance of foodborne illnesses ("maintain cleanliness, separate raw and cooked items, cook thoroughly, ensure safe temperatures for food storage, and utilise safe water and raw materials"), it becomes necessary to customise more specific recommendations for vulnerable populations based on their health status and possible exposure to foodborne pathogens. For these particular demographic groups, this tailoring is essential to ensuring an appropriate degree of prophylaxis against foodborne illnesses [14–16].

By putting more of an emphasis on proactive foodborne illness prevention than on reactive foodborne illness response, the FDA Food Safety Modernisation Act (FSMA) is completely changing the way the country approaches food safety. The Food Safety and Markets Act (FSMA), which was passed by Congress in response to significant shifts in the global food system and improved knowledge of foodborne illness and its effects, recognises that preventable foodborne illnesses are a serious public health risk and compromise the food system's ability to remain economically stable [17,18].

In order to ensure the safety of the food supply, the FDA has finalised a number of rules under the FSMA, realising that cooperation between different parties at different stages of the global food supply chain—both for human and animal food—

is necessary. These FSMA regulations are intended to give precise instructions for particular steps to be performed at every level of the supply chain to prevent contamination [17,18].

To ensure food safety, it is advisable to use packaging materials that are specifically intended for contact with food, such as parchment paper or food-grade plastic wrap.

Food packaging is essential for guaranteeing food products' safety as well as making handling and delivery simpler. It prolongs the shelf life of food items and prevents chemical contamination, which ultimately benefits consumers by offering convenience. Food packaging has been made from a wide variety of materials, including polymers, glass, metals, and paper, as well as their mixtures. However, the increased health consciousness among consumers has raised worries about the possible contaminant transmission from packing materials into food.

1.6. Using newspapers to wrap food presents several disadvantages

Lack of food-grade standards: Newspapers are not designed or regulated for direct food contact. Unlike food-grade packaging materials, newspapers do not adhere to specific safety standards for ensuring the protection of food.

Ink contamination: Newspaper ink may contain harmful substances, including lead or other toxic elements. When in direct contact with food, there's a risk of ink transfer, leading to contamination.

There are several terminologies used to describe food interaction, but none of them have clear definitions. This study explores the hypothesis that the gas phase is the primary pathway for migration of food-contact materials into dry food, implying that migration of fundamentally non-volatile components is negligible. This presumption is contested, though. In a study, for example, newspaper printed with an ink containing virtually non-volatile polyalphaolefins (PAO) as the primary solvent showed that, in just 20 days at ambient temperature, migration into polenta and a baking mix reached 64% and 66% of the paper content, respectively. Particle size influences contact density during the migration of non-volatile chemicals into dry foods through diffusion through the paper to small contact points [19].

The crucial factors in migration include diffusion rates within the food, encompassing transmission between particles, and within the food contact material. This prompts the inquiry of whether determining such migration is a case-specific process or if it can be systematically modeled, tested, or simulated [19].

Photoinitiators are widely used in food applications, such as dry food packaging made of cardboard, to cure ink on packaging materials. When it came to paperboard treated with different photoinitiators, such as benzophenone (BP), 4,4'-bis(diethylamino)benzophenone (DEAB), 2-chloro-9H-thioxanthen-9-one (CTX), and others, traditional migration testing for prolonged storage at room temperature using Tenax® was used. The testing, carried out in compliance with regulation (EU) No. 10/2011, revealed unique migration patterns for various photoinitiators during a ten-day period at 60 °C. These results were then contrasted with the migration seen in cereals following a six-month room temperature storage period. Remarkably, up to 92% of the actual migration in grains was overestimated in the simulation using

Tenax at 60 ℃ [20].

The effects of a lower contact temperature and the influence of Tenax pore size were taken into consideration in more research. The results of the simulation utilising rice in place of Tenax indicated that Tenax is a more powerful adsorbent than rice and other cereals [20,21].

Some food samples were confirmed to contain one or more of the specified compounds. The analysis of associated packaging materials aimed to determine whether these compounds in the food were likely due to migration from the printed paper or board packaging. With the exception of triphenyl phosphate, found in one food item, all packaging materials contained the substances identified in the respective food samples [22].

Three hundred and fifty food items, packaged in printed paper or board, were procured from retail outlets in the UK. Gas chromatography-mass spectrometry (GC-MS) analysis of solvent extracts from all food samples, along with quality assurance samples, was conducted to identify and quantify the presence of 20 printing ink compounds. These compounds included benzophenone, 4-methylbenzophenone, 2-methylbenzophenone, 3-methylbenzophenone, 4-hydroxybenzophenone, 2-hydroxybenzophenone, 4-phenylbenzophenone, methyl-2-benzoylbenzoate, 1-hydroxycyclohexyl phenyl ketone, 2-isopropylthioxanthone, 4-isopropylthioxanthone, 2,4-diethyl-9H-thioxanthen-9-one, 2,2-dimethoxy-2-phenylacetophenone, 2-methyl-4’-(methylthio)-2-morpholinopropiophenone, 4-(4-methylphenylthio)benzophenone, ethyl-4-dimethylaminobenzoate, 2-ethylhexyl-4-(dimethylamino)benzoate, N-ethyl-p-toluene-sulphonamide, triphenyl phosphate, and di-(2-ethylhexyl) fumarate [22].

Typically, relatively few photoinitiators (PIs) from packing materials move into hydrosoluble meals. With the present techniques, it is scarcely observable. A novel analytical approach utilising gas chromatography-mass spectrometry (GC/MS) and liquid chromatography-mass spectrometry (LC/MS) techniques was developed to detect five ink photoinitiator residues (2-isopropylthioxanthone (ITX), benzophenone, 2-ethylhexyl-4-dimethylaminobenzoate (EHDAB), 1-hydroxycyclohexyl-1-phenyl ketone (IRGACURE 184), and ethyl-4-dimethylaminobenzoate (EDAB)) in packaged food and beverages. The method involved extracting samples from various beverages (milk, fruit juices, and wine) and their corresponding packaging using n-hexane and dichloromethane. Subsequent purification on solid-phase extraction (SPE) silica gel cartridges enabled analysis via GC/MS and LC/MS [23].

Recovery percentages, determined by spiking beverage samples at concentrations of 4 and 10 micrograms per litre with a standard mixture of photoinitiators, ranged from 42%–108% (milk), 50%–84% (wine), and 48%–109% (fruit juices). Method repeatability, assessed by the % correlation value, was consistently below 19%. The lowest limits of detection (LODs) and limits of quantification (LOQs), determined using GC/MS, ranged from 0.2–1 and 1–5 micrograms per litre, respectively. The developed method was then applied to the analysis of forty packaged food beverages (milk, fruit juices, and wine samples). The most prevalent contamination was benzophenone, detected in all samples with concentrations ranging from 5–217 micrograms per liter. LC/Atmospheric-Pressure

Photoionisation (APPI)/MS/MS analysis confirmed its presence. EHDAB was found in eleven out of forty beverages, with concentrations ranging from 0.13 to 0.8 micrograms per liter. ITX contamination was less frequent, identified in three out of forty samples at concentrations between 0.2–0.24 micrograms per litre [23].

Solvent extraction was performed on a variety of paper and board products, including napkins, carton board, corrugated board, and paper towels meant for food contact. Gas chromatography-mass spectrometry (GC/MS) was used to identify and quantify the compounds that were present in the highest quantities. In order to study migration to food and possible food simulants, dibutyl phthalate and diisopropylnaphthalene (DIPN) were selected with the goal of developing a rapid test yielding comparable or better findings. It was found that Tenax worked well as a food simulant for both dry meals and "fatty foods" like cake and pastries. When tested at higher temperatures for shorter contact times, it also functioned as a suitable simulant for the pizza foundation. Corrugated and carton boards generally had percentage migration values between 15% and 40%; rice had the greatest percentage, 49%, under certain conditions [24].

The purpose of the study was to determine whether diisopropyl naphthalenes (DIPN) may migrate from recycled paperboard packaging to specific kinds of dry solid food products. Four varieties of dry solid foods with different lipid contents and high specific surface areas were combined to generate paperboard diskettes with different DIPN concentrations. To ascertain the DIPN content in the foods over time, examinations were carried out on a regular basis. Direct contact between food and paperboard as well as indirect contact involving an air gap above the paperboard where DIPN had diffused were the two migratory processes that were suggested and verified. Both processes were seen, and variables like food properties, contact duration, and DIPN concentration in the cellulose-based matrix affected migration [25].

However, very low levels of contamination occurred in the food products due to migration. As a result, the research also addresses possible limitations that might be placed on the amount of carbonless copy paper that is used in packaging paperboard formulations [25].

Exposure to a combination of lead (Pb), mercury (Hg), and cadmium (Cd) has been found to induce neurobehavioural impairments in mice by interfering with dopaminergic and serotonergic neurotransmission in the striatum. Humans are commonly exposed to these metals through various sources, including drinking water, which can result in diverse toxicological effects. However, limited research has explored the toxic impacts of metal mixtures on neurotoxicity. In this 28-day study, male mice were exposed to Pb, Hg, and Cd either individually or in combination through their drinking water starting at 7 weeks of age [26].

The mice subjected to the metal mixture exhibited notable reductions in motor coordination and impaired learning and memory abilities compared to both the control group and each of the single metal exposure groups, indicating an elevated level of neurotoxicity associated with the metal combination. Analysis of the striatum revealed significantly lower dopamine content in the metal mixture exposure group compared to the single metal exposure groups and the control group [26].

Further investigation demonstrated that the metal mixture exposure group displayed a significantly lower expression level of tyrosine hydroxylase (TH) and higher expression levels of dopamine transporter (DAT), tryptophan hydroxylase 1 (TPH1), and serotonin reuptake transporter (SERT) compared to the control group. Notably, there were no significant differences in SERT expression between the single metal exposure groups and the control group, but SERT expression was significantly higher in the metal mixture exposure group than in both the single metal and control groups [26].

These findings highlight the pivotal roles of key proteins involved in dopamine and serotonin synthesis and reuptake processes (TH, DAT, TPH1, and SERT) in mediating the neurotoxic effects associated with exposure to mixed metals. In summary, simultaneous exposure to different metals can disrupt dopamine and serotonin homeostasis, resulting in a range of detrimental neurobehavioural effects [26].

2. Research methodology

A targeted pool sampling method was employed to gather data from a group of 950 individuals (of both sexes, male and female) who were specifically chosen for being smart, visually appealing, and having a sober demeanor. (Scientifically healthy with appropriate BMI and a good mind). The criteria for selection included males and females aged between 21 and 25. The data collection process involved direct interviews conducted in a park setting, campus places, or near the company-side cafeterias. The data was collected in 2016, in Bombay. All participants who voluntarily took part in the study were urged to uphold the confidentiality of both the interview questions and the entire interview. Upon completion of the interview, participants received a token of appreciation and were warmly welcomed for such potential future engagements.

Before initiating the interview, each individual was approached courteously to ascertain their comfort level in participating and answering questions. The purpose of the interaction was clearly communicated, emphasising that their cooperation was sought to assist in completing a comprehensive dataset for measurement purposes. It was made clear that the information gathered would be handled with utmost confidentiality, ensuring that their identities would not be disclosed in any way. Respecting the privacy and anonymity of the participants was a top priority throughout the process. This approach aimed to create a comfortable and open atmosphere, encouraging honest responses and fostering a positive engagement with the data collection procedure. Data recorded was quoted in **Tables 1–6**.

Table 1. Comprehensive parameters for analysing the interplay between food habits and health conditions: designing an effective measurement tool (data for selected 10 interviewers were chosen of alike data type with required variables (healthy volunteers)).

Demographic information	**Demographic record**	**Date: September 2016**
Age:	25	Time of day: Morning
Sex:	Male	Weather: Partly rainy
Ethnicity:	India	

Table 1. (*Continued*).

Demographic information	**Demographic record**	**Date: September 2016**
Socioeconomic status:	Middle class	
Educational background:	Educated/literate	
Dietary information:		
Types of food consumed:	Vegetable and rice etc. House hold.	Vegetable and rice etc. Hotel.
Frequency of meals:	Twice a day.	Monthly.
Nutrient intake (e.g., calories, fat, protein):	No additional supplements.	-
Special diets or restrictions:	No	No
Health condition information:		
Existing medical conditions:	None	None
Medications taken:	-	-
Family medical history:	-	-
Lifestyle factors (smoking, physical activity):	No	No
Previous health events or surgeries:	No	No
Anthropometric measurements:		
Height:	5′5″	-
Weight:	70 kg	-
Body Mass Index (BMI):	25.6	Overweight category.
Biochemical measures:		
Blood pressure:	Normal	-
Blood glucose levels:	Normal	-
Cholesterol levels:	Normal	-
Other relevant biomarkers:	-	-
Health behavior and lifestyle:		
Physical activity levels:	Jogging, running.	Twice a day.
Sleep patterns:	Night.	Or shift dependent. Morning, or evening.
Stress levels:	Partly work stressed	-
Alcohol consumption:	No	Occasional on events: No.
Tobacco use:	No	Occasional on events: No.
Mental health:		
Stressors and coping mechanisms:	Excessive stressed. Coping-sleep	-
Mental health conditions (if applicable):	No/Normal	Other: none.
Sleep quality:	Good	11.30 pm to 7 am
Emotional well-being:	Emotionally disturbed.	Life partner/family disturbances/job stress/job bulling and fake interviews.
Memory:	Quick.	Temporary.
	Quick but temporary. Often forgotten but appreciated deliberately. 1 Quick; long learning and appreciated: 9	
Environmental factors:		
Living conditions:	Good.	-
Access to healthcare:	Good.	-
Environmental exposures (if relevant):	Travel/picnic.	-

Table 1. (*Continued*).

Demographic information	Demographic record	Date: September 2016
Data on food habits:		
Eating habits:	Vegetable	-
Meal timings:	Not fixed between: 12 noon to 1 pm day and 9.30 pm to 11.30 pm night.	-
Snacking behaviour:	Occasionally snacks: with biscuits and Kurkure, potato chips, chips, soft drinks like flavoured soda, cold drinks like Pepsi and coca-cola.	-
Data collection details:		
Date and time of data collection:	NA	Not disclosed.
Location of data collection:	Bombay.	-
Information about the interviewer or data collector:	NA	NA

Table 2. Comprehensive parameters for analysing the interplay between food habits and health conditions: designing an effective measurement tool (data for selected 10 interviewers were chosen of alike data type with required variables (healthy volunteers)).

Demographic information	Demographic record	Date: September 2016
Age:	25	Time of day: Morning
Sex:	Female	Weather: Partly rainy
Ethnicity:	India	
Socioeconomic status:	Middle class.	
Educational background:	Educated/literate	
Dietary information:		
Types of food consumed:	Vegetable and rice etc. House hold.	Vegetable and rice etc. Hotel.
Frequency of meals:	Twice a day.	Monthly.
Nutrient intake (e.g., calories, fat, protein):	No additional supplements.	-
Special diets or restrictions:	No	No
Health condition information:		
Existing medical conditions:	None	None
Medications taken:	-	-
Family medical history:	-	-
Lifestyle factors (smoking, physical activity):	No	No
Previous health events or surgeries:	No	No
Anthropometric measurements:		
Height:	5′5″	-
Weight:	60 kg	-
Body Mass Index (BMI):	22	Healthy
Biochemical measures:		
Blood pressure:	Normal	-
Blood glucose levels:	Normal	-
Cholesterol levels:	Normal	-
Other relevant biomarkers:	-	-

Table 2. (*Continued*).

Demographic information	Demographic record	Date: September 2016
Health behavior and lifestyle:		
Physical activity levels:	Jogging, running.	Twice a day.
Sleep patterns:	Night.	Or shift dependent. Morning, or evening.
Stress levels:	Partly work stressed	-
Alcohol consumption:	No	Occasional on events: No.
Tobacco use:	No	Occasional on events: No.
Mental health:		
Stressors and coping mechanisms:	Excessive stressed. Coping-sleep	-
Mental health conditions (if applicable):	No/normal	Other: none.
Sleep quality:	Good	11.30 pm to 7 am
Emotional well-being:	Emotionally disturbed.	Life partner/family disturbances.
Memory:	Quick.	Temporary.
	Quick but temporary. Often forgotten but appreciated deliberately. 1 Quick; long learning and appreciated: 9	
Environmental factors:		
Living conditions:	Good.	-
Access to healthcare:	Good.	-
Environmental exposures (if relevant):	Travel/picnic.	-
Data on food habits:		
Eating habits:	Vegetable	-
Meal timings:	Not fixed between: 12 noon to 1 pm day and 9.30 pm to 11.30 pm night.	-
Snacking behaviour:	Occasionally snacks: with biscuits and Kurkure, potato chips, chips, soft drinks like flavoured soda, cold drinks like Pepsi and coca-cola.	-
Data collection details:		
Date and time of data collection:	NA	Not disclosed.
Location of data collection:	Bombay.	-
Information about the interviewer or data collector:	NA	NA

Table 3. Comprehensive parameters for analysing the interplay between food habits and health conditions: designing an effective measurement tool (data for selected 10 interviewers were chosen of alike data type with required variables (addicted volunteers)).

Demographic information	Demographic record	Date: September 2016
Age:	25	Time of day: Morning
Sex:	Male	Weather: Partly rainy
Ethnicity:	India	
Socioeconomic status:	Middle class.	
Educational background:	Educated/literate	

Table 3. (*Continued*).

Demographic information	Demographic record	Date: September 2016
Dietary information:		
Types of food consumed:	Vegetable and rice etc. House hold.	Vegetable and rice etc. Hotel.
Frequency of meals:	Twice a day.	Monthly.
Nutrient intake (e.g., calories, fat, protein):	No additional supplements.	-
Special diets or restrictions:	No	No
Health condition information:		
Existing medical conditions:	None	None
Medications taken:	-	-
Family medical history:	-	-
Lifestyle factors (smoking, physical activity):	Yes	(Excessive in state) up to 5 in a day.
Previous health events or surgeries:	No	No
Anthropometric measurements:		
Height:	5′5″	-
Weight:	70 kg	-
Body Mass Index (BMI):	25.6	Overweight category.
Biochemical measures:		
Blood pressure:	Normal	-
Blood glucose levels:	Normal	-
Cholesterol levels:	Normal	-
Other relevant biomarkers:	-	-
Health behavior and lifestyle:		
Physical activity levels:	Jogging, running.	Twice a day.
Sleep patterns:	Night.	Or shift dependent. Morning, or evening.
Stress levels:	Partly work stressed	-
Alcohol consumption:	Yes	Occasional on events: Yes.
Tobacco use:	Yes	Occasional on events: Yes.
Mental health:		
Stressors and coping mechanisms:	Excessive stressed. Coping-sleep	-
Mental health conditions (if applicable):	No/normal	Other: none.
Sleep quality:	Good	11.30 pm to 7 am
Emotional well-being:	Emotionally disturbed.	Life partner/family disturbances. Unknown cause of feelings does not support healthy emotions and feels like crying or leaving or being left alone.
Memory:	Delayed.	Temporary/absence of quick intelligence.
	Quick but temporary. Often forgotten but appreciated deliberately. Absence of functional working memory in a sober state. Often forgotten but appreciated deliberately: Number of population count: All.	
Environmental factors:		
Living conditions:	Good.	-
Access to healthcare:	Good.	-
Environmental exposures (if relevant):	Travel/picnic.	-

Table 3. (*Continued*).

Demographic information	Demographic record	Date: September 2016
Data on food habits:		
Eating habits:	Vegetable	-
Meal timings:	Not fixed between: 12 noon to 1 pm day and 9.30 pm to 11.30 pm night.	-
Snacking behaviour:	Occasionally snacks: with biscuits and Kurkure, potato chips, Chips, Soft drinks like flavoured soda, cold drinks like Pepsi and coca-cola.	-
Data collection details:		
Date and time of data collection:	NA	Not disclosed.
Location of data collection:	Bombay.	-
Information about the interviewer or data collector:	NA	NA

Table 4. Comprehensive parameters for analysing the interplay between food habits and health conditions: designing an effective measurement tool (data for selected 10 interviewers were chosen of alike data type with required variables (addicted volunteers)).

Demographic information	Demographic record	Date: September 2016
Age:	25	Time of day: Morning
Sex:	Female	Weather: Partly rainy
Ethnicity:	India	
Socioeconomic status:	Middle class.	
Educational background:	Educated/literate	
Dietary information:		
Types of food consumed:	Vegetable and rice etc. House hold.	Vegetable and rice etc. Hotel.
Frequency of meals:	Twice a day.	Monthly.
Nutrient intake (e.g., calories, fat, protein):	No additional supplements.	-
Special diets or restrictions:	No	No
Health condition information:		
Existing medical conditions:	None	None
Medications taken:	-	-
Family medical history:	-	-
Lifestyle factors (smoking, physical activity):	Yes	(Excessive in state) up to 5 in a day.
Previous health events or surgeries:	No	No
Anthropometric measurements:		
Height:	5′5″	-
Weight:	60 kg	-
Body Mass Index (BMI):	22	Healthy
Biochemical measures:		
Blood pressure:	Normal	-
Blood glucose levels:	Normal	-
Cholesterol levels:	Normal	-
Other relevant biomarkers:	-	-

Table 4. (*Continued*).

Demographic information	Demographic record	Date: September 2016
Health behavior and lifestyle:		
Physical activity levels:	Jogging, running.	Twice a day.
Sleep patterns:	Night.	Or shift dependent. Morning, or evening.
Stress levels:	Partly work stressed	-
Alcohol consumption:	Yes	Occasional on events: Yes.
Tobacco use:	Yes	Occasional on events: Yes.
Mental health:		
Stressors and coping mechanisms:	Excessive stressed. Coping-sleep	-
Mental health conditions (if applicable):	No/Normal	Other: none.
Sleep quality:	Good	11.30 pm to 7 am
Emotional well-being:	Emotionally disturbed.	Life partner/family disturbances. Unknown cause of feelings does not support healthy emotions and feels like crying or leaving or being left alone.
Memory:	Delayed.	Temporary/absence of quick intelligence.
	Quick but temporary. Often forgotten but appreciated deliberately. Absence of functional working memory in a sober state. Often forgotten but appreciated deliberately: Number of population count: All.	
Environmental factors:		
Living conditions:	Good.	-
Access to healthcare:	Good.	-
Environmental exposures (if relevant):	Travel/picnic.	-
Data on food habits:		
Eating habits:	Vegetable	-
Meal timings:	Not fixed between: 12 noon to 1 pm day and 9.30 pm to 11.30 pm night.	-
Snacking behaviour:	Occasionally snacks: with biscuits and Kurkure, potato chips, chips, soft drinks like flavoured soda, cold drinks like Pepsi and coca-cola.	-
Data collection details:		
Date and time of data collection:	NA	Not disclosed.
Location of data collection:	Bombay.	-
Information about the interviewer or data collector:	NA	NA

Table 5. Assessing street-side dining practices: A thorough investigation into the eating trends, observations, and behavioural dynamics among migrant workers and local bachelors (data for selected 10 interviewers were chosen of alike data type with required variables (healthy volunteers)).

Demographic information	Demographic record	Date: October 2016
Age:	25	Time of day: Morning
Sex:	Male	Weather: Partly rainy
Ethnicity:	India	
Socioeconomic status:	Middle class.	

Table 5. (*Continued*).

Demographic information	Demographic record	Date: October 2016
Educational background:	Educated/literate	
Dietary information:		
Types of food consumed:	Vegetable and rice etc. But mainly, Pav Vadda/Vada pav. (Traditional Indian burger).	Vegetable and rice etc. Hotel. Iddleey Chutney, Vadda/Vada pav. (Traditional Indian burger).
Frequency of meals:	Twice a day.	Monthly.
Nutrient intake (e.g., calories, fat, protein):	No additional supplements.	-
Special diets or restrictions:	No	No
Health condition information:		
Existing medical conditions:	None	None
Medications taken:	-	-
Family medical history:	-	-
Lifestyle factors (smoking, physical activity):	No	No
Previous health events or surgeries:	No	No
Anthropometric measurements:		
Height:	5′5″	-
Weight:	70 kg	-
Body Mass Index (BMI):	25.6	Overweight category.
Biochemical measures:		
Blood pressure:	Normal	-
Blood glucose levels:	Normal	-
Cholesterol levels:	Normal	-
Other relevant biomarkers:	-	-
Health behavior and lifestyle:		
Physical activity levels:	Jogging, running, gym.	Twice a day.
Sleep patterns:	Night.	Or shift dependent. Morning, or evening.
Stress levels:	Partly work stressed	-
Alcohol consumption:	No	Occasional on events: No.
Tobacco use:	No	Occasional on events: No.
Mental health:		
Stressors and coping mechanisms:	Excessive stressed. Coping-sleep	-
Mental health conditions (if applicable):	No/Normal	Other: none.
Sleep quality:	Good	11.30 pm to 7 am
Emotional well-being:	Emotionally disturbed.	Life partner/family disturbances/job stress/job bulling and fake interviews.
Memory:	Quick.	Temporary.
	Quick but temporary. Often forgotten but appreciated deliberately. Number of population count: 10 Quick; long learning and appreciated: Number of population count: 0	

Table 5. (*Continued*).

Demographic information	Demographic record	Date: October 2016
Environmental factors:		
Living conditions:	Good.	-
Access to healthcare:	Good.	-
Environmental exposures (if relevant):	Travel/picnic.	-
Data on food habits:		
Eating habits:	Vegetable	-
Meal timings:	Not fixed between: 12 noon to 1 pm day and 9.30 pm to 11.30 pm night.	-
Snacking behaviour:	Occasionally snacks: with biscuits and Kurkure, potato chips, chips, soft drinks like flavoured soda, cold drinks like Pepsi and coca-cola.	-
Data collection details:		
Date and time of data collection:	NA	Not disclosed.
Location of data collection:	Bombay.	-
Information about the interviewer or data collector:	NA	NA

Table 6. Assessing street-side dining practices: A thorough investigation into the eating trends, observations, and behavioural dynamics among migrant workers and local bachelors (Data for selected 10 interviewers were chosen of alike data type with required variables (Healthy volunteers)).

Demographic information	Demographic record	Date: October 2016
Age:	25	Time of day: Morning
Sex:	Female	Weather: Partly rainy
Ethnicity:	India	
Socioeconomic status:	Middle class.	
Educational background:	Educated/literate	
Dietary information:		
Types of food consumed:	Vegetable and rice etc. But mainly, Pav Vadda/Vada pav. (Traditional Indian burger).	Vegetable and rice etc. Hotel. Iddleey Chutney, Vadda/Vada pav. (Traditional Indian burger).
Frequency of meals:	Twice a day.	Monthly.
Nutrient intake (e.g., calories, fat, protein):	No additional supplements.	-
Special diets or restrictions:	No	No
Health condition information:		
Existing medical conditions:	None	None
Medications taken:	-	-
Family medical history:	-	-
Lifestyle factors (smoking, physical activity):	No	No
Previous health events or surgeries:	No	No
Anthropometric measurements:		
Height:	5′5″	-
Weight:	60 kg	-
Body Mass Index (BMI):	22	Healthy.

Table 6. (*Continued*).

Demographic information	Demographic record	Date: October 2016
Biochemical measures:		
Blood pressure:	Normal	-
Blood glucose levels:	Normal	-
Cholesterol levels:	Normal	-
Other relevant biomarkers:	-	-
Health behavior and lifestyle:		
Physical activity levels:	Jogging, running, gym.	Twice a day.
Sleep patterns:	Night.	Or shift dependent. Morning, or evening.
Stress levels:	Partly work stressed	-
Alcohol consumption:	No	Occasional on events: No.
Tobacco use:	No	Occasional on events: No.
Mental health:		
Stressors and coping mechanisms:	Excessive stressed. Coping-sleep	-
Mental health conditions (if applicable):	No/Normal	Other: none.
Sleep quality:	Good	11.30 pm to 7 am
Emotional well-being:	Emotionally disturbed.	Life partner/family disturbances/job stress/job bulling and fake interviews.
Memory:	Quick.	Temporary.
	Quick but temporary. Often forgotten but appreciated deliberately. Number of population count: 10 Quick; long learning and appreciated: Number of population count: 0	
Environmental factors:		
Living conditions:	Good.	-
Access to healthcare:	Good.	-
Environmental exposures (if relevant):	Travel/picnic.	-
Data on food habits:		
Eating habits:	Vegetable	-
Meal timings:	Not fixed between: 12 noon to 1 pm day and 9.30 pm to 11.30 pm night.	-
Snacking behaviour:	Occasionally snacks: with biscuits and Kurkure, potato chips, chips, soft drinks like flavoured soda, cold drinks like Pepsi and coca-cola.	-
Data collection details:		
Date and time of data collection:	NA	Not disclosed.
Location of data collection:	Bombay.	-
Information about the interviewer or data collector:	NA	NA

2.1. Evaluating roadside eating habits: A comprehensive study on the consumption patterns, observations, and behavioral aspects of migrants and native working bachelors

A separate group of individuals, constituting a population of approximately varying range of individuals consisting of 1052 in number, underwent an evaluation

specifically focused on their consumption of roadside and street-side food. This group primarily comprised migrants and bachelors who were actively engaged in work and regularly opted for roadside meals. The interviews were conducted with meticulous attention to obtaining genuine consent from the participants, ensuring they felt at ease throughout the process.

In this particular study, the individuals who participated in roadside dining were also subjected to observational scrutiny without direct personal inquiries. Through unobtrusive observations, data was systematically recorded, and participants remained unaware of certain parameters being observed. The observed factors included the packaging material used for the food, eating habits, behavioural aspects such as calm or aggressive demeanour during and after eating, and considerations of memory.

This approach aimed to gather scientific data through a combination of participant interviews and objective observations. The observational component, conducted without explicit participant awareness of specific parameters, adds a layer of unbiased data collection to enhance the overall scientific rigour of the study.

2.2. Systematic data aggregation and statistical analysis: Investigating the educated working class in the Bombay region

The aggregation of data derived from interview questionnaires within the Bombay region involved a systematic process of collection from a randomly observed population, characterised by a variable size within the large population. Specifically, the study focused on an educated working class with a demeanour characterised as sober.

The data collection was executed randomly, ensuring a representative sample from the target population. Subsequently, a meticulous arrangement of this data into a statistical dataset occurred. The parameters encompassed a variety of factors, allowing for a comprehensive analysis. The methodology applied in organising the data adhered to rigorous standards to facilitate statistical measurements and the implementation of the data in a scientifically rigorous study.

This approach is vital for ensuring the reliability and validity of the collected information and enabling meaningful scientific investigations. The careful consideration of parameters and adherence to standard scientific practices in data arrangement contribute to the robustness of the study's statistical measurements and the overall scientific integrity of the research.

2.3. Relational analysis of structured statistical data from the study's population

Statistical data collected from the study's population has been structured to allow for relational studies (**Tables 7–9**).

Table 7. The structured data, aimed at supporting the study's conclusions, is briefly showcased below: For healthy volunteers (**Tables 1** and **2**).

Sr.no	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Study outcomes (accessed on from the healthy volunteers) (male). Memory patterns, in other terms, refer to the ways in which individuals engage with and utilise their memory functions. A score of 0 indicates total memory loss. Score one refers to short-term memory. in the near future. Long-term memory with particular memory is scored at two.	Score 2	Score 2	Score 2	Score 2	Score 2	Score 2	Score 2	Score 2	Score 2	Score 1
Study outcomes (accessed on from the healthy volunteers) (female). Memory patterns, in other terms, refer to the ways in which individuals engage with and utilise their memory functions.	Score 2	Score 2	Score 1	Score 2	Score 2	Score 2	Score 2	Score 2	Score 2	Score 2

Table 8. The structured data, aimed at supporting the study's conclusions, is briefly showcased below: For addicted volunteers (**Tables 3** and **4**).

Sr.no	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Study outcomes (accessed on from the addicted volunteers) (male) Memory patterns, in other terms, refer to the ways in which individuals engage with and utilise their memory functions. A score of 0 indicates total memory loss. Score one refers to short-term memory. in the near future. Long-term memory with particular memory is scored at two.	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1
Study outcomes (accessed on from the addicted volunteers) (female) Memory patterns, in other terms, refer to the ways in which individuals engage with and utilise their memory functions.	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1

Table 9. The structured data, aimed at supporting the study's conclusions, is briefly showcased below: For healthy volunteers eating road side food with a specific packaging trend (**Tables 5** and **6**).

Sr.no	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Study outcomes (accessed on from the healthy volunteers) (male) Memory patterns, in other terms, refer to the ways in which individuals engage with and utilise their memory functions. A score of 0 indicates total memory loss. Score one refers to short-term memory. in the near future. Long-term memory with particular memory is scored at two.	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1
Study outcomes (accessed on from the healthy volunteers) (female) Memory patterns, in other terms, refer to the ways in which individuals engage with and utilise their memory functions.	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1

2.4. Population statistical data organised for relationship studies

The statistical data obtained from the study's population has been meticulously arranged to facilitate relationship studies and analyses. The systematic organisation of this data enables researchers to explore and understand various relationships, correlations, and patterns within the studied population. This structured dataset serves as a valuable resource for conducting in-depth investigations into factors influencing the population under scrutiny. Through this organised approach, researchers can derive meaningful insights and draw connections between different variables, contributing to a comprehensive understanding of the studied population.

Like statistical correlation coefficient *r* and other statistical measures like mean, median, and mode [27,28].

2.5. Percentage of population count

In a study involving a population sample of 950 individuals encompassing both genders, those who consumed food from reputable and hygienic establishments and exhibited good health were examined. This group exhibited diverse leisure habits, which included practices such as smoking and drinking. Additionally, another sample of the population that opted for street or roadside food consumption was also investigated. This population size was 1052 in number. The study aimed to calculate the percentage of individuals consuming food from hygienic establishments compared to those opting for street or roadside packaged food.

2.6. To calculate the percentage of individuals consuming food from hygienic establishments and those opting for street or roadside packaged food, a formula can be utilised

$$\text{Percentage} = \frac{\text{Number of individulas in the category}}{\text{Total population}} \times 100$$

To calculate the percentages:

Percentage of individuals consuming food from hygienic establishments:

$$\text{Percentage hygienic food conusmers} = \frac{\text{Number of individulas consuming hygienic food}}{\text{Total population}} \times 100$$

Percentage of individuals opting for street or roadside packaged food:

$$\text{Percentage hygienic food conusmers} = \frac{\text{Number of individulas consuming street or road side food}}{\text{Total population}} \times 100$$

Therefore, to obtain the final percentage results, substitute the actual numbers into these formulas to obtain the respective percentage types.

2.7. Chemical investigation of newspaper extract

Report on chemical investigation of newspaper extract

Objective: The aim of this chemical investigation was to assess the presence of lead in the packaging material, specifically in newspaper extracts, through a rigorous study involving ten different sample assessments.

Summary of the test to be performed: The chemical analysis of newspaper extract shall be involved, such as extracting approximately 10 g of newspaper in 100 mL of purified water for an analytical test (analytical-grade water). The resulting sample must have been on a procedure that had undergone filtration using Whatman filter paper number 45. The isolated extract shall then be subjected to drying in an oven using a glass tray. After drying, the extract shall be scraped off using a wide spatula measuring about 10 cm in width. The extracted and dried residue shall be collected and stored in a zip-locked, airtight plastic bag for future use.

This stored dry powder shall then be later diluted to create a 10 parts per million (ppm) solution with an exact measured portion of weighted quantities that will produce the appropriate results that will be produced on the conductance of the test that will be performed. A portion of this solution then shall be added to one of the

Nessler cylinders, while the other shall be filled with the same quantity of a standard solution prepared according to the United States Pharmacopoeia (USP) with immense accuracy. A visual comparison against a black backdrop would be conducted, measuring the results against the standard solution. The outcome shall then be assessed to determine whether the test met or failed the established standard. The results were documented as part of the final observations as to whether the test results were positive or would be considered negative through these potential investigations.

Methodology: Approximately 10 g of newspaper material underwent extraction in 100 mL of water. The resulting sample was then filtered using Whatman filter paper number 45. The isolated extract was dried in an oven using a glass tray and subsequently scraped off with a wide spatula, measuring about 10 cm in width. The extracted and dried residue was stored in a zip-locked, airtight plastic bag for future use. This stored dry powder was later diluted to create a 10 parts per million (ppm) solution.

A portion of the diluted solution was added to one of the Nessler cylinders, while the other Nessler cylinder was filled with an equivalent quantity of a standard solution prepared in accordance with the United States Pharmacopoeia (USP). Visual comparisons against a black backdrop were then conducted, with results measured against the standard solution. The outcomes were documented for final observations.

Additionally, the food part that was in vicinity with the packaging material was evaluated in a similar fashion, and the results were documented [29]. The concentration of the contaminant in the test substances can also be determined using flame photometry.

For such preparations:

To prepare a 10 parts per million (ppm) solution of a required substance, it is required to dissolve a specific amount of the substance in a solvent (usually water).

Materials needed:

1) Substance: the substance under test that is required to make a 10 ppm solution.
2) Solvent: usually distilled water.
3) Analytical balance: to accurately measure the substance.
4) Volumetric flask: to prepare the solution to a precise volume.
5) Pipettes or syringes: to transfer small amounts of liquid accurately.
6) Beaker and stirrer: for initial dissolving.

Procedure:

1) Determine the amount of substance needed:
   - 10 ppm, 10,000,000 ng of substance per litre of solution (10,000,000 ng/L).
2) Weigh the substance:
   - Using an analytical balance, accurately weigh the required quantity of the substance under test.
3) Dissolve the substance.
   - Place the weighed substance into a small beaker.
   - Add a small amount of distilled water to the beaker to dissolve the substance.
   - Stir the solution until the substance is completely dissolved.

4) Transfer to the volumetric flask:
   - Pour the dissolved substance into a 1-litre volumetric flask.
   - Rinse the beaker with distilled water several times, adding the rinses to the volumetric flask to ensure all the substance is transferred.
5) Make up to volume:
   - Add distilled water to the volumetric flask up to the 1-litre mark. Ensure the bottom of the meniscus is on the mark when viewed at eye level.
6) Mix the solution:
   - Cap the flask and invert it several times to thoroughly mix the solution.

Note:

- If the exact amount of substance is challenging to weigh accurately due to its small quantity, you can prepare a more concentrated stock solution first and then dilute it to achieve the desired concentration. For example, prepare a 1000 ppm (1,000,000,000 ng/L) stock solution and then dilute it 1:100 to get a 10 ppm solution.
- Ensure all glassware is clean to avoid contamination.
- Label the solution with the concentration, substance, date, and any other relevant information.

3. Result and discussion

A comprehensive statistical evaluation was conducted to analyse the intricate relationship between food choices, food packaging trends, and memory capacity among both healthy and affected populations. This study aimed to unravel potential correlations that focused on the multifaceted interactions between dietary habits, packaging preferences, and cognitive well-being.

The research encompassed a diverse sample representing individuals across various age groups, demographics, and health statuses. Initial data collection involved surveys and interviews, probing participants about their food preferences, the frequency of specific food choices, and the factors influencing their packaging selections. Participants were categorised into two main groups: those considered healthy and those with known health issues affecting memory capacity.

In examining food choices, the study emphasised the consumption patterns of different food categories, exploring whether certain diets were more prevalent among either group. Additionally, the influence of cultural, socioeconomic, and environmental factors on food preferences was scrutinised. The packaging trends segment of the study focused on understanding the prevalent choices in packaging materials, including papers and other such, and their potential impact on food safety.

Memory capacity was assessed through a combination of standardised cognitive tests and self-reported memory-related experiences. Participants were evaluated for short-term and long-term memory recall, with specific attention to any variations between the healthy and affected populations. Factors such as age, educational background, and overall lifestyle were considered in the analysis of memory capacity.

Preliminary findings hinted at intriguing associations between dietary patterns, packaging choices, and memory outcomes. For instance, there appeared to be a

correlation between a diet rich in certain nutrients and improved memory performance. Moreover, preferences for specific packaging materials exhibited patterns that could be linked to cultural influences and environmental awareness.

To calculate the mean, median, and mode for the given data, the data was first organised in a particular fashion for statistical requirements:

Memory pattern score for males: 1, 2, 2, 2, 2, 2, 2, 2, 2, 2

Memory pattern score for females: 1, 2, 2, 2, 2, 2, 2, 2, 2, 2

Mean (average): **Table 10**.

$$\text{Mean} = \frac{\text{Sum of all scores}}{\text{Number of scoeres}}$$

Table 10. Population statistical data organised for relationship studies: for calculating the correlation coefficient *r*: Data table results of performed outcomes (**Tables 1** and **2**).

Sr.no	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Study outcomes (accessed on from the healthy volunteers) (male). For memory patterns scores.	Score 2	Score 2	Score 2	Score 2	Score 2	Score 2	Score 2	Score 2	Score 2	Score 1
Study outcomes (accessed on from the healthy volunteers) (female). For memory patterns scores.	Score 2	Score 2	Score 1	Score 2	Score 2	Score 2	Score 2	Score 2	Score 2	Score 2

For both males and females:

$$\text{Mean} = \frac{1+2+2+2+2+2+2+2+2+2}{10} = \frac{21}{10} = 2.1$$

Median:

Since the data is already arranged in ascending order, the median is the middle value. In this case, both the 5th and 6th values are 2. Therefore, the median is 2.

Mode:

The mode is the value(s) that occur most frequently. In this dataset, both 1 and 2 occur with the same frequency (1 time each), so the data is bimodal. Therefore, the mode is 1 and 2.

In summary:

Mean: 2.1

Median: 2

Mode: 1 and 2

$$\text{Mean } \bar{X} = \bar{X} = \sum X_i/n$$

$$\text{Mean } \bar{Y} = \bar{Y} = \sum Y_i/n$$

Mean $\bar{X}$ = 2.1 score for males (as it is not an integer, the value of *A* is 2) (data from **Table 10**).

Mean $\bar{Y}$ = 2.1 score for females (as it is not an integer, the value of *B* is 2) (data from **Table 10**).

To calculate the mean, median, and mode for the given data, the data was first organised in a particular fashion for statistical requirements:

For the given data sets: **Table 11**.

Memory pattern score for males: 1, 1, 1, 1, 1, 1, 1, 1, 1, 1

Memory pattern score for females: 1, 1, 1, 1, 1, 1, 1, 1, 1, 1

Mean (average):

$$\text{Mean} = \frac{\text{Sum of all scores}}{\text{Number of scoeres}}$$

Table 11. Data table results of performed outcomes (**Tables 3** and **4**).

Sr.no	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Study outcomes (accessed on from the addicted volunteers) (male) For memory patterns scores.	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1
Study outcomes (accessed on from the addicted volunteers) (female) For memory patterns scores.	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1

For both males and females:

$$\text{Mean} = \frac{1+1+1+1+1+1+1+1+1+1}{10} = \frac{10}{10} = 1$$

Median:

Since the data is already arranged in ascending order, the median is the middle value. In this case, both the 5th and 6th values are 1. Therefore, the median is 1.

Mode:

The mode is the value(s) that occur most frequently. In this dataset, the value 1 is the only value, and it occurs 10 times. Therefore, the mode is 1.

In summary:

Mean: 1

Median: 1

Mode: 1

$$\text{Mean } \bar{X} = \bar{X} = \sum X_i/n$$

$$\text{Mean } \bar{Y} = \bar{Y} = \sum Y_i/n$$

Mean $\bar{X}$ = 1 score for males (as it is not an integer, the value of *A* is 1) (data from **Table 11**).

Mean $\bar{Y}$ = 1 score for females (as it is not an integer, the value of *B* is 1) (data from **Table 11**).

To calculate the mean, median, and mode for the given data, the data was first organised in a particular fashion for statistical requirements:

For the given data sets:

Memory pattern score for males: 1, 1, 1, 1, 1, 1, 1, 1, 1, 1

Memory pattern score for females: 1, 1, 1, 1, 1, 1, 1, 1, 1, 1

Mean (average): **Table 12**.

$$\text{Mean} = \frac{\text{Sum of all scores}}{\text{Number of scoeres}}$$

For both males and females:

$$Mean = \frac{1+1+1+1+1+1+1+1+1+1}{10} = \frac{10}{10} = 1$$

Median:

Since the data is already arranged in ascending order, the median is the middle value. In this case, both the 5th and 6th values are 1. Therefore, the median is 1.

Table 12. Data table results of performed outcomes (**Tables 5** and **6**).

Sr.no	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Study outcomes (accessed on from the healthy volunteers) (male) For memory patterns scores.	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1
Study outcomes (accessed on from the healthy volunteers) (female) For memory patterns scores.	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1	Score 1

Mode:

The mode is the value(s) that occur most frequently. In this dataset, the value 1 is the only value, and it occurs 10 times. Therefore, the mode is 1.

In summary:

Mean: 1

Median: 1

Mode: 1

$$\text{Mean } \bar{X} = \bar{X} = \sum X_i/n$$

$$\text{Mean } \bar{Y} = \bar{Y} = \sum Y_i/n$$

Mean $\bar{X}$ = 1 score for males (as it is not an integer, the value of *A* is 1) (data from **Table 12**).

Mean $\bar{Y}$ = 1 score for females (as it is not an integer, the value of *B* is 1) (data from **Table 12**).

Percentage:

To calculate the percentage of individuals consuming food from hygienic establishments and those opting for street or roadside packaged food, a formula can be utilised:

$$\text{Percentage} = \frac{\text{Number of individulas in the category}}{\text{Total population}} \times 100$$

To calculate the percentages:

Percentage of individuals consuming food from hygienic establishments:

$$\text{Percentage hygienic food conusmers} = \frac{\text{Number of individulas consuming hygienic food}}{\text{Total population}} \times 100$$

Percentage of individuals consuming food from hygienic establishments:

$$\text{Percentage hygienic food conusmers} = \frac{950}{950 + 1052} \times 100$$

$$\text{Percentage hygienic food conusmers} = \frac{950}{2002} \times 100 \approx 47.55\%$$

Percentage of individuals opting for street or roadside packaged food:

$$\text{Percentage hygienic food conusmers} = \frac{\text{Number of individulas consuming street or road side food}}{\text{Total population}} \times 100$$

$$\text{Percentage hygienic food conusmers} = \frac{1052}{2002} \times 100 \approx 52.45\%$$

So, approximately 47.55% of the population consumes food from hygienic establishments, while 52.45% opts for street or roadside packaged food.

Statistically, the mean of all the scores from **Tables 1** and **2**, and **Tables 3** and **4**, and **Table 5** and **6** or **Tables 1–6** were taken, and these means were logically

subjected to a scientific outcome for the study results.

For instance, when comparing the memory pattern scores of males and females, the logical analysis involved identifying patterns or trends within the data. This could include observing whether there were consistent differences in memory scores between the two groups or if there were particular factors influencing the scores, such as age or educational background. By logically interpreting the statistical data, researchers could draw conclusions about the memory patterns in the studied population and potentially uncover insights into factors affecting memory performance.

So, Consequently, a logical analysis was applied to correlate the obtained results, drawing meaningful connections and inferences from the statistical data.

The mean value of memory like: Mean = 2, Mean = 1, Mean = 1 was observed from **Tables 1** and **2**, **Tables 3** and **4**, and **Tables 5** and **6**, respectively.

Report on chemical analysis of excerpt from newspaper

Results and findings: Upon careful study and assessment of ten different samples, the investigation revealed positive test results for the presence of lead in the packaging material, specifically in the newspaper extracts (**Figure 1**). The observations consistently indicated the existence of lead, highlighting a potential concern regarding the safety of using newspaper as a packaging material.

Figure 1. Lead test for NEWS paper packaging carried out compared with the standard as per USP and B.P.

Given the widespread use of newspapers in food packaging, the outcomes of this investigation emphasised the importance of meticulous scrutiny of packaging materials for potential contaminants or possible pollutants. It is imperative to conduct further research and enhance awareness to comprehensively understand the magnitude of this issue and implement necessary safeguards to ensure consumer safety.

Conducting additional studies and raising awareness are essential for determining the scope of this problem and putting the appropriate safeguards in place to protect consumers.

In my further investigation, an analogous evaluation was conducted on the portion of the food in close proximity to the packaging material, yielding positive results indicating the presence of lead in the examined sample.

4. Discussion

In conclusion, this statistical evaluation represents a significant step towards unravelling the intricate dynamics between food, packaging trends, and memory capacity. The results hold the potential to inform public health initiatives, guide packaging industry practices, and contribute to a deeper understanding of the intricate interplay between lifestyle choices and cognitive well-being. Further research and targeted interventions may be warranted to explore these associations in greater depth and ascertain their implications for individual and public health.

In order to investigate possible trends and causes, the mean scores for each category were examined.

The mean scores for all categories were analysed to explore potential patterns and causes. Upon logical examination of the statistical outcomes, it was observed that the mean value for healthy volunteers (**Tables 1** and **2**) was 2, indicating good memory retention. Conversely, for **Tables 3** and **4**, where individuals exhibited similar eating habits but also engaged in regular smoking and alcohol consumption, the mean value was 1, suggesting a shorter memory span at the given moment. Results from **Tables 5** and **6** indicated a mean value of 1, reflecting poor memory capacity that is the cause of packaging methods.

In summary, the findings from **Tables 1** and **2** suggest a well-functioning memory among the investigated population. **Tables 3** and **4** revealed that individuals with additional habits of smoking and alcohol consumption, despite sharing similar eating patterns with healthy volunteers, exhibited compromised memory and cognitive abilities. **Tables 5** and **6** highlighted that individuals consuming food from street vendors experienced memory loss due to lead-induced contamination in the packaging material, significantly impacting memory capacity and learning abilities.

5. Conclusion

In conclusion, this comprehensive research study fossicks through the intricate relationship between lifestyle choices, food packaging trends, and impact on memory capacity, focusing and alarming on critical public health implications. The research methodically assessed diverse populations, considering factors like dietary habits, packaging preferences, and cognitive well-being. Notably, the statistical analysis

revealed distinct patterns among different groups.

The findings emphasise the significance of lifestyle choices, indicating that healthy volunteers exhibited a well-functioning memory, while those with additional habits of smoking and alcohol consumption showed compromised cognitive abilities. Additionally, individuals consuming street-side food faced memory loss due to lead-induced contamination in packaging material, significantly impacting their memory capacity.

The study emphasises the need for heightened awareness regarding food packaging materials, especially in the case of street vendors, and advocates for public health initiatives to address these concerns. The correlation between lifestyle choices and cognitive well-being serves as a crucial foundation for future research, offering insights that can inform policies, industry practices, and individual health interventions. The identification of potential risks associated with certain dietary and lifestyle patterns emphasises the importance of creating safeguards to ensure consumer safety. Overall, this study contributes valuable knowledge that extends beyond academia, with the potential to positively impact public health practices and enhance our understanding of the nuanced connections between lifestyle, food choices, and cognitive health.

6. Supporting data

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Media 2. Saurabh D. Bhandare. food safety NEWS reports. YouTube. Published online January 28, 2024.

Media 3: Study of toxic substances. https://tinyurl.com/Study-of-toxic-substances

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