



**International Journal of Biology, Pharmacy
and Allied Sciences (IJBPA)**
'A Bridge Between Laboratory and Reader'

www.ijbpas.com

A COMPREHENSIVE ANALYSIS OF MULTIVITAMIN SUPPLEMENT USAGE PATTERNS AND PUBLIC ATTITUDES

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Received 6th July 2025; Revised 16th Aug. 2025; Accepted 31st Oct. 2025; Available online 1st Aug. 2026

<https://doi.org/10.31032/IJBPA/2026/15.8.10318>

ABSTRACT

Our study investigates the complex relationship between individuals and their consumption of multivitamin supplements. It examines consumption pattern as well as the attitudes and beliefs that drive such health-related behavior. By taking a holistic approach, the research encompasses a wide range of age groups, socioeconomic demographics, and geographical regions. This diversity provides a thorough understanding of multivitamin use and its drivers. The study adopts a mixed-methods approach, combining quantitative surveys and qualitative interviews to collect rich, complex data. The quantitative survey provides information about specific patterns of multivitamin use, such as frequency, duration, and the reasons why people choose to incorporate these supplements in their everyday life.

Meanwhile, qualitative interviews provide greater understanding of the underlying attitudes and perceptions that influence these actions.

Participants were urged to describe their supplementing habits and the factors affecting their decisions. This includes investigating their understanding of dietary requirements, faith in the efficacy of

multivitamin products, and the impact of external factors such as marketing, peer recommendations, and professional advice. The study also intends to explore how consumers perceive the health benefits of multivitamin supplements, such as increased energy, immune system strength, and overall health improvement, and whether these perceptions are supported by scientific evidence.

One of the study's primary goals is to highlight the public's lack of understanding regarding the proper usage of multivitamins. Most people use these supplements as a quick fix to correct nutritional imbalances, frequently without sufficient advice or knowledge of potential hazards. This study investigates the extent to which disinformation, marketing, and societal trends influence consumption behaviors, particularly among younger populations and busy individuals.

Keywords: Multivitamin, Public Attitudes, Supplement Use, health-related behavior, Nutritional Deficiency, Consumer Awareness, Self-Medication

INTRODUCTION

Multivitamin

The National Health and Nutrition Examination Survey (NHANES) USA, defines multivitamin supplements as a formulation containing three or more vitamins with or without minerals [1].

Why do we need multivitamin supplements:

Vitamins in therapeutic amounts (normally 5-10 times, the recommended daily allowance) are indicated for the treatment of deficiency states or pathologic conditions in which absorption and utilization of vitamins is reduced or when requirements are increased [2]. In addition, they are also recommended for the treatment of no nutritional disease in which a large dose has a unique effect independent of nutritive activity e.g. alcoholic neuritis and Wernicke's syndrome (thiamine), hyperlipoproteinemia (niacin), to

prevent neuropathy in those on isoniazid (pyridoxine), sideroblastic anemia (pyridoxine), infantile seborrhea (biotin) and acute promyelocytic leukemia (all-trans-retinoic acid) [3-6].

Misuse of MTVs

As these supplements are widely used, it is necessary to safeguard the health of our human resource by ensuring right products are available to them. However, we found that banned fixed dose combination of vitamins B1, B6 and B12 were available in the Indian market. This combination product is available even as a single formulation and in combination with other vitamins [7]. The misuse of vitamins is not without its safety concerns. The amount of vitamins or nutrients in multivitamins generally does not exceed the recommended daily allowance. For vitamins to cause side effects the intake

should exceed recommended daily allowance several fold. Excess intake may occur if single vitamins are taken in addition to multivitamins [8].

Most frequently consumed multivitamin

The most frequently used supplement among young athletes is a form of found the most vitamin/mineral supplement. Studies investigating only vitamin and mineral supplementation forms of vitamin/minerals consumed tend to be vitamin C, multivitamins, iron, and calcium. These results coincide with a more recent study which also included a range of what were termed ‘ergogenic aids’ such as Creatine and caffeine, and again, the most commonly used supplements by adolescent athletes were multivitamins, vitamin C, and iron [9-11].

Why are they taking?

Young athletes are under great pressure to attain increasingly higher levels in sport, thus they may be enticed to seek alternative means to be able play at elite levels or to be noticed by professional scouts. The high economic value and social status of a professional athletic career may lure young athletes to engage in supplement use as a means for developing the competitive edge to ‘make it’ as a professional sports person. [12] Burns *et al.*, 2004 found that adult athletes reported using vitamin and mineral

supplements frequently and considered them to have the highest impact on healing/rehabilitation, while protein supplements and Creatine were considered to have the highest perceived impact on sport performance. Other reasons for supplement use cited by adult and elite athletes include increased energy, enhanced performance, improved health, prevention of nutritional deficiencies, prevention of illness, increased muscle mass, and improved recovery [13].

Side Effects of multivitamins

Our body needs to consume at least 13 vitamins and 16 minerals regularly to function properly. A well-balanced diet is the best way to obtain these nutrients. That said, multivitamins provide a good alternative source for those who are unable to meet their nutrient requirements through diet alone. Multivitamins that provide up to 100% of the daily Dietary Reference Intakes (DRIs) are generally considered safe and often free of side effects, as long as you take them as directed. Nonetheless, some people may still experience a few side effects when taking multivitamins. Some side effects are more common than others. Excess vitamin A supplementation has been suggested to be associated with adverse effects on bone health including low bone mineral density and increased fracture risk [14]. In addition,

women consuming large amounts of vitamin A supplements during pregnancy have been reported to have increased incidence of congenital abnormalities [15]. In particular, there is an increasing risk of hyperchromatism, an iron storage disease associated with liver injury after excess consumption of iron multimineral supplements [16].

Multivitamin for Beauty

It is the popular consumer belief that a healthy diet contributes to beautiful skin. Indeed, this seems to make common sense, since the body requires the proper nutritional building blocks to build and repair body tissues, especially those with a high metabolic turnover rate such as skin, hair, and nails.¹ For example, a source of protein is needed to repair skin, vitamin C is required for collagen production, and vitamin E is necessary to function as a primary antioxidant [17, 18].

Method of survey:

A survey was carried out to study consumption of multivitamin supplements by adults and elderly of age group 18 to 70 years old. A questionnaire was designed and was interviewed personally. The survey was conducted among 202 respondents.

Questionnaire:

- Age: 18-30\31-44\45-65\>65

- Gender: male\female
- Education: primary\secondary\college\others
- Occupation: government employee\private employee\others
- Do you currently consume any multivitamin supplements: yes \no
- What benefits do you think multivitamin supplements provide? increase energy levels\maintain muscle strength\boosts immune system\improve brain function \all the above.
- In which form do you consume your multivitamin Supplements? gummy\tablets\injectables\liquids\powders\others
- Do you know the brand of multivitamin Supplements you consume? yes\no\maybe
- Where did you get the information regarding the consumption of multivitamin Supplements? physician\relatives\advertisement\self-medication\others.
- Have social media/TV advertisements influenced you to consume multivitamin Supplements? yes\ no\ maybe

- Why did you prefer self-medication for multivitamin Supplements? glowing skin\gaining muscle strength\hair growth\all the above
- Do you have knowledge regarding the side effects or interactions of multivitamin Supplements? yes\ no\ maybe
- Do you know how long does it take for multivitamin supplements to work? a week\three months\six months\others
- Do you suggest others to take multivitamin: yes/No/maybe

RESULTS:

AGE:

According to the survey among 201 respondents we found that most of the responses: 80% were belonging to the age between 18-30 years, also 10% belonging to the age 31-44 years and 10% were belonging to the age 45-65 years (**Figure 1**).

GENDER:

According to the survey of 201 respondents we found that 130 were females and 71 were found to be males (**Figure 2**).

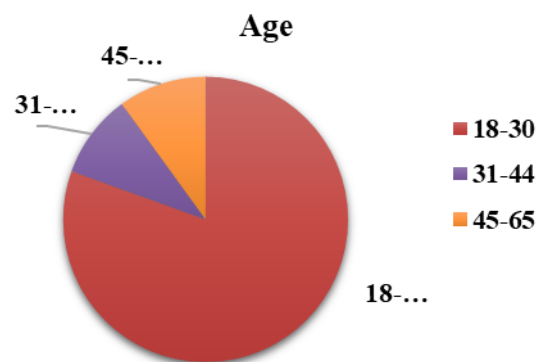


Figure 1: Age

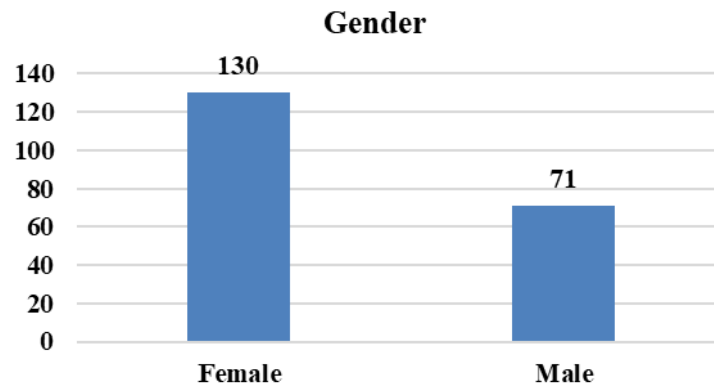


Figure 2: Gender

EDUCATION:

Survey based on education among 201 respondents most of the respondents were college students of percentage 67.2%. 28.9% were found to be others. 2.5% belongs to secondary education and 1.5% belongs to primary education (**Figure 3**).

OCCUPATION:

Based on the survey among occupation 187 respondents: 66.8% were others, 28.3% were found to be private employee, 4.8% were found to be government employee (**Figure 4**).

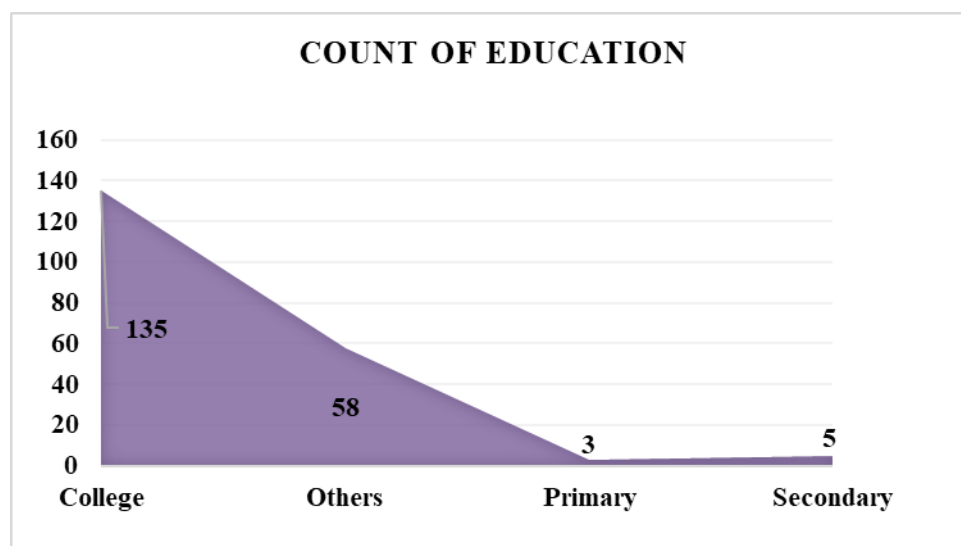


Figure 3: Count of Education

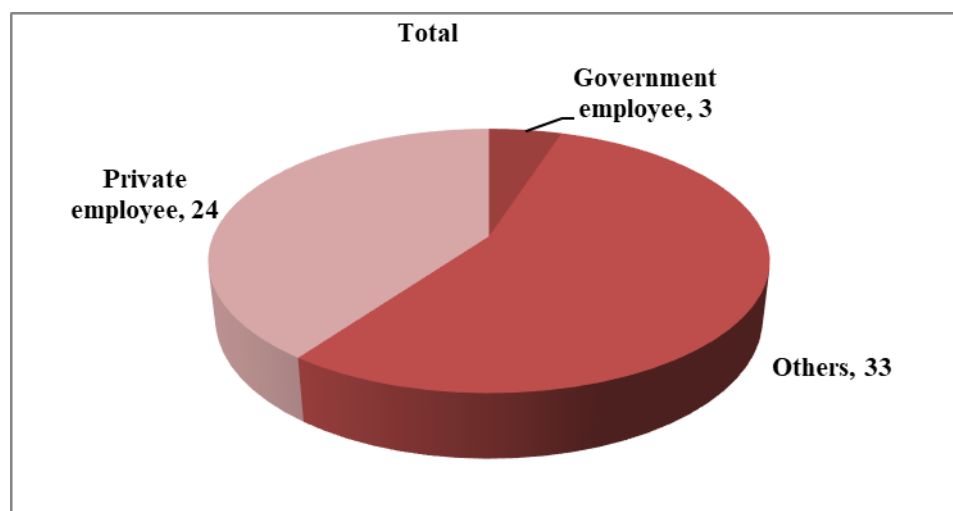


Figure 4: Occupation

1. Do you currently consume any multivitamin supplements?

According to the survey, 66.7 percent of respondents consume multivitamins, while the remaining 33.3 percent do not take them (Figure 5).

2. What benefits do you think multivitamin supplements provide?

According to the survey findings concerning the benefits attributed to multivitamin supplements, a significant portion, precisely 65.2%, indicated that they believe such supplements enhance various aspects of health. Specifically, respondents identified

that multivitamins are associated with increasing energy levels, maintaining muscle strength, boosting the immune system, and improving brain function. A breakdown of the responses reveals that 32% of participants highlighted increased energy levels as a primary benefit, while 23% underscored the role of multivitamins in bolstering the immune system. Additionally, 4% of respondents emphasized the importance of multivitamins in maintaining muscle strength, and 2.5% attributed improvements in brain function to these supplements (Figure 6).

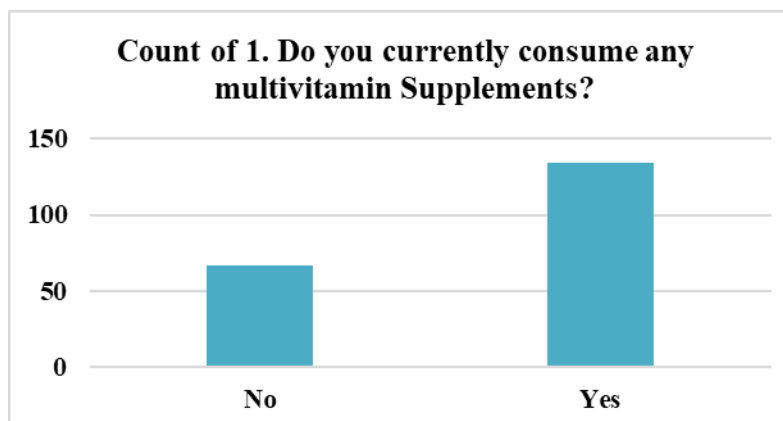


Figure 5: Do you currently consume any multivitamin Supplements

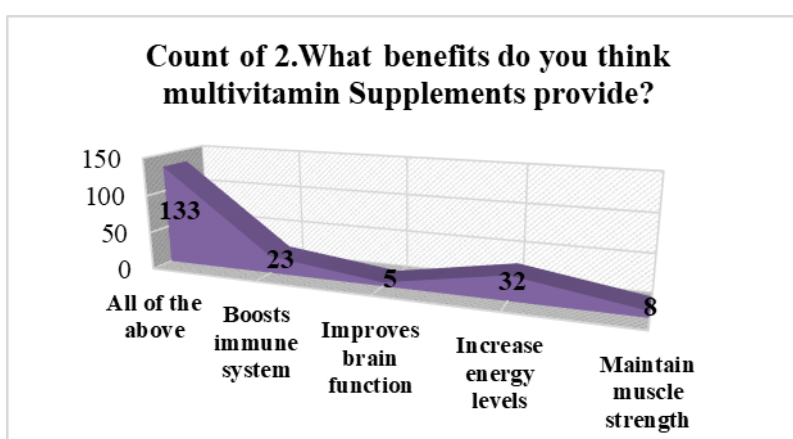


Figure 6: Do you currently consume any multivitamin Supplements

3. In what form do you consume your multivitamin supplements which?

According to the survey of 190 respondents, 56.8% consume multivitamin supplements in tablet form, 15.3% prefer gummies, 11.1% opt for liquids, and 6.3% use powders. There are also minor percentages who utilize injectables or obtain their vitamins from fruits and vegetables (**Figure 7**).

4. Do you know the brand of multivitamin supplements you consume?

According to the survey of 189 respondents, 28.0% knew the brand of multivitamin supplements they were using, while 56.8% did not know the brand. Additionally, 15.1% of respondents were unsure about the brand of their multivitamin supplements (**Figure 8**).

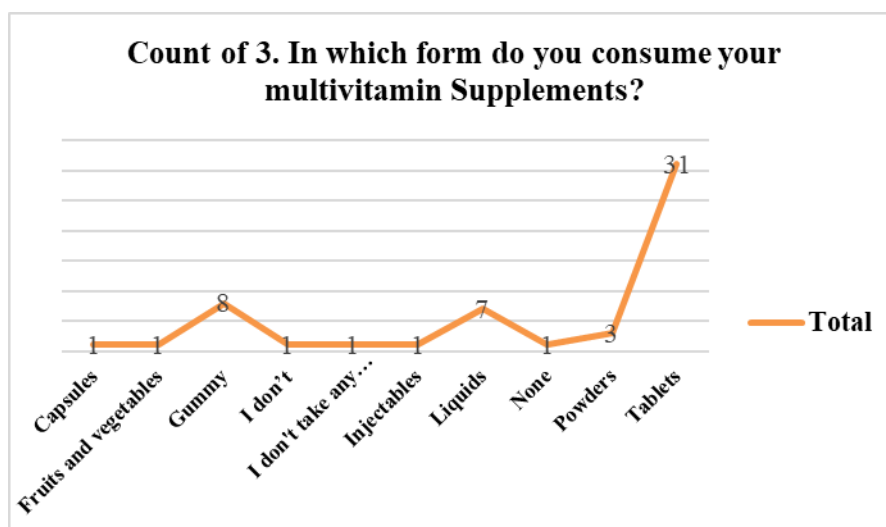


Figure 7: In which form do you consume your multivitamin Supplements

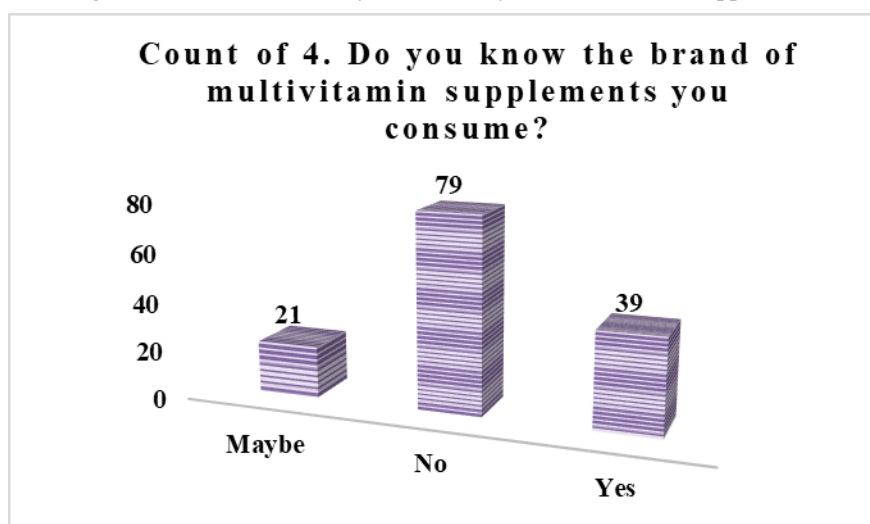


Figure 8: Do you know the brand of multivitamin supplements you consume

5. Where did you get the information regarding the consumption of multivitamin supplements?

The consumption of multivitamin supplement, based on 191 respondents: 49% respondents practiced self-medication and made their decision without consulting any specific source. 33% of respondents received information from a physician. 8% obtained information from advertisement. 8% cited relatives as a source of information. 2%

acquired information through other sources (Figure 9).

6. Have social media/TV advertisements influenced you to consume multivitamin Supplements?

According to the data provided from 196 responses: 55.4% of respondents answered "Yes", indicating that social media/TV advertisements have influenced them to consume multivitamin supplements. 32.5% of respondents answered "No", suggesting

that social media/TV advertisements have not influenced their decision to consume multivitamin supplements. 12.0% of respondents answered "Maybe", indicating

uncertainty or partial influence from social media/TV advertisements regarding the consumption of multivitamin supplements (Figure 10).

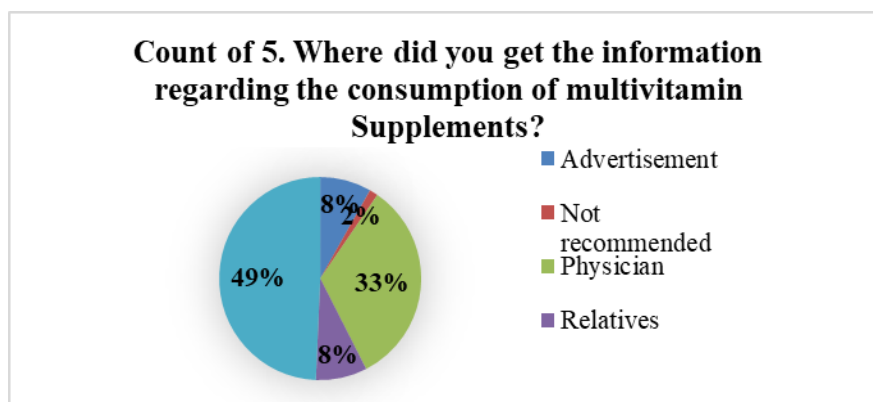


Figure 9: Where did you get the information regarding the consumption of multivitamin Supplements

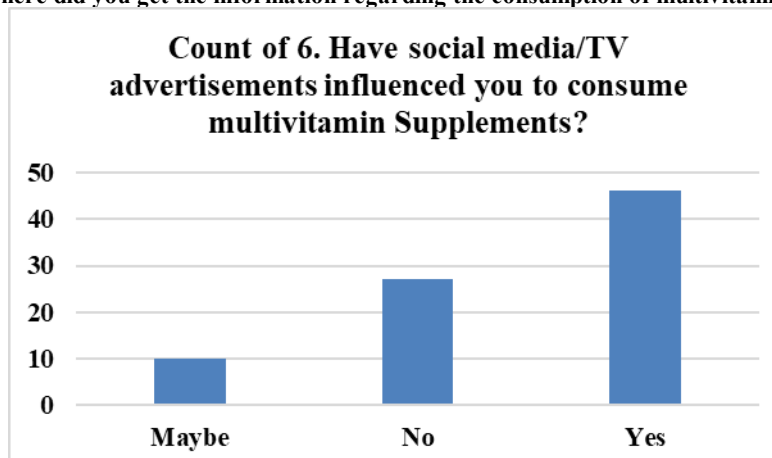


Figure 10: Have social media/TV advertisements influenced you to consume multivitamin Supplements

7. Why did you prefer self-medication for multivitamin Supplements?

Based on the survey 185 responded: 0.5% of respondents mentioned a connection between multivitamin supplements and a diet plan. 6.6% expressed an interest in expecting glowing skin from consuming multivitamin supplements. 15.9% indicated an interest in gaining muscle strength as a possible benefit of taking multivitamin supplements. 0.5%

mentioned a preference against self-medication with multivitamin supplements. 11.0% mentioned a desire for hair growth attributed to multivitamin supplement consumption. 57.1% of respondents appeared to believe that multivitamin supplements could potentially provide all the above benefits, including glowing skin, gaining muscle strength, hair growth, and possibly aiding in a diet plan (Figure 11).

7. Why did you prefer self medication for multivitamin Supplements?

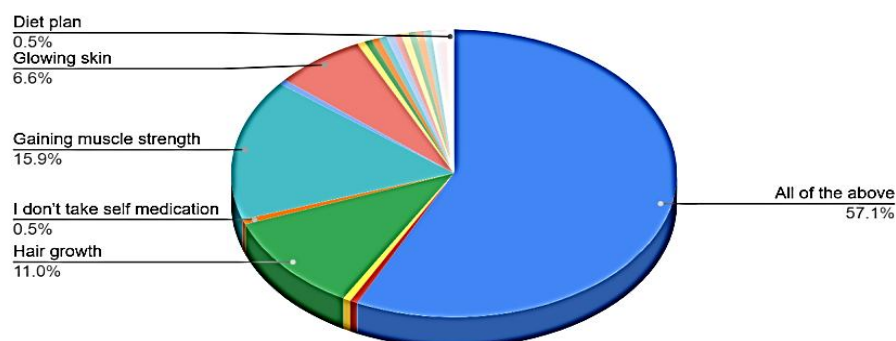


Figure 11: Why did you prefer self medication for multivitamin

8. Do you have knowledge regarding the side effects or interactions of multivitamin Supplements?

Certainly! Here's the breakdown of the 196 responses regarding knowledge of the side effects or interactions of multivitamin supplements: 32% of respondents answered "YES" indicating they possess knowledge about the side effects or interactions of

multivitamin supplements. 60% of respondents answered "NO," suggesting they do not have knowledge about the side effects or interactions of multivitamin supplements. 8% of respondents answered "MAYBE," indicating uncertainty or partial knowledge about the side effects or interactions of multivitamin supplements (**Figure 12**).

Count of 8. Do You Have Knowledge Regarding The Side Effects Or Interactions Of Multivitamin Supplements?

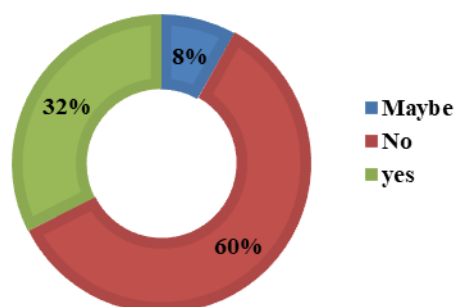


Figure 12: Do You Have Knowledge Regarding The Side Effects Or Interactions Of Multivitamin Supplements

9. Do you know how long does it take for multivitamin supplements to work?

According to the survey data collected from 195 respondents, various beliefs regarding the time it takes for multivitamin supplements to demonstrate noticeable effects were observed. Specifically, 18.7% of respondents asserted that it requires three months for these supplements to showing effects. Similarly, 17.7% of respondents held the belief that a week is sufficient for

multivitamin supplements to start working. On the other hand, a minority, accounting for 4.0% of respondents, expressed the opinion that it takes six months for these supplements to exhibit effects. Notably, a significant portion, encompassing 49.5% of respondents, either expressed uncertainty or selected "others," suggesting a lack of consensus or clarity regarding the specific duration for multivitamin supplements to take effect (Figure 13).

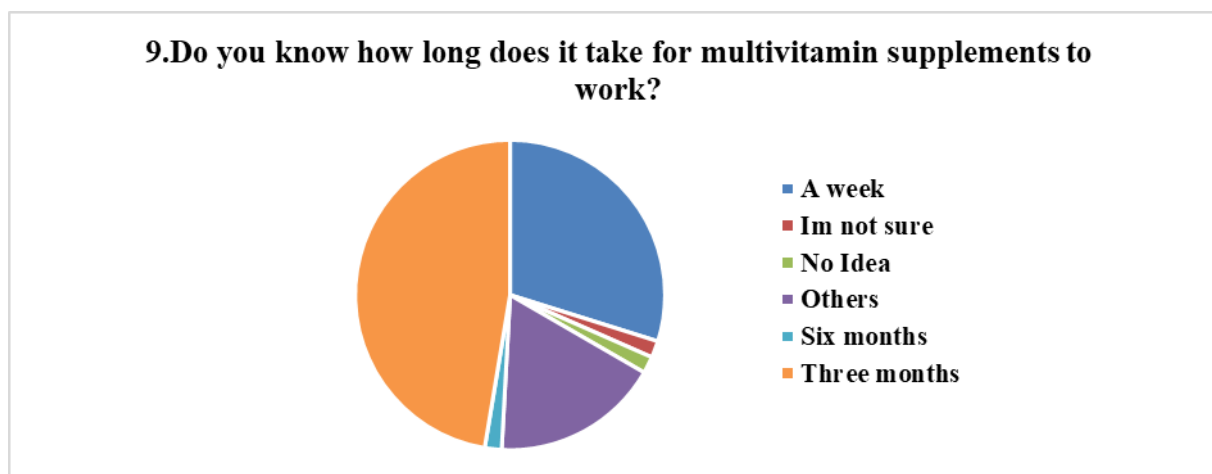


Figure 13: Do you know how long does it take for multivitamin supplements to work

10. Do you suggest others to take multivitamin Supplements?

The survey results indicate varied opinions on whether others should take multivitamin supplements: where 197 people responded, 50% of respondents recommend taking multivitamin supplements. 13% of

respondents do not suggest taking multivitamin supplements. 37% of respondents are unsure or hesitant about recommending multivitamin supplements to others, expressing a "maybe" stance (Figure 14).

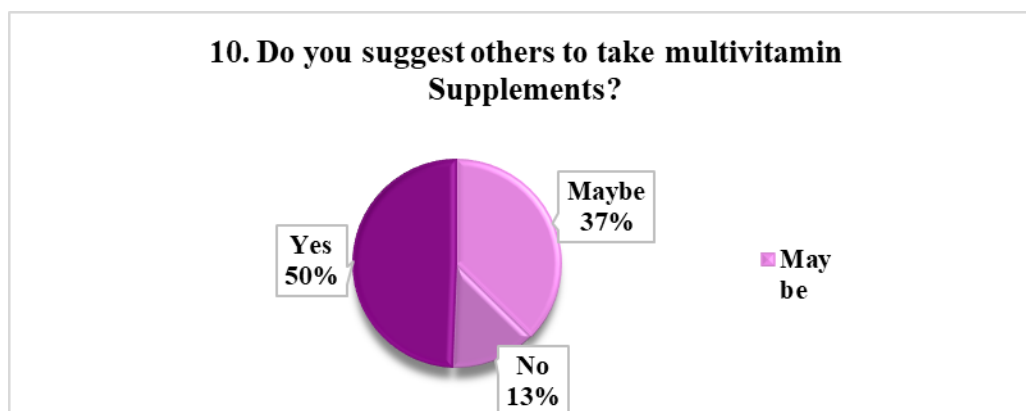


Figure 14: Do you suggest others to take multivitamin Supplements

DISCUSSION

The research looks into the patterns of multivitamin use, public attitudes, and the factors that impact their consumption. Multivitamins are often viewed as an easy way to address nutritional deficiencies, but their use reveals significant gaps in awareness, education, and informed decision-making. This talk discusses the survey results and provides insights on the implications of multivitamin use in contemporary society.

1. Patterns of multivitamin Use

According to the survey results, 66.7% of respondents take multivitamin supplements, indicating that they are widely accepted in health routine. Tablets were the most widely used form, accounting for 56.8%, followed by gummies (15.3%), liquids (11.1%), and powders (6.3%). This preference for tablets may be due to their simplicity of use, availability, and longer shelf life.

A important discovery was the demographic distribution of multivitamin users, with 80% of them aged 18 to 30. This implies that younger populations, notably college students (67.2%), rely substantially on supplements, which could be attributed to the demands of modern lifestyles, academic stress, and insufficient diets. The survey also revealed that 49% of respondents used self-medication, raising worries regarding misinformed and perhaps dangerous use. Advertisements had a substantial part in determining consumer behavior, with 55.4% of respondents being influenced by social media or television commercials. This demonstrates the power of marketing in promoting health products, frequently without scientific validation or professional input. Surprisingly, only 33% of respondents consulted doctors before taking

multivitamins, while the rest relied on relatives, marketing, or self-research.

2. Perceived benefits of multivitamins

The study respondents correlated some perceived health benefits with the multivitamins they took. 32% of people believed that consuming supplements will increase their energy levels. Improving the immune system by 23% was also a significant advantage. Other small observed benefits included retaining muscle strength by 4% and improving mental performance by 2.5%. These findings show a general understanding of the benefits of multivitamins in improving health. Indeed, multivitamins help supplement nutritional gaps in poor diets, but their usage to boost energy or immunity may be overdone without addressing particular shortages. Thus, for example, while vitamins B-complex and C are known to increase energy and immunological function, their effects are most noticeable when combined with a healthy diet.

3. Knowledge gaps and brand awareness.

Despite the widespread use of multivitamins, the survey reveals a lack of awareness. More than 56.8% of respondents were unable to identify the brand of supplements they used,

while 15.1% were unclear. This is troublesome because it indicates a lack of consumer participation and comprehension, which is troubling given the variation in quality and safety across brands. Aside from that, only 32% of participants were aware of the potential negative effects or interactions associated with multivitamin use. Such ignorance predisposes users to misuse and abuse because supplements may be mixed with other medications or used in incorrect dosages. For example, a user may combine multivitamins alongside specific vitamins and so ingest more than the specified quantity, resulting in detrimental effects like hypervitaminosis.

4. Misuse and potential risks

- The most concerning component was identified as the overuse of multivitamins. Though multivitamins are safe when taken in appropriate dosages, their overuse can result in serious health conditions.
- **Excessive vitamin A:** High vitamin A levels have been linked to bone health issues, such as decreased mineral density and fractures. Pregnant mothers who consumed too much vitamin A gave birth to infants with congenital abnormalities.

- **Iron Overload:** An iron overload can induce liver damage as well as hemochromatosis, a type of iron storage problem. This can be especially problematic when multivitamins are combined with a high intake of iron from diet or other supplements.
- **Banned Combinations:** Banned vitamin combinations, such as B1, B6, and B12, remain on the market. This has raised serious concerns about the appropriate regulatory procedures and the safety of the items in those markets.

These findings underscore the importance of educating consumers on how to use multivitamins correctly, as well as the hazards associated with misuse.

5. Lifestyle and Diet.

The survey discovered a concerning tendency among respondents: many use multivitamins as a substitute for healthy eating habits rather than as a supplement to a balanced diet. This reliance on supplements suggests larger lifestyle difficulties, such as poor eating habits, insufficient physical activity, and excessive stress. Such circumstances are frequently related with vitamin deficits and poor overall health results.

Although multivitamins can help with some nutrient deficiencies, they can never replace the wide spectrum of nutrients included in a well-balanced diet. Whole foods like fruits, vegetables, lean proteins, and whole grains are high in vitamins and minerals, but they also contain fiber, antioxidants, and other beneficial substances that pills cannot provide.

The data show that young people are increasingly reliant on multivitamins. This could be attributed to the convenience of multivitamins in the context of hectic schedules, academic or professional commitments, and a lack of information about optimal nutrition. These difficulties can be addressed by offering focused education and lifestyle interventions, which will reduce reliance on supplements and promote healthy behaviors. Encouragement of fresh, nutrient-dense meals, as well as lifestyle adjustments aimed at reducing stress and physical inactivity, may result in longer-term health advantages.

6. Marketing and social influence.

Marketing and societal influence have a significant impact on consumer behavior regarding the use of multivitamins. According to the survey, more than half of respondents were influenced by advertisements on social media and

television, with 55.4%. In most cases, these marketing campaigns emphasize the benefits of taking multivitamin supplements, such as increased energy, immunity, and overall well-being, while rarely or entirely ignoring concerns and adverse effects.

The unidirectional narrative surrounding the use of supplements generates unreasonable expectations. Furthermore, it may encourage people to use supplements excessively or incorrectly. Several advertising target young customers with influencers and enticing imagery, giving the impression that supplement intake is a necessary element of modern health. Marketing in this manner is deceptive because consumers with little nutritional literacy frequently feel that supplements are an all-in-one solution to health problems.

The frequency of self-medication among respondents (49%), highlights the need for more regulatory measures to reduce such fraudulent claims and educate the public. Without competent supervision, one may rely on supplements without understanding the exact nutrients that the body requires, or risk overconsumption. Misuse, particularly when multivitamins are taken with other supplements or drugs, causes negative side effects.

This demands public health messaging to counteract marketing impact and promote evidence-based supplement use advice. Such advertisements should encourage interaction with healthcare experts and emphasize the need of nutrient acquisition through a balanced diet. Stricter monitoring of marketing claims and greater clarity about the hazards connected with supplements are required for better informed consumer choices.

7. Suggestions

Based on the findings, the following recommendations were given to address concerns with multivitamin use:

Public health programs should educate the public on the proper use of multivitamins. They must choose the right moment to seek supplementation and use it correctly to ensure safe vitamin consumption. Programs will be required to educate populations that may require multivitamins, such as pregnant women, the elderly, and those with a deficit that must be supplemented.

Stringent Marketing Regulations:

Marketing regulations for multivitamins should be stringent and enforced by regulatory organizations. Claims about these items should be scientifically supported in order to avoid deceiving consumer perception. Advertisements may be required

to carry warnings about potential dangers and state that multivitamins do not replace a healthy diet. It would be similar to warnings necessary for drugs, in which supplements may be compelled to include disclaimers.

Establishing nutritional literacy

Public education initiatives should focus on increasing nutritional literacy. Some of these efforts may include workshops, internet resources, and school-based programs that teach people how to eat a balanced diet and explain the significance of supplements. Promoting the consumption of complete, nutrient-dense foods could lessen the requirement for supplements. and help individuals make better dietary choices

Quality Control and Regulation:

Increased regulatory control is necessary to ensure the safety and efficacy of multivitamin products. This would entail monitoring for prohibited vitamin combinations, verifying product labeling, and doing frequent quality checks. Regulatory agencies should collaborate with manufacturers to standardize procedures and guarantee that consumers have access to high-quality supplements that meet safety requirements.

Lifestyle-Based Interventions

Educate on lifestyle changes that directly address the causes of nutritional deficits.

Lifestyle interventions should emphasize regular physical activity, stress reduction, and healthy eating habits. Such approaches would indirectly minimize reliance on vitamin supplements while promoting long-term health and wellness.

Health Professional Education: Teach medical staff how to properly advise patients about the use of supplements. The most recent evidence-based recommendations should be available to providers so they may assist patients in making well-informed decisions on the use of multivitamins, taking into consideration their individual dietary preferences and health requirements.

Tracking patterns: Ongoing investigation and tracking of supplement-using consumer patterns will aid in the detection of new problems and enable the modification of public health initiatives. Gathering information on demographic trends, reasons for taking multivitamins, and the results of doing so will assist direct focused initiatives and policy decisions.

Quality Control and Regulation:

There is a need for stronger regulatory oversight to ensure the safety and efficacy of multivitamin products. This would include monitoring for banned combinations of vitamins, verification of product labeling, and regular quality checks. Regulatory

agencies should work with manufacturers to implement standardized practices and ensure that consumers have access to high-quality supplements that meet safety standards.

Lifestyle-Based Interventions

Educate on lifestyle modification to deal directly with the causes of nutritional deficiencies. Interventions on lifestyle changes should aim for regular physical activity, stress reduction, and healthy eating practices. Such interventions would indirectly reduce the reliance on vitamin supplements and promote health and wellness in the long run.

Health Professional Education:

Train healthcare professionals to counsel patients effectively on supplement use. Providers should be equipped with the latest evidence-based guidelines to help patients make informed decisions about whether and how to use multivitamins, taking into account their unique health needs and dietary patterns.

Monitoring Trends:

Continued research and monitoring of consumer trends in supplement use will help identify emerging issues and allow for the adaptation of public health strategies. Collecting data on demographic patterns, motivations, and outcomes of multivitamin

use will help guide targeted interventions and policy-making.

CONCLUSION:

Multivitamin supplements are incredibly popular, with 2-thirds of respondents (66.7) incorporating them into their routine to boost energy, support their immune system, and maintain overall health. Despite this widespread use, it's surprising that over half of the respondents (56.8%) couldn't even name the brand they were consuming. Decision making around multivitamin varies widely, from self-medication (49%) to seeking advice from health care professionals (33%). Interestingly, social media and tv advertisements influenced over half of respondents (55.4%) in their multivitamin choices, highlighting the power of advertising in shaping health decisions. People have high hope for these supplements, expecting benefits from glowing skin to improved muscle strength, with over half (57.1%) believing in their potential for overall wellness. However, there is a gap in knowledge about potential side effects, with only 32% feeling confident in their understanding. Recommendations are also mixed with half of respondents (50%) advocating for multivitamin use, while others are unsure or advised against it (13%) this highlight the need for clearer information and

guidance to help people make informed choices about their health.

Acknowledgment

We thank Our Principal and Management, Joginpally B. R. Pharmacy College, Hyderabad for extending their support.

Conflict of Interest

Authors declare no conflict of interest.

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