

Assessment of Multivitamin Utilization Pattern and Pharmacoeconomics in a Tertiary Care Hospital

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Abstract: ***Background:** Healthy eating remains the best source of vitamins, minerals and nutrients. A multivitamin is not a substitute for a healthy food or a healthy lifestyle, but it can provide a nutritional backup for a less than ideal diet. Although some evidence questions the benefit of a daily multivitamin and its ability to stave off disease, many people add them to their diet to maintain or boost health. **Objectives:** To study the prescribing patterns of different multivitamin supplements. To evaluate the most commonly prescribed brands of multivitamins. To assess pharmacoeconomic burden to the patient. To assess the rational use of multivitamin supplements. **Methodology:** A Prospective study, conducted in Narayana Mallareddy Hospitals, Suraram in which about 350 patients were reviewed among whom 150 patients were considered who meet the inclusion criteria. Utilization patterns of multivitamins based on age, gender, social history, department, ward, composition and formulation of the drug were assessed. By using cost effective analysis, pharmacoeconomic burden of multivitamin utilization was analyzed using MS EXCEL by several statistical and mathematical analysis. **Conclusions:** In our study, use of multivitamin is high in patients having social history of alcoholism. Oral route of administration of MVT is more preferred and used in this study. The most commonly used brand and category of MVT is Optineuron (76%). The avg. mean economic burden of 176.34 INR in female and 174.4 INR in male can be ruled out with the use of generic drugs which are equally effective to the brand drugs. The irrationally used MVT supplements in the age 20-39 years costs at an avg. of 291.14 INR and in the age group of 40-50 is about 185.12 INR. It is advisable to use generic MVTs rather than branded MVTs to curb the economic burden and irrational prescription of MVTs should be minimized.*

Keywords: nutrition, supplements, diet, daily value, generic drug, brand drug, multivitamin, smoking, alcohol, age, sex, formulation, cost

1. Introduction

A **multivitamin** is a preparation dietary supplement with vitamins, dietary minerals, and other nutritional elements. Such preparations are available in the form of tablets, capsules, pastilles, powders, liquids, and injectable formulations. Multivitamin supplements are commonly provided in combination with dietary minerals. In healthy people, most scientific evidence indicates that multivitamin supplements do not prevent cancer, heart disease, or other ailments, and regular supplementation is not necessary. However, there may be specific groups of people who may benefit from multivitamin supplements (people with poor nutrition or at high risk of macular degeneration).

For certain people, particularly the elderly, supplementing the diet with additional vitamins and minerals can have health impacts, however the majority will not benefit. People with dietary imbalances may include those on restrictive diets and those who cannot or will not eat a nutritious diet. Pregnant women and elderly adults have different nutritional needs than other adults, and a multivitamin may be indicated by a physician. Generally, medical advice is to avoid multivitamins, particularly those containing vitamin A, during pregnancy unless they are recommended by a health care professional.

2. Effects of Multivitamin Usage on Health

People take MVMs for many reasons such as to increase nutrient intakes, promote health, and reduce the risk of disease.

MVM-harmful?: Taking a basic MVM is unlikely to pose any risks to health. But if you consume fortified foods and

drinks or take other dietary supplements, make sure that the MVM you take doesn't cause your intake of any vitamin or mineral to go above the upper levels. Particular attention to the amounts of vitamin A, beta-carotene, and iron in the MVM should be done.

Women who get too much vitamin A during pregnancy can increase the risk of birth defects in their babies. Smokers, and perhaps former smokers, should avoid MVMs with large amounts of beta-carotene and vitamin A because these ingredients might increase the risk of developing lung cancer.

Adult men and postmenopausal women should avoid taking MVMs that contain 18 mg or more of iron unless their doctor has told them that they have iron deficiency or inadequacy. Estimating the prevalence of MVM use is challenging because of differences in definitions of these products, varying frequency of use, and the increasing complexity of MVM formulations.

Interactions with Medications

MVMs providing nutrients at recommended intake levels do not ordinarily interact with medications, with one important exception. People who take medicines to reduce blood clotting, such as warfarin (Coumadin®), should talk with their health care providers before taking any MVM or dietary supplement containing vitamin K. Vitamin K is involved in blood clotting and decreases the effectiveness of warfarin and similar drugs. The dose of medication is determined in part by the amount of vitamin K routinely consumed.

Choosing an MVM

Basic MVMs contain both vitamins and minerals, mostly at levels that do not exceed the DVs for these nutrients. MVMs usually have low levels of nutrients whose required intake is relatively large, such as calcium and magnesium, so people might need to take supplements containing these nutrients separately from their MVMs. In contrast, as noted above, some people should pay special attention to the vitamin A and iron content of any MVM they take so as to avoid over consuming these nutrients.

When choosing an MVM product, people should try to find one tailored to their age, gender, and other characteristics (e.g., pregnancy). Prenatal supplements generally provide no vitamin A as retinol, and most children's MVMs provide age-appropriate amounts of nutrients.

From Nutrient Deficiency to Healthy Eating: If you suspect you have a nutrient deficiency, talk to your doctor. Blood tests can help determine if you are deficient. And if you are, your doctor may refer you to a registered dietitian or recommend supplements.

The best way to avoid or remedy nutrient deficiencies is to make sure you are eating a balanced, nutrient-rich diet, and those at risk include vegans and those who are lactose-intolerant.

Risks of Overdoing It: Vitamins are not dangerous unless you get too much of them. More is not necessarily better with supplements, especially if you take fat-soluble vitamins.

3. Aims and Objectives

1. To study prescribing patterns of different multivitamin supplements
2. To evaluate the most commonly prescribed brands of multivitamins.
3. To study risks associated and evaluate the diseases caused by over usage of multivitamins
4. To assess pharmaco economic burden to the patient.
5. To assess the rational use of multivitamin supplements.

4. Methodology

Study Site: The study was conducted in various departments and wards such as general medicine, paediatrics, gynaecology, orthopaedics, nephrology, ICU in NARAYANA MALLAREDDY HOSPITALS, SURARAM. It is a 600 bedded multi-specialty hospital offering both inpatient and outpatient services.

Study Design: An observational and prospective study. A prospective study monitors the outcome within a study group and relates it to suspected risk or preventive factors.

Study Period: 6 months

Study Population:

Inclusion criteria:

- Patients of either sex admitted with any of the diseases of all the wards including the gynaecological, obstetric and paediatric wards

Exclusion criteria:

- Neonates
- Non co-operative patient

Source of data:

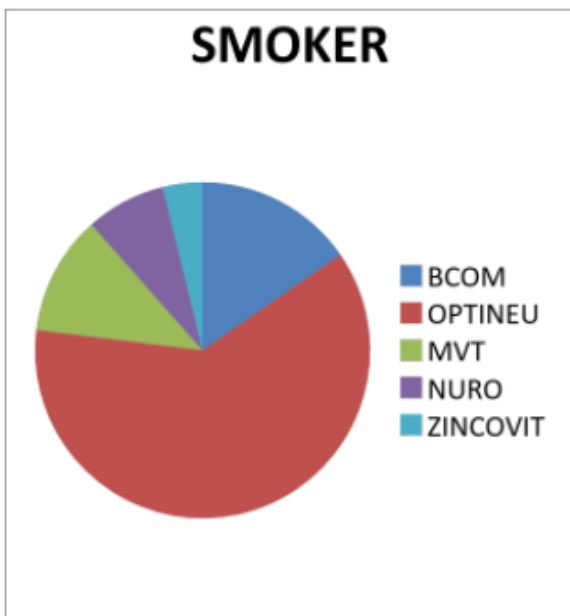
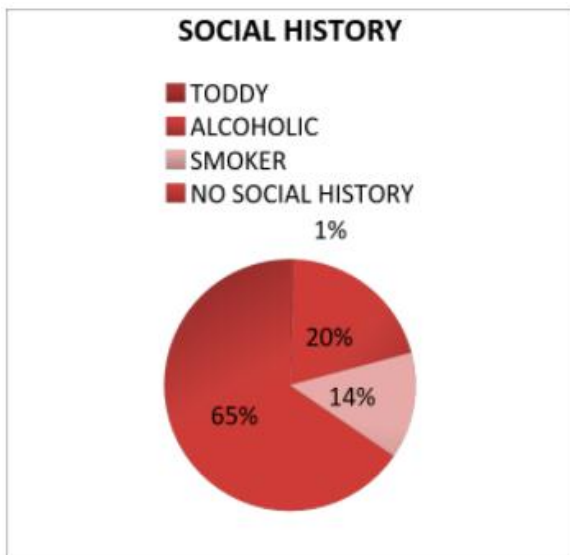
- Patient case records.
- Direct patient or their care takers interview.

Study Procedure:

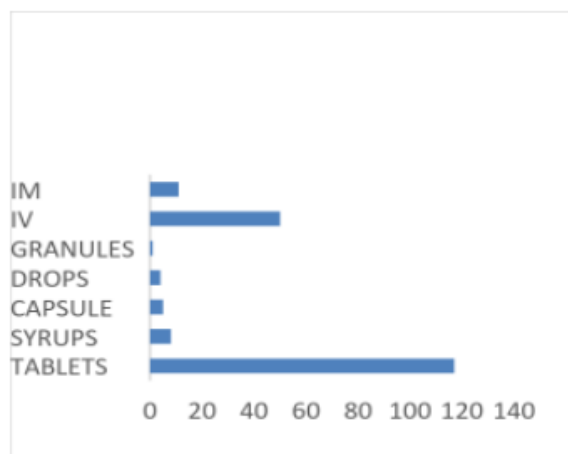
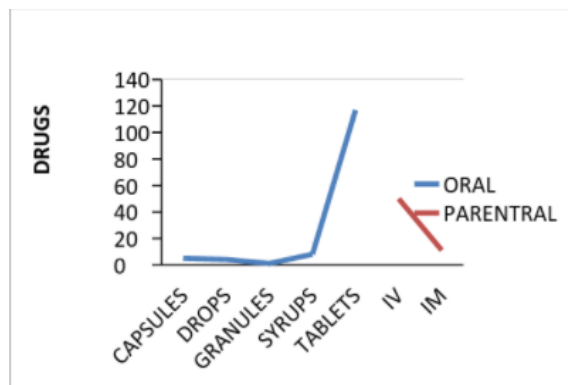
- All the patients meeting the inclusion criteria were reviewed on daily basis. A detailed study of the patient case sheets was done and the relevant information was noted in a data collection form containing various entities such as demographics, past medical and medication history, social history, diagnosis, haemoglobin levels, prescribed multivitamins, doses and frequency, any adverse effects, along with the discharge medication.
- In total, about 250 patients were reviewed. Among them 150 patients were considered in our studies who comply with the inclusion and exclusion criteria.
- Study and analysis of various prescribing patterns based on age, sex, and adverse effects of treatment, effects on stoppage of drugs, response to drugs in different age groups
- Prescribed multivitamin drug is compared with the available alternative(s) with respect to safety, cost and efficacy/effectiveness
- A detailed study about the multivitamin prescribing pattern is done and in case of need for the patient counseling regarding the drugs, it is done.
- Assessment of the need, safety, efficacy and rationality in the use of multivitamin is done.
- Analysis of rationality of multivitamin usage is done in comparison of the patient's disease with its corresponding benefit for the patient.
- Analysis of the cost and pharmaco-economics of the multivitamin drugs is done so as to avoid any kind of socio economic burden on the patient.
- The aspects that are included in the pharmacoeconomic analysis comprises of multivitamin prescribed, plan i.e no. of days, frequency of the drug, cost of the drug and is calculated with respect to the patient's drug profile.
- The socio-economic burden of the multivitamin utilization is ruled out by cost effective analysis. It is done in such a way that the multivitamin drug should meet the grounds in both the cost and efficacy perspectives.
- Data collection form is designed in such a way that all the aspects of the study are covered.

5. Analysis and Results

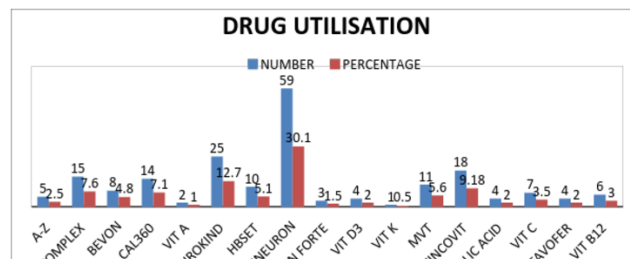
In our study 350 patients were reviewed and 150 patients are selected with the use of multivitamin supplements. Out of 150 patients 56% are male and 43% are women (43%). patients with 46-65 years are (34%), patients with age between 31-45 years are (29%). With age 15-30 years patients are (21%), patients >65 are (10%) with age group below 15 years are (6%). In our study, out of 85 (56%) Male patients 23 (15%) are having social history of smoking and the multivitamin supplements prescribed to them can be explained with the graph mentioned below.



Out of total 200, Oral administrations of drugs are 134 (67%) and Parenteral route of administration are 64 (32%)



The dosage forms used are Tablets (87%), Syrups 8 (5%), Capsules 5 (3%), Drops 4 (2%), Granules 1 (0.7%), and Injections – IV 50 (78%), IM 11 (17%).



In our study use of OPTINEURON is 59 (30.1%) and NEUROKIND is 25 (12.7%), ZINCOVIT multivitamin is 18 (9.18%), BCOMPLEX multivitamin is 15 (7.6%), CAL360 supplement is 14 (7.1%) MVT is 11 (5.6%), HB SET 10 (5%), BEVON is 8 (4.8%), VIT C is 7 (3.5%), VITB12 is 6 (3%), A-Z multivitamin is 5 (2.5%), FOLIC ACID is 4 (2%), TRIFER 4 (2%), POLYBIAN FORTE is 3 (1.5%), VIT A (1%), VITAMIN K supplement 1 (0.5%).

Prophylactic Percentage	Prophylactic	Department
16	15	Gynaecology
16	15	Ortho
15	14	General
14	13	Surgery
11	10	Gastro
24	23	Others

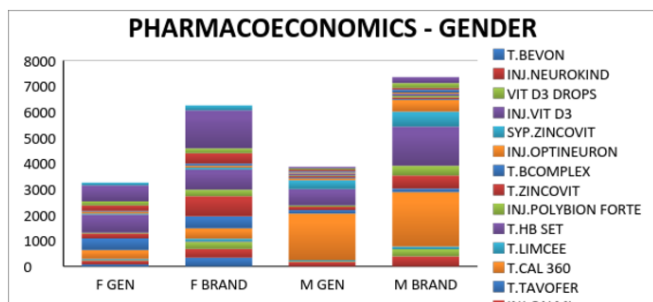
Treatment Percentage	Treatment	Department
13	8	Surgery
9	6	Gastro
8	5	General
8	5	Gynecology
4	3	Ortho
50	33	Others

The most given supplements are Vitamin B2, Vitamin B6, Vitamin D, Vitamin B3. When difference in use of multivitamin supplements between women and men is considered, Vitamin B, Vitamin D are found to be more used in female when compared to men. Vitamin A and Vitamin C are found to be equal in both women and men. Whereas use of Vitamin K is more in men.

Pharmacoeconomic study reveals the following data:

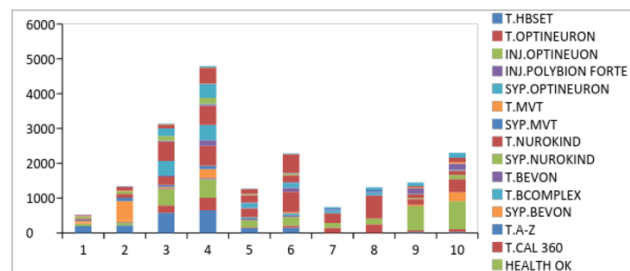
When **brand cost** is considered, the avg mean cost for the use of MVT in female is **368.14 INR** and in males is about **367.9 INR**

Whereas if the same drug is used in **generic form**, the avg mean cost of MVT use in female would be **191.8 INR** and in males the avg mean cost is about **193.5 INR**. The avg. mean economic burden of **176.34 INR** in female and **174.4 INR** in male can be ruled out with the use of generic drugs which are equally effective to the brand drugs.



The MVT requirement in age group of **20-39 years** includes the usage of cal, vit.D, folic acid, iron, vit B12. The avg. mean cost of which is **298.4 INR** and in the age group of **40-50 years**, the avg mean cost is **77.6 INR**. The irrationally used MVT supplements in the age **20-39 years** costs at an avg. of **291.14 INR** and in the age group of **40-50** is about **185.12 INR** which can be directly considered as economic burden on the patient.

40	20-30	Irrational Drug Given
60	360	T.OPTINEURON
589	551	T.NUROKIND
112	165	T BEVON
530	460	ZINCOVIT
12		VIT C
132	439	B COMPL;EX
38	25	POLYBION
8	38	LIMCEE



Economic burden to the patient due to irrational prescription of drug can be represented by the graph below:

6. Conclusion

In our study site, use of multivitamin is high in patients having social history of alcoholism. Oral route of administration of MVT is more preferred and used in this study. The most commonly used brand and category of MVT is **OPTINEURON (76%)**. The avg. mean economic burden of **176.34 INR** in female and **174.4 INR** in male can be ruled out with the use of generic drugs which are equally effective to the brand drugs. The irrationally used MVT supplements in the age **20-39 years** costs at an avg. of **291.14 INR** and in the age group of **40-50** is about **185.12 INR**

It is advisable to use generic MVTs rather than branded MVTs to curb the economic burden, irrational prescription of MVTs should be minimized, and further studies are to be conducted in this area for the benefit of patient in both clinical and economic aspects. Hence, it is to be noted that while designing a hospital formulary, the MVTs which are cost effective are to be included rather than those which cause economic burden on the patients.

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