

**Title: Comprehensive Overview of Physicians` Perception and  
Consumers` Preference of Drinkable Calcium as an Element of Wellness**

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## **Abstract:**

A vast research is done on the role of the physicians and patients in the choice of drugs with chronic diseases like Hypertension, Cancer, Ulcers where patients need to take medicine for a longer period of time. Does the switch from old and less expensive drugs to the new and expensive drugs represent genuine welfare improvements? This question is very important when we are considering dietary supplements which are essential part of the nutrients. Modernization and the successful dissemination of new drugs are critical for the financial performance of pharmaceutical companies—as well as the health of patients. New drug diffusion is determined mostly by the strategies of pharmaceutical companies, government policies, as well as the perception of medical professionals. This research concentrates mainly on the last point, through a methodical review of the literature using behavioral (prescribing) data as well as analysis of collected data. There is a need and physicians are also prescribing drinkable calcium, so opportunity for Pharmaceutical companies in Drinkable Calcium can be easily identified. But due to palatability and ease of use of Calcium Tables, Physicians are prescribing more of tables than Drinkable Calcium for Calcium as an Element of Wellness. Pharmaceutical companies should come up with Novel Drug Delivery system for Calcium source which would be economical as well as easy to administer.

**Key Words:** Calcium Trend, Element of wellness, Drinkable Calcium, Palatability, Novel Drug Delivery System

## **I. Introduction:**

The World Health Organization (WHO) identifies nutrition as a significant and manageable determinant of chronic disease, stressing the need for a shift in nutrient intake towards 'healthier' foods (WHO 2002). Increasing health care costs have also incited research into healthier foods and food ingredients. The combination of growing scientific evidence as some foods and food ingredients provide certain physiological benefits and/or reduction of risk in chronic disease benefits beyond basic dietary functions, connecting the part of diet in maintaining good health and preventing disease, together with increased consumer and industry interest, have raised overall awareness in and the profile of the health food sector.

Natural health products (NHP) have become a fairly innovative module of the human diet with important policy implications. Increased consumer interest in healthier food products is driven by a variety of factors including growing awareness of the relation between diet and health, maintaining good health, greater practicality in meeting nutritional needs and preventing chronic diseases such as diabetes, cancer, cardiovascular diseases and respiratory diseases. Consumers are more conscious of the maintenance of good health through diet, thereby gravitating towards foods that offer additional benefits beyond that provided by conventional food and are demonstrating a willingness to pay a premium for these products. Ever increasing health care costs have led governments, health professionals and researchers to examine measures that promote well-being and reduce the risk of disease.

## **II. Objectives:**

1. To analyze the Calcium Trend which examines the methods and preference in which consumers are investing in order to meet their daily dietary as well as Deficiency need for calcium.
2. To analyze the effectiveness of marketing campaigns that center around the health benefits of calcium-rich products as well as Calcium supplements.
3. It provides a comprehensive overview of Physicians perception and consumer preference of Drinkable Calcium as an element of wellness.

## **III. Research Question:**

What is the impact of Physicians` Perception of prescribing Drinkable Calcium on the Consumers` Preference of Drinkable Calcium as an Element of Wellness?

## **IV. Literature Review:**

A vast research is done on the role of the physicians and patients in the choice of drugs with chronic diseases like Hypertension, Cancer, Ulcers where patients need to take medicine for a longer period of time. The expenditure on Pharmaceuticals is increasing rapidly in many countries. An important explanation for the increased expenditure is the switch from old to new drugs (Gertham et al. 1998). Does the switch from old and less expensive drugs to the new and expensive drugs represent genuine welfare improvements? This question is very important when we are considering dietary supplements which are essential part of the nutrients.

The successful diffusion of new drugs is crucial for both pharmaceutical companies and patients—and of wider stakeholder concern, including for the funding of healthcare provision. Micro-level characteristics (the socio-demographic and professional characteristics of medical professionals), meso-level characteristics (the prescribing characteristics of doctors, the marketing efforts of pharmaceutical companies, interpersonal communication among doctors, drug attributes, and the characteristics of patients), and macro-level characteristics (government policies) all influence the diffusion of new drugs. This systematic literature review examines the micro- and meso-level characteristics of early prescribers of newly introduced drugs. Understanding the characteristics of early adopters may help to speed up the diffusion process, promote cost-efficient prescribing habits, predict utilization, and develop targeted involvement strategies. Modernization and the successful dissemination of new drugs are critical for the financial performance of pharmaceutical companies—as well as the health of patients. New drug diffusion is determined mostly by the strategies of pharmaceutical companies, government policies, as well as the perception of medical professionals. This research concentrates mainly on the last point, through a methodical review of the literature using behavioral (prescribing) data.

A good accumulation of calcium in the bones at early stages in life is the best prevention of age related bone loss and fractures. It is important for vegans to include adequate amounts of non-dairy sources of calcium in their daily diet. It is more efficient to take calcium in smaller doses several times a day and at night before bedtime, which also promotes a sound sleep. The key is prevention and prompt diagnosis. When there is not enough calcium absorbed in the body, the

output of estrogen decreases. As is the case with postmenopausal women, older men are often deficient in calcium. Even it also can be encourages moderate exercise. Although dairy products are the main source of calcium in the diet, other foods also contribute to overall calcium intake. Calcium is also used in muscle contraction, blood clotting, and maintenance of cell membranes. Long-term calcium deficiency can lead to osteoporosis, in which it is remarkable that there should be so much controversy over the roles of calcium and vitamin D in human nutrition in general and in osteoporosis in particular, given that both are acknowledged to be essential nutrients. No sooner have osteomalacia and osteoporosis been satisfactorily distinguished than evidence of their overlapping a etiologies becomes apparent. Low calcium absorption may be the result of moderate vitamin D insufficiency and that high calcium excretion may be due to dietary factors (such as protein and sodium intakes) or to hormonal effects (such as estrogen deficiency). Interfering factors in absorbing Calcium. When excess amounts of fat, protein or sugar combine with calcium an insoluble compound is formed which cannot be absorbed. Insufficient vitamin D intake or excess phosphorus and magnesium hinder the absorption of calcium. Large amounts of physic acid present in unleavened grains may also inhibit absorption by the body. Other interfering factors include lack of exercise, physical and emotional stress, excitement, depression and too rapid a flow of food through the intestinal tract. The parathyroid glands in the neck help adjust the body's storage of calcium. If these glands are not functioning properly, accumulation may occur.

Calcium needs acid for proper assimilation. If acid in some form is not present in the body, the mineral will not be dissolved and therefore cannot be used as needed by the body. Instead it may build up in tissues or joints as deposits, leading to a variety of disturbances. Drugs affecting absorption include caffeine, diuretics, fatty acids, fibre oxalates, glucocorticoids, fluoride, losec, Mylanta, protein, thyroxine.

Figure No.1: Reasons for calcium deficiency

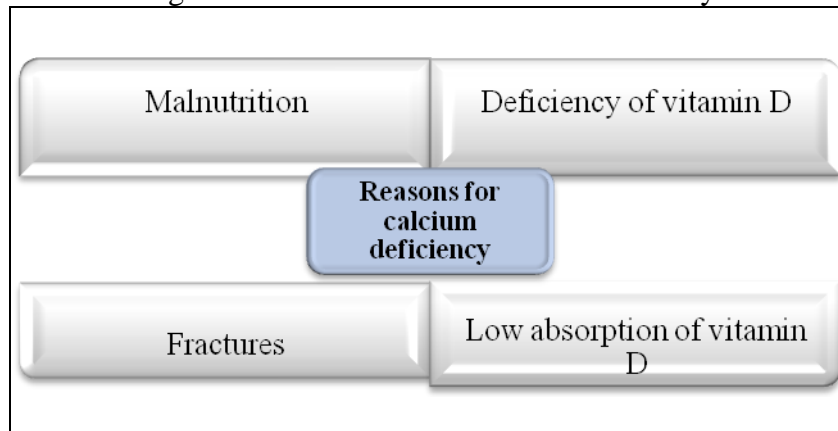
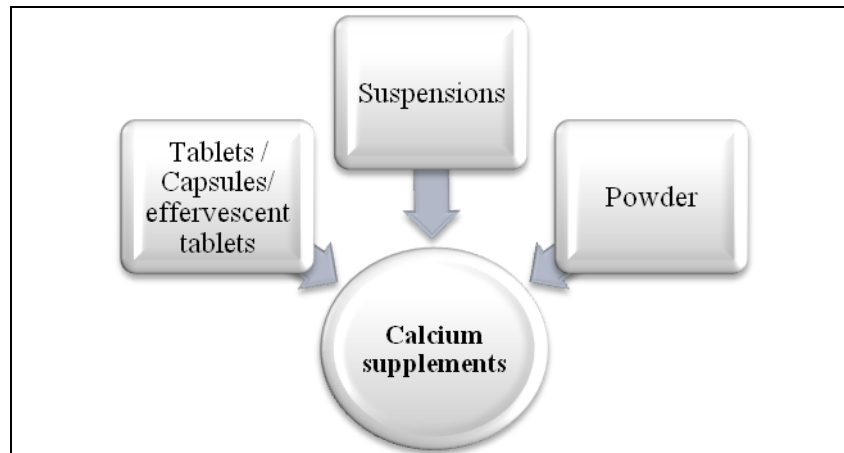


Figure No.2: Calcium supplements



## V. Research Methodology:

Based on the above objectives, the following hypotheses were initiated.

**H1:** Dosage forms of Calcium available with the chemists play significant role for perception of Physician's for prescribing Drinkable Calcium.

**H2:** Brand of Drinkable Calcium play significant role for perception of Physicians while prescribing particular Drinkable Calcium.

**H3:** Palatability of the Drinkable form play significant role in preference of customers of purchasing Calcium as an element of wellness.

**H4:** Side effects associated with various Calcium Dosage forms play an important role for preference of Physicians of prescribing Drinkable Calcium.

### A) Research Model:

A Research Design is a frame work or blue print for conducting the marketing research project. It details the procedure necessary for obtaining the information needed to structure or solve marketing research problems. A Research Design lays foundation for conducting the project. In today's scenario Research Design is an important tool. It comprises one of the most significant and fascinating facts of marketing. It plays a vital role in producing information for the marketing decision. Research helps to answer the unsolved problems. The aim is however common to go far deeper than others, to deliver perceptive sights and ideas be answerable for results. The Research process incorporates Qualitative as well as Quantitative Analysis. This multi-pronged Approach helps us to provide superior risk-adjusted for the clients. It includes the sources from which information and data are collected.

## B) Sample Size

The questionnaires were given to only a small sample of the entire population of the Pune Region in India. Out of total population only a very small sample size i.e. 100 respondents was surveyed.

Statistical Tools Used: The various types of statistical tools were used in this project for data collection, tabulation and analyses are:

- a. **Chi-Square Test:** In chi-square test we have to deal with attributes, although the members can be divided into two or more categories with respect to the attributes. Here the two attributes are customer perception and Drinkable Calcium as a product as well as Physician's preference and Drinkable Calcium.
- b. **Pie-Chart:** It is a pictorial diagram in the form of circles where the whole area represents the aggregate an area of different sectors of the circles when divided into several parts. In this work, pie-charts have been used to show the values in percentage, of the respondents, regarding a particular question.
- c. **Cross Tabulation:** A cross tabulation can be done by combining any two of the questions and tabulating the data. This is a two variable cross tabulation. Here, cross tabulation is done on the basis of Indications for which calcium supplements are mostly prescribed and preference of Physicians of prescribing Drinkable Calcium.
- d. **Z-Test:** Z-Test is valid for large sample sizes (say, more than 30). These tests are also called "approximate tests", because the sampling distributions used are only approximately true, when the number of observations in the sample is large.

## C) Type of Data:

The study concentrated both on primary and secondary data.

- a. The Secondary data provided details of the Marketing Campaigns that center around the health benefits of calcium-rich Products.
- b. The Primary survey (100 respondents was surveyed) was decisive constituent of the study as it would yield crucial data on the Physicians perception and Customers preference for Drinkable Calcium as an element of wellness.

The survey would give an idea on:

1. The marketing activities done by Pharmaceutical companies for Drinkable Calcium supplements.
2. It provides a comprehensive overview of Physicians perception of Drinkable Calcium as an element of wellness.
3. It provides a comprehensive overview of Customer perception of Drinkable Calcium as an element of wellness.
4. Analysis of the data will give an overall trend of Drinkable Calcium as well as its supplements which is affected by the Physicians perception and customers' preference.

The instrument used was a questionnaire. The questionnaire was prepared taking into consideration certain parameters such as-

1. Demographic Information.
2. Information related to Physician's awareness about the Novel drug options for Drinkable Calcium.
3. Information related to Physician's preference and reasons for prescribing specific brand of Drinkable Calcium.
4. Information related to consumer's preference of purchasing Drinkable Calcium even after prescribed by the Physician.

## **VI. Findings:**

1. Malnutrition is the major reason for Calcium deficiency followed by Fracture i.e. during accidental cases.
2. The time of a woman's life following menopause is called postmenopausal. During this time, many of the bothersome symptoms a woman may have experienced before menopause gradually decrease. But as a result of several factors, including a lower level of estrogen, postmenopausal women are at increased risk for a number of health conditions, such as osteoporosis and heart disease.
3. In almost all the areas like Osteoporosis, Hypo Calcium, Antenatal Care, Fractures/Accidents, deficiency of Vitamin D, Post menopause as well as Pregnancy, Calcium supplements are prescribed by the Physicians.
4. There is a need and physicians are also prescribing drinkable calcium, so opportunity for Pharmaceutical companies in Drinkable Calcium can be easily identified.
5. Physicians are mostly prescribing Tablets/Capsules than other dosage forms like Powder, effervescent tablets and Suspension/syrup.
6. The response of the patients towards drinkable calcium is positive.
7. Though the response from the Patients is good for drinkable Calcium and even Physicians prefer Prescribing Drinkable Calcium but still Physicians are prescribing mostly Tablets or Syrups.
8. Although dietary sources of Calcium are available, most people do not receive adequate amounts for proper bone health. Fortunately, supplements are available in the market in the form of various forms of Calcium sources that can supply the body with amounts necessary for bone health but preference of their intake varies from a healthy person to a patient.
9. Continued discussions with patients to promote awareness of bone health and enhance compliance with Drinkable calcium supplements, should be promoted by the Pharmaceutical companies through the Physicians.
10. The pharmacist has a vital role in making patients aware of the need for calcium as well as intake of Drinkable Calcium with prescription during osteoporosis therapies, malnutrition, during pregnancy, Post menopause as well as Amenorrhain women.

## VII. Discussion:

Interdependence of Brand of Drinkable Calcium, its Palatability and perception of Physicians for prescribing particular Drinkable Calcium.

It was assumed that Brand of Drinkable Calcium do not play significant role for perception of Physicians for prescribing particular Drinkable Calcium. The data as per table and the discussions, project that  $X^2$  calculated 72.212 as much greater than the tabulated values of 3.143 at 0.05 level of significance hence the null hypothesis was rejected, proving that a specific Brand of the Drinkable Calcium and its Palatability plays a significant role in the Physician's preference of Prescribing a particular Brand than others. Patients prefer for a palatable form of Drinkable Calcium over the one which is not palatable.

### Perception of Physicians for prescribing Drinkable Calcium as a Dosage form available with the chemists.

Chi-square is applied to find whether there is no significant difference between the availability of the specific dosage form with the preference of Physicians for prescribing a particular Dosage form of Calcium.

Table 11: Availability of the specific dosage form with the preference of Physicians for prescribing a particular Dosage form of Calcium.

	Chi-Square Value	df	Asymp.Sig. (2-sided)
Pearson Chi-Square	103.854 (a)	3	.000

It is found from the table 11 that the calculated value of  $X^2$  is 103.854 and the table value of the  $X^2$  is 5.250 for the 5 percent significance level at and  $df = 3$ . As the calculated value is more than the table value, the null hypothesis is rejected and concluded that there is a significant difference between the Availability of the specific dosage form with the preference of Physicians for prescribing a particular Dosage form of Calcium.

## VIII. Conclusion:

Drinkable supplements are prescribed by the Physicians but due to Non palatability patients do not prefer it. Physicians prefer to prescribe drinkable calcium to children and elder people than adults. The major competitors in the market are *Glaxo Smith Kline* and *Merck*. Since there is tough competition between Pharmaceutical companies manufacturing Calcium tablets there is an opportunity for Drinkable Calcium supplement if palatability issues are taken into consideration.



## **IX. Limitations of the Study:**

1. The research is confined to particular geographical areas of Pune, India.
2. Since the project involves interacting with customers, it is difficult to convince them to participate in the data collection and cooperate in surveys and interviews of the project.
3. The response of individual is 'Perception', so it is difficult to quantify.
4. Qualitative aspects of prescribing behavior of Physicians' and purchase behavior of customers may not be interlinked.
5. Though the respondents have a very complete and clear picture of their prescription but purchase behavior and consumption pattern differs from the prescription of the doctors. This affects the accuracy of the research. This is due to generic alternatives provided by the pharmacy stores and patient's personal preference.

## **X. Further Research:**

Further work in this field includes research on innovative and useful products which could include alternative sources of calcium i.e. calcium supplements as a Drinkable Calcium. Preference of the physicians while prescribing and acceptability by the patients of two or more Calcium formulations (e.g. chewable tablet and effervescent powder) as a dietary supplement containing combination of calcium and Vitamin D3 in adults, women and children could be studied. Even tolerability of such combinations and risk involved can also be further studied. Consumer preference for intake of such dietary supplements and various innovative dosage forms would be studied in order to give a spark of manufacturing such products and initiating the marketing activities by the Pharmaceutical companies. Further work would also include the study of efficacy of Dietary combinations and the cost involved in the treatment. Further study would also include preference and perception of healthy people living in the community towards the Drinkable Calcium as a dietary supplement and should be used to come up with calcium recommendations for the general population.

## **XI. Managerial Implications:**

This Research is vital for professionals working in marketing, product innovation or Pharmaceutical retail channel who work with calcium-based products. Utilizing the entire health care team can be beneficial in this quest. Healthcare staff should understand and remind patients about bone health at key times, such as during scheduling of bone density testing. The health care providers should highlight proper nutrition and supplementation at pertinent times. The research is also useful for Pharmaceutical companies who are already into the production of Calcium, Drinkable Calcium as well as those who would like to take this opportunity and enter into production of Novel drug delivery system of Calcium.

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**Web links:**

- a) [http://www.osteoporosis.ca/multimedia/pdf/copn/Questions\\_Answers\\_Nov\\_17\\_VF.pdf](http://www.osteoporosis.ca/multimedia/pdf/copn/Questions_Answers_Nov_17_VF.pdf)
- b) <https://www.hsph.harvard.edu/nutritionsource/what-should-you-eat/calcium-and-milk/>
- c) <http://www.spine-health.com/blog/10-ways-get-enough-calcium-if-youre-lactose-intolerant>
- d) [http://www.sld.cu/galerias/pdf/sitios/rehabilitacion-bal/how\\_much\\_calcium\\_is\\_in\\_your\\_drinking\\_water.pdf](http://www.sld.cu/galerias/pdf/sitios/rehabilitacion-bal/how_much_calcium_is_in_your_drinking_water.pdf)
- e) <http://www.spine-health.com/conditions/osteoporosis/monitoring-osteoporosis>
- f) <http://www.nature.com/pr/journal/v74/n6/full/pr2013160a.html>
- g) <http://europepmc.org/articles/PMC3760705>
- h) [http://www.medicinenet.com/vitamins\\_and\\_calcium\\_supplements/article.htm](http://www.medicinenet.com/vitamins_and_calcium_supplements/article.htm)

### XIII. Appendix:

#### A) Questionnaire for Physicians:

1. Name: \_\_\_\_\_
2. Specialization: \_\_\_\_\_
3. Importance of calcium in our body: \_\_\_\_\_
4. Which are the natural drinkable sources of calcium?
  - a) Milk
  - b) Tea
  - c) Orange juice
  - d) Skimmed yoghurt
  - e) Soy milk
5. Recommended intake of calcium

sex \ Age(yrs)	0-1	1-10	10-25	25-65	65 & above
Men					
Women					

6. Groups of individuals which are at risk of calcium deficiency
  - a) Postmenopausal women
  - b) Non-vegetarians
  - c) Vegetarians
  - d) Amenorrhic women
7. Calcium deficiency leads to
  - a) Osteomyelitis
  - b) Osteopenia
  - c) Osteoporosis
  - d) Hypocalcemia
8. Do you prescribe drinkable calcium?
  - a) Yes
  - b) No
9. Which of the following supplements of drinkable calcium do you prescribe? Rate them according to rank no.1 being the best
  - a) Macalvit syrup
  - b) Calmax syrup
  - c) Ostocalcium syrup
  - d) Ostopolybion syrup
  - e) Vancal D syrup
10. Why do you prefer drinkable calcium
  - a) Rate & amount of absorption
  - b) Convenience
  - c) Ease of use
  - e) cheap
11. What is the response of patients towards drinkable calcium
  - a) 10%
  - b) 20%
  - c) 30%
  - d) 40%
  - e) 50%
12. What are the side effects of drinkable calcium supplements?

13. Calcium should be supplemented with vitamin D?  
 a) Strongly agree b) Agree c) Neither agree nor disagree d) Disagree e) Strongly disagree
14. Does lactose intolerance hinder the intake of calcium in patients?  
 a) Strongly agree b) Agree c) Neither agree nor disagree d) Disagree e) Strongly disagree
15. Is female menstrual cycle influenced by bone mineral deficiency?  
 a) Strongly agree b) Agree c) Neither agree nor disagree d) Disagree e) Strongly disagree
16. Intake of calcium with other drugs has an effect on their absorption?  
 a) Strongly agree b) Agree c) Neither agree nor disagree d) Disagree e) Strongly disagree
17. Is presence of calcium necessary in drinking water?  
 a) Yes b) No
18. Calcium concentration of water is highest in:  
 a) Tap water b) Purified water c) Mineral water
19. Out of total patients you come across how many suffer from calcium deficiency?  
 a) 10% b) 30% c) 50% d) 70%
20. Calcium deficiency occurs due to:  
 a) Malnutrition b) Poor utilization c) Low absorption d) Low concentration of vitamin D  
 e) Injury f) Stress fracture
21. Are retailers/chemists ready to keep a stock of drinkable calcium prescribed by you?  
 a) Yes b) No
22. Do you prescribe calcium supplements immediately after surgery or after the patient has recovered?

**B) Questionnaire for Chemists:**

**Name of the medical:** \_\_\_\_\_

**Name of the owner:** \_\_\_\_\_

1. Which type of calcium supplements do doctors mostly prescribe? Rate accordingly

- a) Powder
- b) Tablet/capsule
- c) Effervescent tablets
- d) Suspension/syrup

2. Do you keep a stock of drinkable (liquid) calcium supplement?

Yes  No

3. What is the response of patients towards drinkable calcium?

Poor  Good  Better  Best

4. Which are the most popular brands for liquid calcium supplements? Rate accordingly

- a) Calcimax+ suspension (Meyer)
- b) Macalvit syrup (novartis)
- c) ostocalcium syrup (glaxo Smith Kline)
- d) Ostopolybion suspension (Merck)

5. Which calcium supplements are mostly prescribed? Rate accordingly

- a) Ostocalcium
  - Tablets
  - Syrup
- b) Ostopolybion
  - Tablets
  - Syrup
- c) Total CalD<sub>3</sub>
- d) Calcium Sandoz efferscenttablets

6. Which of the following flavors do customers mostly prefer for liquid calcium

- a) Orange
- b) Strawberry
- c) Mango
- d) Lemon

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