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Original Research Article

# A survey to evaluate the awareness of Fixed Dose Combinations (FDCs) among 2nd year medical undergraduates at a rural tertiary care centre, B G Nagara

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**Abstract:** Combination of two or more active ingredients in a fixed dose ratio is termed as fixed dose combination (FDC). Presently, there is lot of debate over rationality and irrationality of FDCs. This study was focused on medical undergraduates to evaluate the awareness about FDCs as these students are the future practitioners. Like two sides of each coin FDCs do have advantages & disadvantages and it's up to the physician to misuse it or use it judiciously by maintaining the balance. The objective is to evaluate the awareness of Fixed dose combinations (FDCs) among 2nd year medical students. A cross-sectional questionnaire-based study was conducted among 2nd year medical students of AIMS, B G Nagar. Total respondents were 134. Among them 57 participants (42.53%) are male and 77 participants (57.46%) are females. All the participants were within the age group of 19 to 21 years. The analysis of responses for assessing the awareness of students about FDCs, showed that students had a high level of awareness (>80%) regarding some of basic aspects related to FDCs like knowing the term (66.41%), their common use in prescription (67.91%), constitution of FDC (50%), providing benefits to patients by improving compliance (54.47%) and increasing therapeutic response (64.17%). However, students weren't aware regarding the deeper scientific aspects of FDCs like need for similarity in pharmacokinetics of ingredient drugs (21.64%), rationality & approval status of FDCs available in market. Majority of the students are well aware about the basic concepts of FDCs and their usage; however they are lacking in deeper scientific concepts. It is imperative that the concept of FDCs should be emphasized in sufficient detail to these budding doctors by giving an educational intervention through an interactive lecture presentation; so that the awareness of the students can be increased substantially.
**Keywords:** Fixed dose combinations, awareness, medical students, B G Nagar

## INTRODUCTION:

Combination of two or more active ingredients in a fixed ratio of doses is termed as fixed dose combination (FDC). This term is generically used to mean a particular combination of active ingredient irrespective of the formulation or brand. It may be administered as single entity product given along with or as a finished pharmaceutical product [1]. FDC is an innovative product, the main advantage being increase in patient's compliance, decrease in pill burden, reduced cost and complications [2]. These products are acceptable only when the combination has a proven advantage over single compounds administered separately in therapeutic effect, compliance or safety.

FDCs were more than one-third among the new drug products introduced worldwide during the last decade. The trend varied from country to country. In European countries like Spain, 56% of the new products were FDCs, whereas, in Japan it is only 10% but, such statistical data are not available for the developing countries [3].

Rational use of drugs requires that patients receive medications in doses that meet their own individual requirements for an adequate period appropriately to their clinical needs at a cost at which they can afford [4]. Rationality of FDCs should be based on certain aspects such as the drugs in combination should act by different mechanisms, the combination should not have supra additive toxicity of the ingredients or the pharmacokinetics must not be widely different [5]. In developing countries, there is a growing concern about increasing number of irrational FDCs leading to increase in the occurrence of adverse

drug reactions, unnecessary financial burden and ultimately reducing quality of life [6].

There are no worldwide criteria to accept & to define irrational FDCs & no international standards or uniform principles for their development & regulatory assessment. There is an increase in the number of irrational FDCs in the Indian drug market at an alarming rate because the Indian law is not properly defined to grant marketing approval by central or state drug controlling authorities [7].

Hundreds of irrational drug combinations which are not approved in any developed country are being marketed in India. These facts to be taught well to medical undergraduates as they are the budding clinicians so that they will be aware to prescribe drugs judiciously in future to common conditions like diabetes, hypertension, bronchial asthma, psychiatric illnesses, common infectious conditions & other co-morbidities where medicines may be required by patients on a daily basis.

Thus, the present study was conducted to assess & evaluate the awareness about the usage of FDCs in 2nd year medical undergraduates as these students would be the prescribing doctors in future.

**OBJECTIVES:**

To evaluate the awareness of fixed dose combinations (FDCs) among 2nd year medical students

**METHODOLOGY:**

**Study design:** Cross-sectional questionnaire study

**Study Area:** Adichunchanagiri Institute of Medical Sciences (AIMS), B G Nagar.

**Study population:** 4th term second year medical undergraduates.

**Sample size**: 134.

**Data Collection Procedures:**

A cross-sectional questionnaire based study was conducted in AIMS, B G Nagar, with an aim to evaluate the awareness of fixed dose combinations (FDCs) among medical students studying in 2nd year. The study was conducted after obtaining the permission from the Institutional Ethical Committee.

Objectives and procedure of the study was explained to the participants and those who were willing to fill the informed consent form were included in the study. A feedback questionnaire covering various aspects of FDCs was distributed among the participants. The information pertaining to FDCs, whether they are prescribed commonly by physicians, do they provide therapeutic benefits to patients, does it improve patient's compliance and efficacy of individual drugs, whether they reduce cumulative toxicity or increase the incidence of adverse drug reactions or increases the chance of drug resistance and any FDC drug which is banned in our country? The investigators were present in case the respondents required assistance. For the purpose of the study, certain medical terms were explained to the participants if they cannot understand. The filled questionnaire feedbacks were retrieved from the participants.

**Statistical Analysis:**

The returned questionnaires were checked for completeness of the data and the descriptive data were expressed in percentages.

**Quality control:** Was maintained as per the standard protocol.

**Confidentiality:** Was maintained.

**RESULTS:**

Total respondents were 134. Among them 57 participants (42.53%) are male and 77 participants (57.46%) are females. All the participants were within the age group of 19 to 21 years (Table-1).

**DISCUSSION:**

It is evident from the result that medical students are quite aware of the basic concept of FDCs, but they lack in knowledge about the scientific aspects of the FDCs like their advantages, disadvantages, criteria to choose the drugs for a FDC, rationality etc. The analysis of responses for assessing the awareness of students (Table-1)about FDCs, showed that students had a high level of awareness (>80%) regarding some of basic aspects related to FDCs like knowing the term (66.41%), their common use in prescription (67.91%), constitution of FDC (50%), providing benefits to patients by improving compliance (54.47%) and increasing therapeutic response (64.17%). *Atal S et al.;* [8] study among medical undergraduate's shows similar results.

However, students weren't aware regarding the deeper scientific aspects of FDCs like need for similarity in pharmacokinetics of ingredient drugs (21.64%), rationality & approval status of FDCs available in market. Similarly students are also not aware about the potential of FDCs to reduce as well as enhance toxicity or their variable effect by expressing their lack of knowledge through the 'don't know' response. Similar studies done among resident doctors, Goswami *et al.;* [9] shows that the resident doctors lack in knowledge pertaining to prescription of FDCs, their advantages and disadvantages. Comparative studies among patients, physicians and pharmacists, Patil P J *et al.;* [10] showed that there was contrast thinking on the rationality of FDCs. Pharmacists and physicians think

all FDCs are rational but the patients think it is irrational.

**Table 1: Awareness of medical undergraduates regarding FDCs**

| Q. No | Questions | Yes | | No | | Don't know | |
|---|---|---|---|---|---|---|---|
| | | No's | % | No's | % | No's | % |
| 1 | Have you heard the term FDC? | 110 | 82.08 | 18 | 13.43 | 6 | 4.47 |
| 2 | FDC means fixed dose combination? | 89 | 66.41 | 32 | 23.88 | 15 | 11.19 |
| 3 | FDC means fixed drug combination? | 39 | 29.1 | 81 | 60.44 | 14 | 10.44 |
| 4 | FDC contain two or more active ingredients in fixed proportion of doses in a single formulation? | 67 | 50 | 30 | 22.38 | 37 | 27.61 |
| 5 | FDCs are commonly prescribed by physicians? | 91 | 67.91 | 17 | 12.68 | 26 | 19.40 |
| 6 | FDCs can provide therapeutic benefit to patients? | 86 | 64.17 | 15 | 11.19 | 33 | 24.62 |
| 7 | An important criterion for choosing drugs to be combined together is similarity in pharmacokinetics? | 29 | 21.64 | 32 | 23.88 | 73 | 54.47 |
| 8 | An important criterion for choosing drugs to be combined is enhanced therapeutic effect – potentiation, additive effect or synergism? | 33 | 24.62 | 17 | 12.68 | 84 | 62.68 |
| 9 | FDCs lead to improved efficacy of individual drugs? | 53 | 39.55 | 22 | 16.41 | 59 | 44.02 |
| 10 | FDC's lead to improvement in patient's compliance? | 73 | 54.47 | 19 | 14.17 | 42 | 31.34 |
| 11 | FDCs can help reduce cumulative toxicity? | 19 | 14.17 | 50 | 37.31 | 65 | 48.50 |
| 12 | FDCs may result in increased incidence of ADR? | 53 | 39.55 | 2 | 1.49 | 79 | 58.95 |
| 13 | In FDCs it is difficult to identify which medicine has caused adverse effects. | 47 | 35.07 | 33 | 24.62 | 54 | 40.29 |
| 14 | Irrational prescription of FDCs can lead to drug resistance? | 85 | 63.43 | 14 | 10.44 | 35 | 26.11 |
| 15 | In FDCs dosage alteration of one drug is not possible without alteration of other drug. | 43 | 32.08 | 24 | 17.91 | 67 | 50 |
| 16 | All FDCs available in market are rational combination? | 29 | 21.64 | 12 | 8.95 | 93 | 69.4 |
| 17 | All FDCs available in market are approved by drug regulatory authority? | 69 | 51.49 | 34 | 25.37 | 31 | 23.13 |
| 18 | Disadvantage of FDCs is may be use of sub therapeutic doses of individual drugs. | 23 | 17.16 | 8 | 5.97 | 103 | 76.86 |
| 19 | A separate clinical trial is required for launching a new FDC even if individual drugs are already approved? | 17 | 12.68 | 3 | 2.23 | 114 | 85.07 |
| 20 | Are there any FDCs which are banned in India? Give name/s | 23 | 17.16 | 13 | 9.7 | 98 | 73.13 |

FDCs are associated with many advantages and disadvantages [11].

Advantages are

1. Simpler dosage schedule improves compliance & therefore improves treatment outcomes
2. Reduces inadvertent medication errors
3. Prevents and/or slows attainment of microbial resistance by eliminating monotherapy
4. Allows for synergistic combinations (i.e., trimethoprim/sulphamethoxazole combination allows each drug to selectively interfere with successive steps in bacterial folate metabolisms)
5. Eliminated drug shortages by simplifying drug storage & handling, & thus lowers risk of being "out of stock"
6. Only one expiry date simplifies dosing
7. Procurement, management & handling of drugs is simplified
8. Lower packing & shipping costs
9. Less expensive than single ingredient drugs
10. Potential for drug abuse can be minimized by using one drug of the combination for this purpose (i.e., excessive use of antidiarrheal narcotic diphenoxylate is discourage by side effects of atropine in the FDC atropine + duogebixylate)

Disadvantages are

1. FDCs are (possibly) more expensive than separate tablets
2. Potential quality problems, especially with rifampin in FDCs for TB, requiring bio-availability testing
3. If a patient is allergic or has a side effect to one component, the FDC must be stopped & replace by separate tablets
4. Dosing is inflexible and cannot be regulated to patient's needs (each patient has unique characteristics such as weight, age, pharmacokinetics, co-morbidity, that may alter drug metabolism and effect)

5. Incompatible pharmacokinetics is irrational because of different elimination half-lives of individual components
6. Reaction of one of the components (e.g., a rash to suphamethoxazole in cotrimoxazole) may result in patient avoiding the "innocent" trimethoprim in the future
7. Drug interactions may lead to alteration to the therapeutic effect

Students should also be made aware about the rationality of prescribing FDCs. As the students are the budding future physicians it is most important for them to know & understand this because not all FDCs in Indian market are rational combinations. Rational use of medicine means use of a right medicine, in the right manner, at right time, in the right type of patients, at a right cost i.e. "the rule of right". The rationality of FDCs should be based on certain aspects such as [12]:

• The drugs in the combination should act by different mechanisms.
• The pharmacokinetics must not be widely different.
• The combination should not have supra-additive toxicity of the ingredients.

Hence, by giving an educational intervention through an interactive lecture presentation, the awareness of these medical students can be increased substantially about all the aspects of FDCs.

## CONCLUSION:

Majority of the students are well aware about the basic concepts of FDCs and their usage; however they are lacking in deeper scientific concepts of FDCs like their similarity in pharmacokinetics of individual ingredients, rationality and approval status of FDCs. Thus, it is imperative that the concept of FDCs should be emphasized in sufficient detail to these budding doctors by giving an educational intervention through an interactive lecture presentation; so that the awareness of the students can be increased substantially about all the aspects of FDCs like drug-drug interactions, rationality of prescribing especially the multi-drug regimens in chronic diseases more precisely.

## LIMITATIONS:

The limitation of our study was that the sample size was very small, representing a single private medical institute and that too only second year medical students were the participants which can be biased. A multicentre study with higher sample size will be beneficial in assessing the awareness of FDCs among medical undergraduates.

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