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Research ETPM

A Study to Assess the Effect of Nutritional Supplementation on the Hemoglobin Level and the Associated Signs and Symptoms of the Students Identified with Anaemia in Selected Colleges of SNDT Womens' University Mumbai

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Abstract

The purpose of this study was to assess the effects of nutritional supplements on haemoglobin levels and related symptoms among students at SNDT Women's University in Mumbai who had been diagnosed with anaemia in a few particular institutions. Non-occurrence A sample of thirty anaemic students was selected via easy sampling. With a one-group pre-test-post-test methodology, the study used a descriptive evaluative design. Data collecting instruments included measurement devices, opinion questionnaires, inventory checklists, and observation checklists. To assess the reliability of the observation checklist, inter-rater reliability tests were performed. The design's viability and practicality were confirmed by a preliminary analysis carried out before the main investigation. Nutritional supplements were given to several groups for either 15 or 30 days during the course of a month-long data collection session. After 15 and 30 days of supplementation, the results showed a considerable increase in haemoglobin levels. Following supplementation, related anaemia symptoms and indicators decreased. The majority of students reported few side effects from the supplementation and did well to tolerate it. Before taking supplements, individuals' iron consumption was found to be unsatisfactory based on an analysis of their food intake. The majority of students expressed enthusiasm in spreading the intervention to others and had favourable thoughts regarding the taste and efficacy of the supplementation. The study's findings showed that iron-rich dietary supplements can help college students with anaemia symptoms by raising haemoglobin levels and reducing iron deficiency. Though some were worried about possible adverse effects on the gastrointestinal system, the supplements proved to be well-tolerated and even helped to improve bowel habits. The potential for improving the health condition of anaemic students through this intervention underscores the significance of addressing nutritional deficits in this population.

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Keywords: Anemia, hemoglobin, nutritional supplementation, college students, SNDT women's university

INTRODUCTION

Research Approach

The method by which the researcher organizes the investigation to find solutions to the research questions and validate the hypothesis is known as the research methodology. This study is aimed at studying the effect of the nutritional supplementation on the hemoglobin level and associated signs and symptoms of the students who are identified with anemia [1].

Descriptive evaluation using a single group pretest-post test design was deemed suitable and approved for this study.

This approach was considered to be the most suitable one for this study, because it helped the investigator to observe the effect of iron rich nutritional supplementation on the hemoglobin level and associated signs and symptoms. Hence, the investigator conducted the study and evaluated the significant difference.

RESEARCH DESIGN

Polit and Beck state that "a research design is a comprehensive strategy on how to get answers to the questions under investigation and how to handle some of the challenges encountered during the research process" [2]. One group pre-test-post-test methodology was employed in this investigation.

Hypothesis

As to B.T. Basavanthappa [3], a hypothesis is a declaration of assumption regarding the correlation between two or more variables that proposes a solution to the study question. It is an explanation or preliminary prediction about how two variables relate to one another. The following are the study's hypotheses.

H1= There will be a significant difference in the Hemoglobin level and associated signs and symptoms before and after nutritional supplementation at 0.01 level of significance.

H0 = There will be no significant difference in hemoglobin level and associated signs and symptoms before & after nutritional supplementation at 0.01 level of significance

Assumption

According to Polit and Beck (2008) [2], “assumption” is a principle that is accepted as being true based on logic or reason, without proof.

The assumption for this study are:

- Iron rich Nutritional supplementation may improve the Hemoglobin levels.
- The nutritional requirement varies from individual to individual.

Reliability

“One important factor in evaluating the accuracy and quality of the tool is its reliabilityIt measures the characteristic it is meant to evaluate with a particular degree of reliability” [4]. The lesser the variations an instrument produces at repeated measurement of an attribute, the higher is its reliability. In this study the reliability of the observation checklist was established using the inter-rater method [5]. Two observers observed students who were identified with anemia. The reliability was checked for method of observation and questionnaire which is for assessing signs and symptoms were checked for reliability. The scores obtained from the observation were computed using the scott pie formula [6].

- Scott $\pi = 100 - \frac{\sum D - {}^{\sum E2}/_{100}}{100 - {}^{\sum E2}/_{100}}$
- Where D is the difference between the scores of the first and the second observation.

Development of The Tool

The researcher created the instrument after reading literature to keep herself up to date on theory. A practical approach was used to develop the tool [6]. Prior to the preparation of the tool the investigator visited the colleges under SNDT University to interact with the students who were anemic. She noticed that students who knew they were anemic, they did not take any particular interest for taking an iron rich diet.

Reviewing of the literature helped the investigator to formulate nutritional supplementation. She also visited the dietician to get the information regarding diet for the anemic girls. She came to know that garden cress seed is the rich source of iron. Therefore she searched for the recipe of garden cress seed and found out three recipes. Out of those recipes, she decided to prepare laddoo. After formulating recipe she distributed to the experts for it's palatability and their suggestions.

The following tools were used in this study :

- Observation checklist
- Inventory checklist
- Opinionnaire
- Weighing scale
- Tape measure
- Torch
- Sahli's Hemometer
- Solutions to check hemoglobin- 0.1 % Normal HCl, Distilled water,
- The articles required for blood collection like – Tourniquet, disposable rubber gloves, disposable syringes, cotton swabs, spirit, sodium hypochloride solution, EDTA vaccute, puncture proof container, red plastic bag to collect contaminated articles

Σ is the sum of the scores of the first and the second observations.

For most uses, a reliability coefficient more than 0.7 is deemed good; the computed value of the Scott pie was 0.90. The tool's satisfactory reliability was determined by the fact that the estimated value exceeded the tabulated value.

Pilot Study

Pilot study is defined as "a small scale trial of the research method to ensure that the design is feasible" [7]. The pilot study is undertaken to assess the feasibility of planned study, adequacy of the instrumentations and problems of data collection. A pilot study's main goal is to test as many components of the research proposal as it can, allowing for the correction of any parts that is not functioning correctly [1]. The pilot study was conducted from the 7th Aug, 2010 to 21st Aug, 2010 in the L.T. College of Nursing, SNDT Women's University. It was carried out on three pupils whose blood hemoglobin levels were determined to be below 10 gm%. The investigator assessed them for signs and symptoms of the anemia, asked them to fill up demographic data and provided them for 15 days with the nutritional supplementation prepared by the investigator after intake of supplementation their hemoglobin level was estimated again.

During the course of their nutritional supplementation the investigator also asked them to maintain daily food intake records for calculating their calorie intake and iron intake.

The study design was found to be practical, feasible and convenient. The researcher used the pilot trial to help assess whether concerns would surface after taking nutritional supplements. The pilot study also helped to know about changes in the hemoglobin level of the blood after the course of the study [8].

Data Gathering Process

The data collection began from 18th July, 2010 and ended on 19th August, 2010 prior to starting the study formal administration permission was obtained from the Principal and class co-ordinators, L.T. College of Nursing to obtain their co-operation.

The list of the students were collected and students whose hemoglobin level was 10gm/dl or less were identified [9]. Then investigator asked them to gather in another classroom and explained them

the purpose of research, assessment of anemia, estimation of hemoglobin and providing nutritional supplementation. Investigator requested them for willingness to be a part of the study. The investigator obtained written consent from the students who were willing to become the sample of the study.

The investigator instructed to the fifteen students from first year that they were subjected to intervene for thirty days and the other students along with second year, third year and fourth year were subjected to intervene for fifteen days. It was decided as per the convenience of the investigator because first year students had theory block so they were available in the college throughout study whereas other students had clinical block so they intervened for fifteen days.

On the day 0 the investigator provided the tool to the students to fill up their demographic data and simultaneously assessed them for physical parameters and signs and symptoms of anemia. Then investigator explain the procedure for blood collection. She provided comfortable position to the student and applied the tourniquet on forearm, then she clean the area with spirit swab and collected one ml blood sample in EDTA vaccute [10]. During the procedure she maintained all aseptic precaution, after that she discarded the bio hazards in the puncture proof container which was labeled with the red coloured symbol of bio hazard containing hypochloride solution. After the procedure of blood collection the investigator had given them the checklist to fill up 24 hours dietary recall of previous day. Thus, investigator found out thirty students for the study.

From the next day onwards the investigator approached the students greeted and made them seat in the classroom and provided the nutritional supplementation in the covered plastic polythene bag which contained five laddoos each weighed 20 gm. The students were instructed to consume all the laddoos during college time. The investigator also asked them to fill up inventory checklist for dietary recall. In the evening the investigator ensured about consumption of nutritional supplementation. Investigator did not force them to eat all the laddoos at a time but she ensured that the correct number of laddoos consumed was mentioned in the inventory checklist.

For 30 days, the identical approach was used with group 2.

On the 16^{th} day the investigator again assessed all the students for their physiological parameters associated signs and symptoms of anemia and estimation of hemoglobin level.

Group 1 students were given an opinionnaire checklist to fill up and tolerance for the given nutritional supplementation was recorded. Furthermore, they were briefed about the termination of dietary supplementation and were instructed on how to prepare the nutritional supplementation. They were told that if they wished they could continue the supplementation on their own and on the 31^{st} day, they would be assessed for physiological parameters and hemoglobin estimation.

On 16^{th}- 30^{th} day: The investigator continued providing supplementation to group 2. Inventory checklist was checked and collected every day.

On 31^{st} day, all the students were approached and assessed for the height and weight measurement, estimation of hemoglobin and assessment of associated signs and symptoms of anemia.

The opinionnaire checklist and tolerance for the supplementation were given to the students of group 2 to fill it up.

On the completion of the data collection investigator thanked all the students and class co-ordinator for their kind cooperation and support. As seen in Figure 1, the samples were distributed by age. The distribution of the samples was determined by the number of family members, as shown in Figure 2. Figure 3 illustrates the sample distribution by menarche age. The sample distribution based on the

regularity of the menstrual cycle as depicted in Figure 4. Sample distribution with respect to menstrual cycle duration as shown in Figure 5. Sample distribution with respect to menstrual blood flow duration as shown in Figure 6. Figure 7 displays the samples' distribution with respect to menstrual blood loss. The samples' distribution according to the body mass index, as represented in Figure 8. Distribution of the samples in relation to daily caloric intake without nutritional supplementation shown in Figure 9. Distribution of the samples in relation to daily caloric intake with nutritional supplementation shown in Figure 10. Distribution of the samples in relation to daily iron intake without nutritional supplementation shown in Figure 11. Distribution of the samples in relation to daily iron intake with nutritional supplementation shown in Figure 12. Distribution of the samples (Group 2) in relation to their hemoglobin at 0 days, 15 days and 30 days shown in Figure 13.

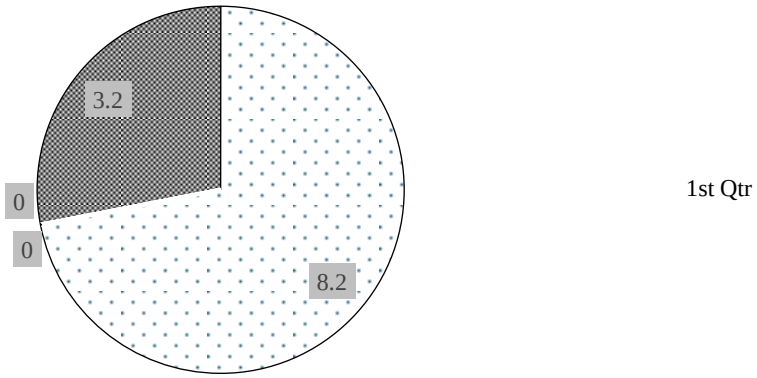

Figure 1. Distribution of the samples in relation to their age.

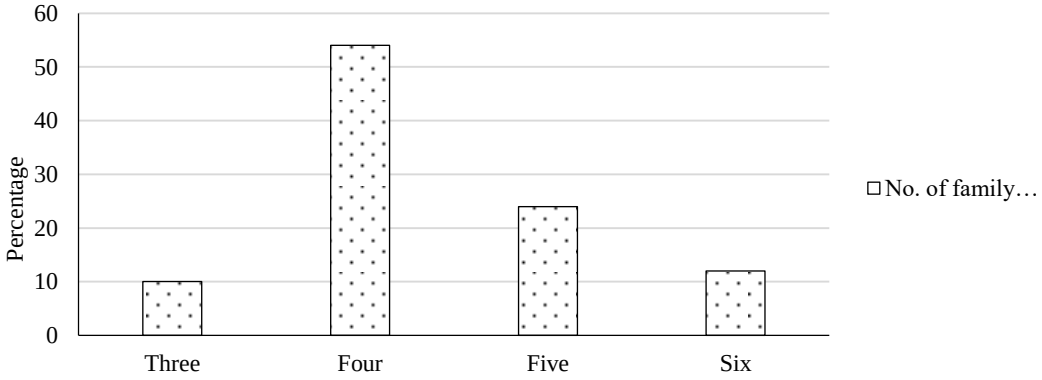

Figure 2. Distribution of the samples in relation to their number of the family members.

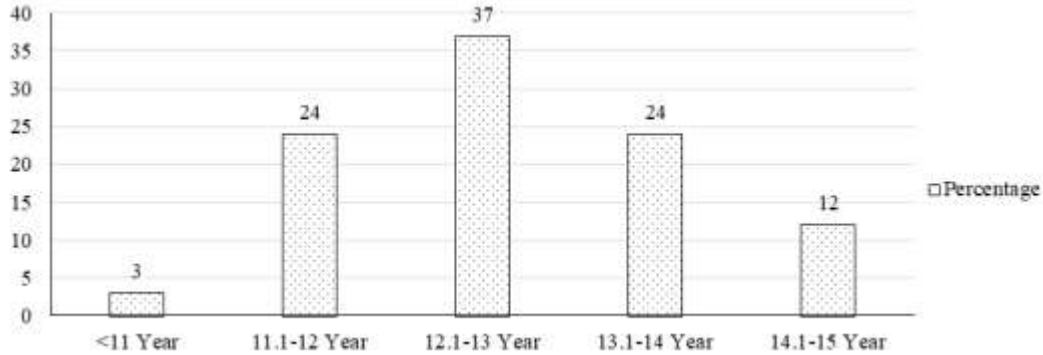

Figure 3. Distribution of the Samples in relation to age of menarche.

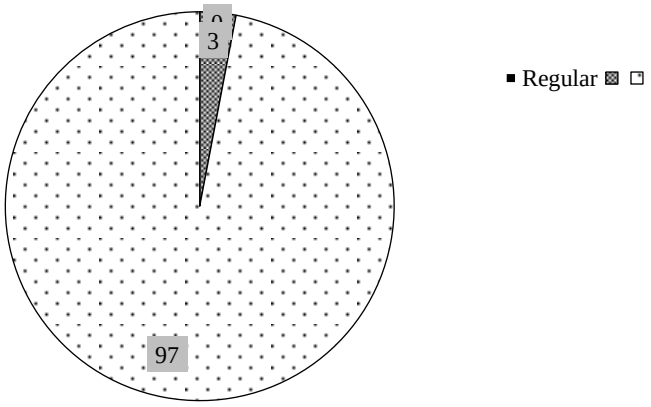

Figure 4. Distribution of the samples in relation to regularity of menstrual cycle.

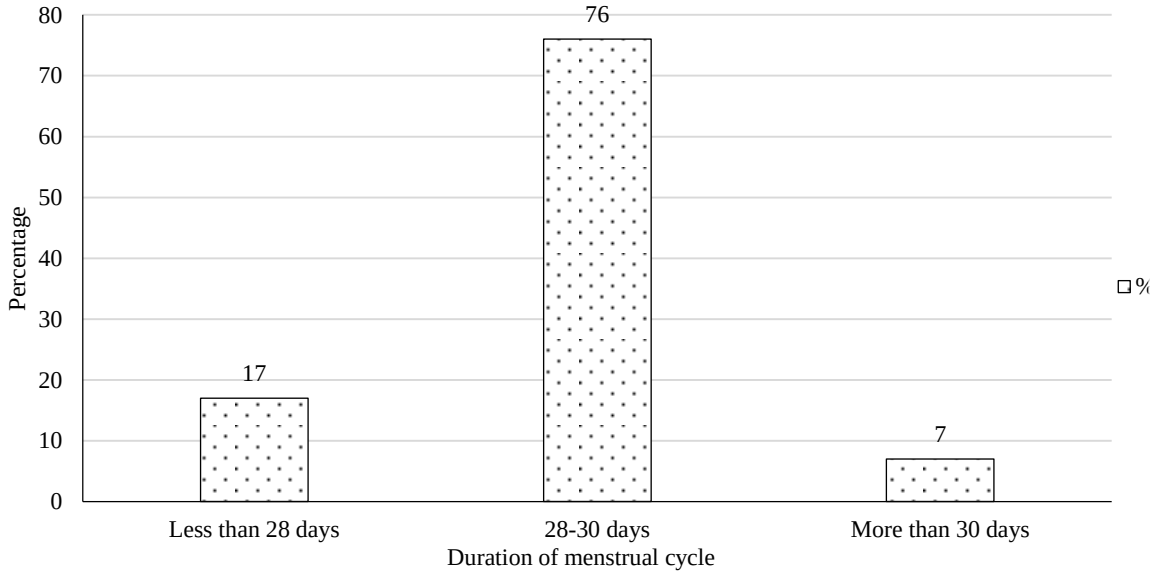

Figure 5. Distribution of the samples in relation to duration of menstrual cycle.

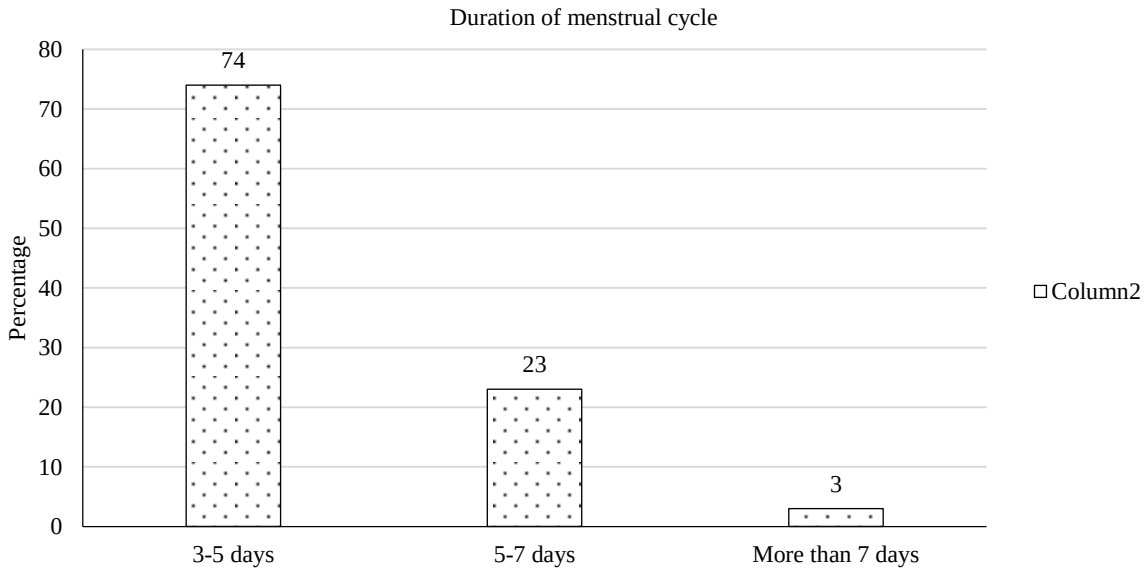

Figure 6. Distribution of the samples in relation to duration of menstrual blood flow.

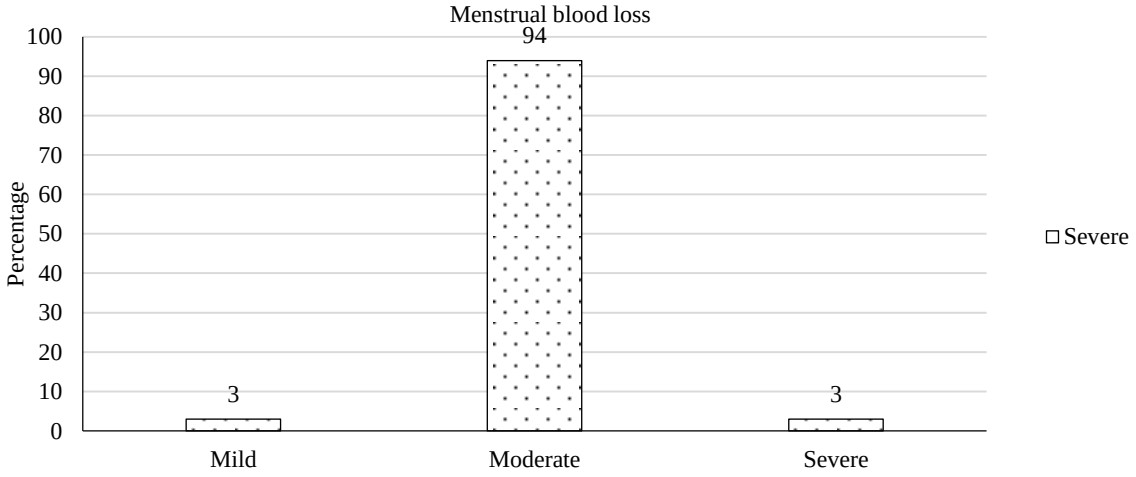

Figure 7. distribution of the samples in relation to menstrual blood loss.

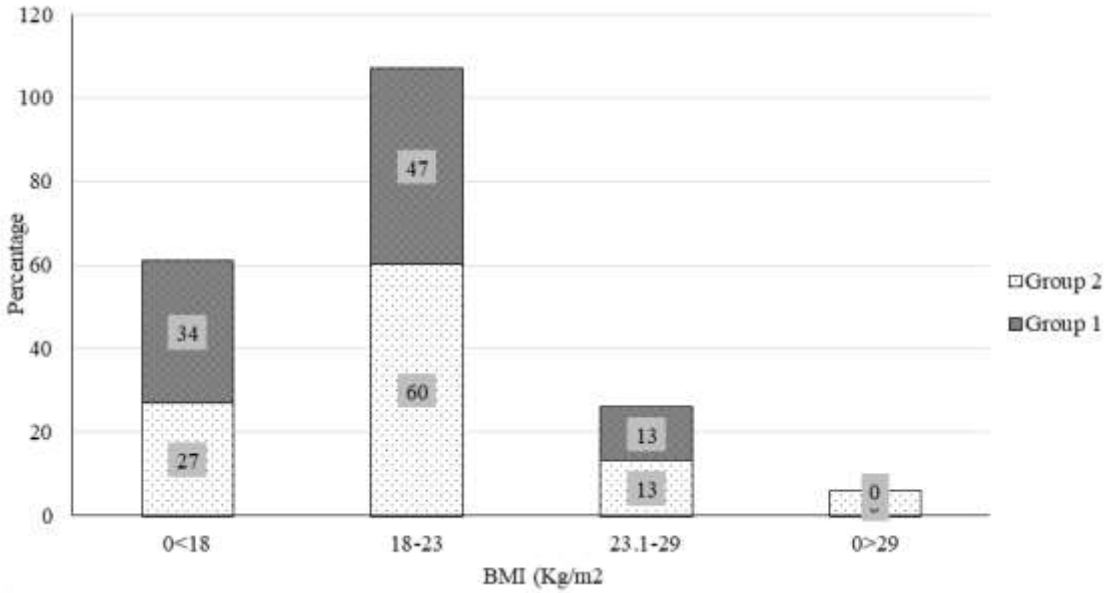

Figure 8. distribution of the samples in relation to body mass index.

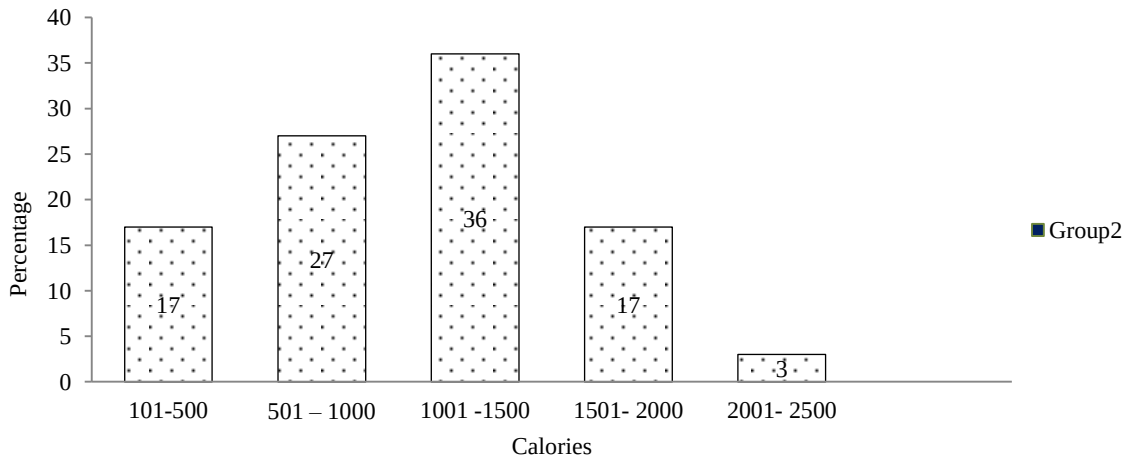

Figure 9. Distribution of the samples in relation to daily caloric intake without nutritional supplementation.

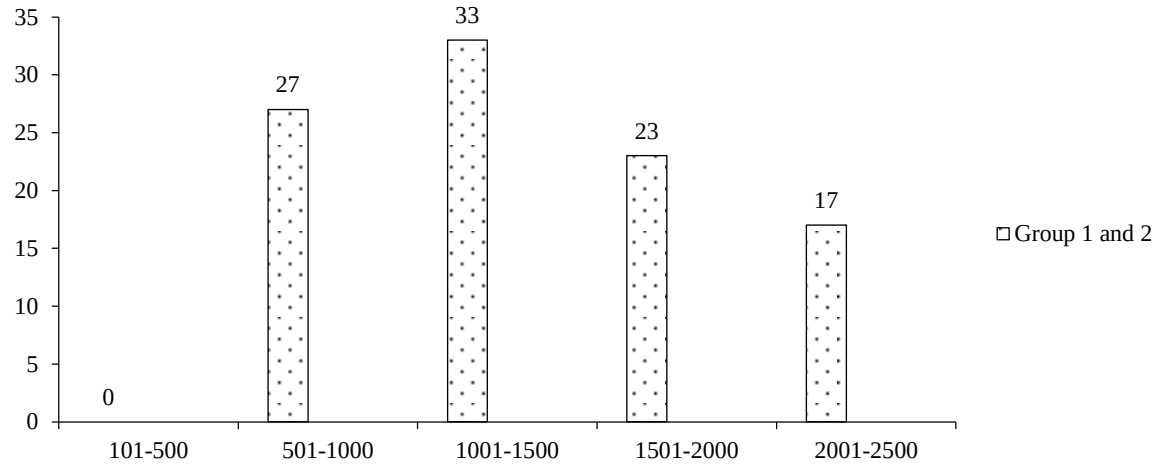

Figure 10. Distribution of the samples in relation to daily caloric intake with nutritional supplementation.

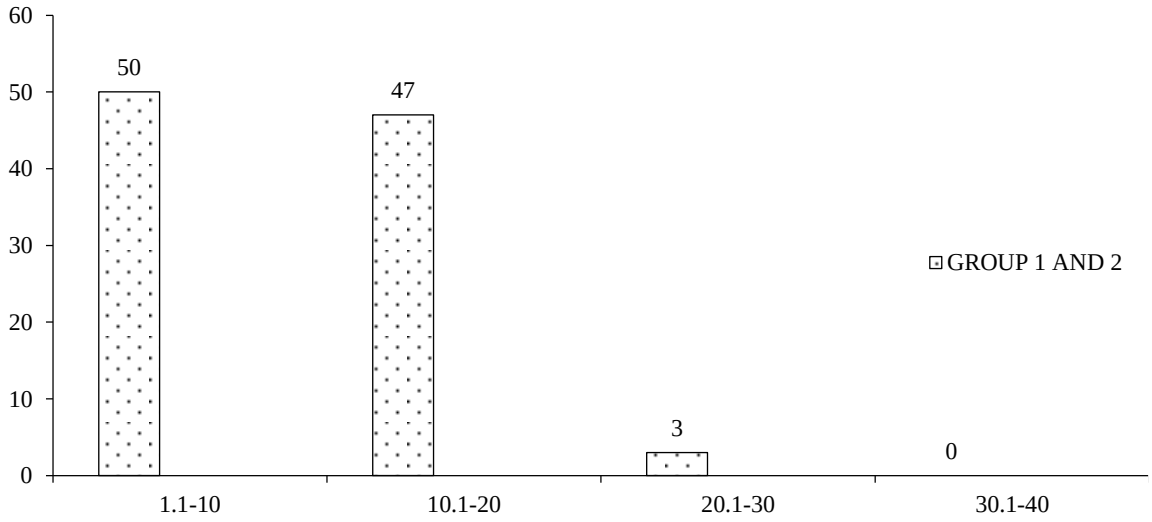

Figure 11. Distribution of the samples in relation to daily iron intake without nutritional supplementation

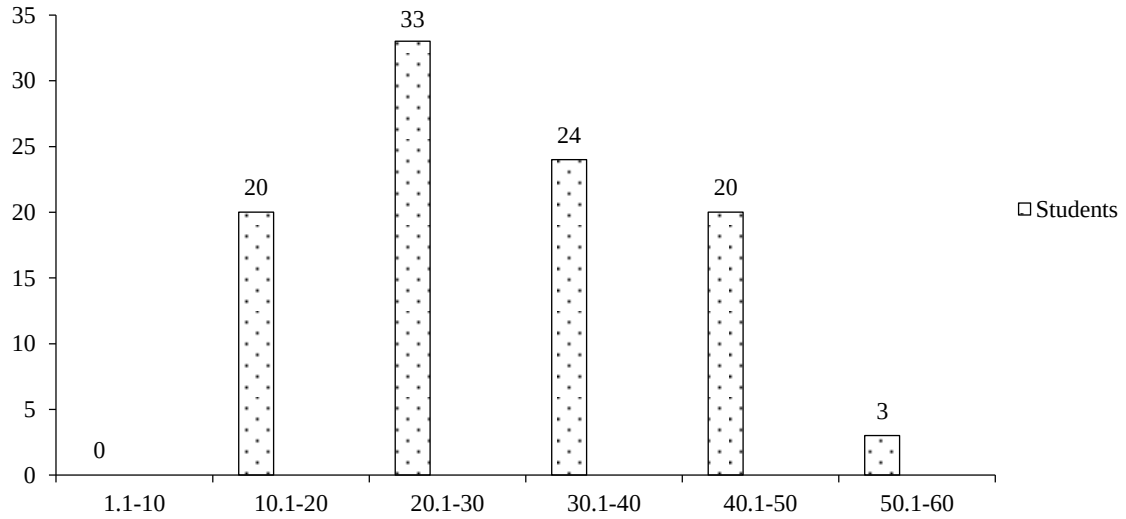

Figure 12. Distribution of the samples in relation to daily iron intake with nutritional supplementation

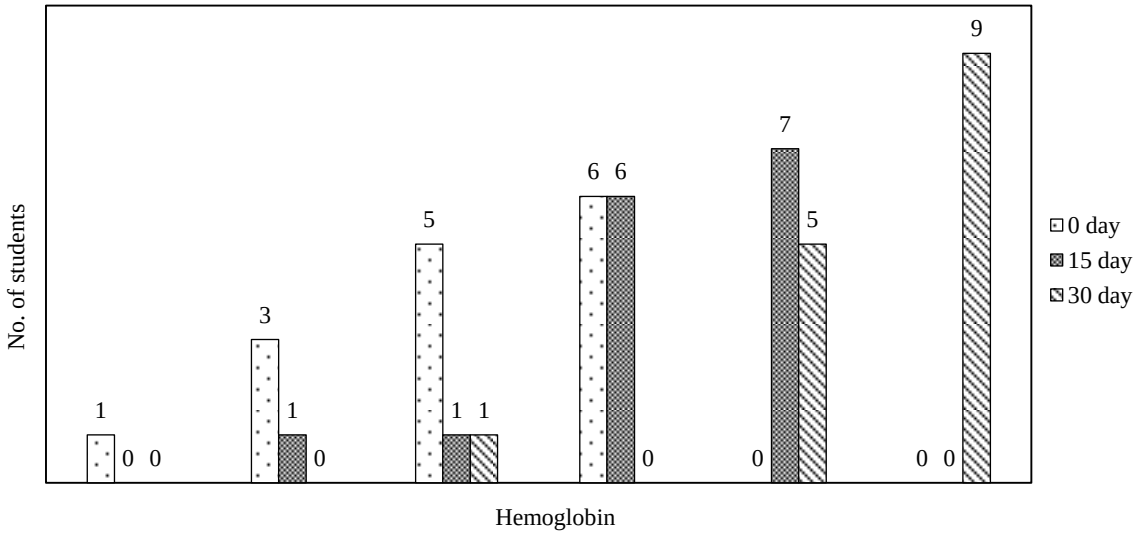

Figure 13. Distribution of the samples (Group 2) in relation to their hemoglobin at 0 days, 15 days and 30 days.

Major Finding of the Study

Section I: The samples' demographic data

- According to the study, the bulk of the samples were between the ages of 21 and 25.
- The menstrual cycles of the majority of students were regular.
- The bulk of the samples (54%) had a normal body mass index (BMI).

Section II: Analysis of the average dietary intake record of the samples

- The majority (34%) of the samples' caloric intake ranged from 1001-1500.Average iron intake of the samples was 11-20 mg per day which is less than normal recommended dietary allowances as per Indian Council Of Medical and Research. This was reported less than daily requirement before nutritional supplementation.

Section III: Analysis of estimated hemoglobin level before and after nutritional supplementation.

- The hemoglobin level increased from 7.1 gm % to 11gm% after consuming the nutritional supplementation for 15 days.
- The hemoglobin level increased from 8.1 gm% to 12.2 gm% after consuming the nutritional supplementation for 30 days.

Section IV: Analysis of associated signs and symptoms of anemia before and after nutritional supplementation.

- The signs of anemia were observed to be reduced after nutritional supplementation.
- The symptoms of anemia were reported less number of times after nutritional supplementation.

Section V: Analysis of the tolerance reported by the students after nutritional supplementation.

- The majority of students (97%) did not report experiencing any symptoms of constipation, diarrhea, vomiting, or nausea.
- It suggested that they tolerated the nutritional supplementation well.

Section VI: Significant difference between pre test and post test hemoglobin levels of the students

- The calculated 't' value for group 1 is 4.95 which is significant at 0.01 level. Thus, the nutritional supplementation was effective in the improvement of hemoglobin level of the students after fifteen days of nutritional supplementation.

- Group 2's computed "t" value is 11.4, which is significant at the 0.01 level. Thus, the nutritional supplementation was effective in the improvement of hemoglobin level of the students after thirty days of nutritional supplementation.

Section VII: Opinionnaire

- Majority of the students have opined that supplementation tasted good, was really helpful for them to improve nutritional status, they felt more energetic, interested to learn the recipe as well as they also felt need to make their friends, neighbor and relatives aware about such kind of low cost nutritional supplementation.

CONCLUSION

During the study it was observed that most of the students were facing the signs and symptoms of anaemia. It had suggested low serum hemoglobin level. The study revealed that the iron rich nutritional supplementation had an effect on the improvement on hemoglobin as well as associated signs and symptoms of anaemia. Overall the study proved that this nutritional supplementation proved significant role to improve the health status of the students. Though the nutritional supplementation was rich in iron which generally causes constipation and gastrointestinal disturbances not showed any such kind of symptoms but their bowel pattern became more regular reported by the students may be because of coconut powder.

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