Letters to the Editor
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Iron supplementation and deworming among anaemic adolescent girls of a residential school in a rural area of India: An interventional study

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Dear Editor,

Iron deficiency anaemia is the most common malnutrition among the adolescent population. Girls are most vulnerable to this problem, particularly in developing countries such as India.

Causes of nutritional anaemia are inadequate iron intake, increased physiological requirement of iron, chronic blood loss and infections like malaria and hookworm.

Hookworm infection which causes chronic blood loss is widely prevalent in India and an underlying cause of anaemia in the Indian population. Nutritional anaemia in adolescents attributes to high maternal mortality, high incidence of low-birth weight babies, high perinatal mortality and fetal wastage. [1]

The multicentre study completed in three regions of India (Mumbai, Gujarat and Delhi) showed anaemia as 62–66%, 57–65% and 48–50% respectively in adolescent girls. [2]

The present study was carried out to ascertain the impact of iron supplementation along with deworming and health education on anaemic adolescent girls in rural areas.

The study was conducted at a residential school for girls named, Pravara Kanya Vidya Mandir, at Loni, Dist. Ahmednagar in India. Assuming the prevalence rate of anaemia among adolescent girls to be 66% with 10% allowable error and 95% confidence interval, the estimated sample size was 206. All the residential girls (total 209) were enrolled for the study. Their clinical examination was done and haemoglobin status was established by Sahli's haemoglobinometer.

If any morbidity was found, patients were referred to Pravara Rural Hospital, Loni for treatment. If haemoglobin was less than 12gm/dl they were categorised as anaemic. Grades of anaemia were defined as mild anaemia (haemoglobin -10gm/dl -11.9g gm/dl), moderate anaemia (haemoglobin -7gm/dl -10g gm/dl) and severe anaemia (haemoglobin less than 7gm/dl). [3] An interventional trial with iron supplementation for three months was conducted for anaemic girls. The study protocol was prepared before the intervention.

The inclusion criteria for the interventional trial were: residential scholar of the school; and haemoglobin less than 12gm/dl.

The exclusion criteria were: day scholar of the school; haemoglobin 12gm/dl or more; and unwilling to give consent.

Clearance was obtained from the Institutional Ethical Committee of Rural Medical College, Loni, and oral consent was obtained from the school authorities and parents. All girls enrolled in the trial were treated with 100mg of Mebendazole twice a day for three days and randomly allocated into the experimental group or control group using a random number table. The experimental group was supplemented with one tablet daily containing 100mg of elemental iron (300mg of ferrous sulphate), and 0.5mg of folic acid for a period of three months. No supplements were given to the control group. For both control and experimental groups, health education regarding anaemia and personal hygiene was given. Haemoglobin measurements were repeated at the end of three months of iron supplementation. The collected data was analysed and statistically tested. After the end of the study, all anaemic girls in both groups were prescribed iron and folic acid tablets for three months.

Out of 209 residential girls, 108 (51.67 %) were anaemic. Out of these 108 anaemic girls 54 were selected in the study group and 54 were in the control group. Four girls in each group left the study before completion due to personal reasons (drop-out rate of 7.4%). The pre- and post-intervention mean haemoglobin level of anaemic girls is shown in Table 1. Grades of anaemia in the pre- and post-intervention phase are shown in Tables 2 and 3

among the experimental and control group respectively. Among the experimental group there was a highly significant increase in mean haemoglobin status from 8.93gm/dl to 12.51gm/dl (z = 11.5,p < 0.01). Among the control group there was also a significant increase in mean haemoglobin status from 8.78gm/dl to 9.49gm/dl(z = 2.08, p< 0.05).

Table 1: Pre- and post-intervention mean haemoglobin level (gm/dl) among anaemic girls

Phase	Experimental group mean haemoglobin level (mean ± S.D.)	Control group mean haemoglobin level (mean ± S.D.)	Z value
Pre-intervention	8.93 ± 1.6	8.78 ± 1.8	Z = 0.29, p > 0.05
Post-intervention	12.51 ± 1.4	9.49 ± 1.6	Z = 9.7, **p < 0.01**

Table 2: Grades of anaemia in pre- and post-intervention phase (experimental group):

Grades of Anaemia	Experimental Group (n=50)		
	Pre-intervention	**Post-intervention**	**Z value**
Mild	36 (72%)	05 (10 %)	Z = 8.11, **p < 0.01**
Moderate	13 (26 %)	03 (6 %)	Z = 2.83, **p < 0.01**
Severe	1 (2 %)	0 (0 %)	Z = 1.01, p > 0.05

The present study has indicated a very high magnitude of the anaemia problem in adolescent girls in rural areas. Before the intervention there was no difference in mean haemoglobin levels among the experimental group and control group (z=0.29). But after intervention there was a significantly higher haemoglobin level in the experimental group compared with the control group (z=9.7), this is most likely due to iron supplementation. There was a significant increase in the mean haemoglobin level after intervention in both the experimental and control group. The significant increase in haemoglobin level in the control group may be due to deworming and health education. This study thus indicates the importance of deworming and health education in any anaemia control programme for adolescent girls.

Table 3: Grades of anaemia in pre- and post-intervention phase (control group):

Grades of Anaemia	Control Group (n=50)		
	Pre-intervention	**Post-intervention**	**Z value**
Mild	31 (62 %)	26 (52 %)	Z = 1.01, p > 0.05
Moderate	17 (34 %)	14 (28%)	Z = 0.65, p > 0.05
Severe	2 (4%)	0 (0%)	Z = 1.44, p < 0.05

Sincerely,

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Impact of teleradiology on patient healthcare

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Dear Editor,

Teleradiology[1, 2] is the electronic transmission of radiological images, interpretations and reports. Now even audio or videos can also be integrated with the above data.

Recent advances in imaging have increased the number of radiological investigations, but the number of radiologists has not increased correspondingly. Moreover, as the reports are required sooner, the crunch is felt even more although those who report are given good pay packages. Teleradiology is the one stop solution to this dire situation.

The basic teleradiology system has three major components[1]**:** a medical imaging source which acquires images; a sending station; and an image review and workstation. Digitisation of a patient's images is completed electronically.

Advantages of teleradiology are that it bridges the gap between rural/underdeveloped areas and urban/developed areas by providing expert opinion even at remote places, without the expert having to be physically present in the underprivileged area.[2] It also permits a second opinion and even subspecialist opinion on difficult cases whenever the problem cannot be solved by the locally available radiologist. It enables group reporting, a more rapid turnover, and a more satisfying teaching and learning process. Round the clock and round the year services can be rendered. Continuation of medical education and group discussions are also possible as are virtual seminars.[2]

Debatable Issues in teleradiology are the lack of bonding between the patient, referring physician and the reporting radiologist. The human touch in the doctor-patient relation is lost.

Image compression techniques like Joint Photographic Expert Group (JPEG) file image format and the Graphics Interchange Format (GIF) may result in a loss of image quality. This problem can be overcome by using Digital Imaging and Communications in Medicine (DICOM) or Portable Network Graphics that are the standardised formats of grey-scale images with high bit depths.

The legal angle[2] is hazy as the legal relationship between patient, referring physician, reporting radiologist and teleradiology service provider is indistinct.

Teleradiology has ushered in an era of super and subspecialty within radiology. The regional radiologists might get ignored due to teleradiology and might soon migrate to greener pastures or shut down their trade. Due to this local technicians would have nobody to guide or supervise them and results will then be chaotic.

Teleradiology has seen the glaring light of today because of astonishing advances by information and technology experts who are the backbone of teleradiology. Without their constant help and vigil the entire service will collapse. Constant upgrading of existing facilities and quality control of hardware and software are some of the main tasks expected of them.

Suggestions[2, 3] for improving teleradiology so that we can truly reap the benefits are that it should be introduced only after complete agreement of local radiologists and a close communication between the reporting radiologist, referring clinicians and patients is very vital. The reporting radiologist must be properly accredited and must undergo programmes for educational improvement from time to time. They must also use proper hardware and software, get facility accredited and perform periodic quality assurance programmes as well as clarify legal issues and jurisdictions. Medical indemnity insurance is important for all involved and periodic evaluation of the clinico-economical impacts is a must to shape the future direction of teleradiology.

Teleradiology plays different roles in different locations around the world.[2, 3] In developed nations like the UK and the USA there is shortage of specialists because work has increased due to newer modalities of radio-imaging. Hence, there is a trend towards outsourcing work to developing nations like India where US board certified radiologists report the scans. Advantages to the developed nation are in the form of savings of time and money. In contrast, in developing nations like India, within the nation teleradiology services are used to report scans done at remote places where radiologists are not available all around the clock.

To summarise, teleradiology has shrunken the world into a global village. Although it has numerous financial benefits to the professionals, as well as the patients, the primary aim of improving patient healthcare must never be sidetracked.

The legal arena concerning teleradiology and healthcare is ambiguous and therefore calls for hefty medical indemnity insurance of all medical professionals involved in teleradiology.

New ideas for research include working strongly to provide online support group for patients and their caretakers, direct access by patients via email, and emphasis on educational resources and research using widely available and achieved teleradiology data.

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Increasing number of female medical students in Nepal: Some challenges and opportunities

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Dear Editor,

Nepal, a small developing country situated between India and China, had at the beginning of September 2011 18 medical schools with the majority in the private sector.[1] In consonance with trends in other countries recently the number of female medical students in Nepal has increased substantially. A study conducted in four developed nations, Canada, England, Australia and the USA in 2002 showed nearly half of the medical students and 20% to 30% of all practicing physicians were female.[2] The author has not come across studies on female medical students in developing nations and Nepal.

Increasing number of female students – opportunities

Studies have suggested that female medical students may have higher empathy than men. In the US, a cross-sectional measurement of medical student empathy was carried out.[3] Female medical students had higher empathy scores compared to males. The authors stated that students with higher empathy prefer people-oriented specialties like internal medicine, family medicine and paediatrics. In Nepal the author and Dr Piryani studied empathy in first year medical students before and after a medical humanities module using the interpersonal reactivity index (Shankar and Piryani, personal communication). The study showed women had higher scores in certain subscores of empathy. The manuscript is under review. Female doctors may be able to bond better with women and children and educate them about proper childcare, nutrition, immunisation, disease prevention and healthy living. They may also be able to motivate women to adopt birth control and limit family size.

Increasing number of female students – challenges

The majority of teachers in Nepalese medical schools are male and there have been occasional reports of sexual harassment and inappropriate behaviour with female students. Studies on this important aspect are lacking. In the US a study stated harassment and gender stereotyping continued to detract from the education of women and opportunities presented to them.[4] The author concluded that schools have to take steps to ensure gender equity.

Schools may have the challenge of creating more facilities for female students like hostels, recreational facilities and others. The issue of increased security for female students has to be addressed. Studies have shown women are more likely to work part-time for a longer period of time. In Nepal women take breaks for maternity and child rearing. Pathology, gynaecology, family medicine and dermatology are popular career choices. Men dominate higher positions both in academic institutions and hospitals.

In Nepal scholarship students after graduation have to spend time in rural areas. Reaching the place of work may sometimes involve walking long hours and women may find working conditions more difficult. In Nepal the status of women has been traditionally low and they have been marginalised due to illiteracy, poverty and social taboos.[5] In rural health facilities a doctor is also a team leader, community leader and administrator. In Nepal older age is a factor commanding respect and older team members

may not always obey young, freshly graduated doctors. The influence of the female gender as an additional factor in this situation may have to be studied.

Questions for research

The increasing number of women raises many research questions. Among these are the question of increased empathy and emotional intelligence among female students, the possible effect on the doctor-patient relationship, and the impact on mandatory rural service for scholarship students. These areas would be of great interest to a medical school enrolling more female students and interested in improving their status. Other research questions could be whether female students are more likely to migrate to developed nations especially after marriage, whether they are more likely to work part-time or in specialties where the workload is lighter or can be scheduled. New requirements and changes required in teaching-learning methodologies as a result of the increasing number of women, the relationship between male teachers and female students, the future impact of increasing number of female teachers can be studied. The impact on health delivery in rural communities and on the status of women in society is an important area of enquiry.

In Nepal in addition to the problems, advantages and challenges noted in developed nations the low status of women, the problem of security, the traditional patriarchal nature of society, greater expectations from women with regard to care of children and the family throw up novel challenges.

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