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Proposing a Single centre as a Drug and Toxicology Unit for Complete Care of Substance Abuse and Poisoning Patients at Tertiary Care Centers

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ABSTRACT

A Registered medical practitioner is qualified to manage all the cases of poisoning and substance abuse after passing their graduate medical education. The qualification of managing poisoning cases comes from Toxicology taught to them under the subject "Forensic Medicine and Toxicology".

At tertiary care centres, the post-graduates in Internal Medicine manage poisoning and substance abuse cases under emergency care based on the knowledge they received during their undergraduate studies. However, the Teacher who taught the subject is practically not involved in managing such patients, i.e. preaching without practice. This results in a gross deficiency in the quality of care for poisoning cases.

To overcome this, we propose one centre as a Toxicology unit at every tertiary care centre, corroborating Medicine, Forensic Medicine, Pharmacology, Psychiatry and various other disciplines dealing with all the aspects of Substance abuse and Poisons.

With the help of this unit, we can run a single centre catering to the management of poisoning and substance abuse patients, their mental health, diagnostic centres for drugs and poisons, drugs and poison information centre (DPC) including drugs de-addiction and treatment centre (DDAC), an integrated rehabilitation centre for addicts (IRCA), Outreach and Drop-in centres (ODIC), De-addiction drug pharmacy and various training courses to the health care professionals.

Keywords: Toxicology, Poisoning, Substance abuse, Mental health, Suicide

Introduction

Suicide is one of the preventable forms of death. Suicide is not only a personal tragedy that takes the life of an individual prematurely, but it has a continuing ripple effect, affecting the lives of families, friends and communities. The global burden of death due to suicide is more than seven lakhs per year (1). Suicide is among the top 20 leading causes of death in the world (WHO) and among the top 10 leading causes of death in India (NCRB data) (2). Although we don't have actual data on the suicide attempters, as per WHO, for each suicide, there are likely more than 20 suicide attempts (3). In that way, if we consider suicide as a preventable disease, then this will become the most prevalent disease in the world, and 2nd commonest will be far behind. Sadly, 77% of global suicide occurs in middle- and low-income countries. Suicidal behaviour is a complex phenomenon that demands a holistic approach of care and support by multiple agencies.

Mental Health Care Act, 2017 and India

Under Indian Penal Code (IPC) section 309, the attempt to commit suicide is a criminal offence and is punishable with one-year imprisonment with or without a fine. With the implementation of the Mental Health Care Act 2017 (4), Section 309 of IPC was decriminalized, and it was stated that "Any person who attempts to commit suicide shall be presumed, unless proved otherwise, to have severe stress. And the appropriate government shall have a duty to provide care, treatment and rehabilitation to a person having severe stress and who attempted to commit suicide to reduce the risk of recurrence of attempt to commit suicide". This has changed the approach of every stakeholder towards suicide patients. Although suicidal behaviour was seen as a mental illness, treatment for the same is provided by the Psychiatry department of the hospital for a long apart from their regular treatment (5-9). But with this commendatory step taken under the Mental Health Care Act, every attempt of suicide shall now be seen as a disease rather than an offence for which the appropriate government and healthcare provider will provide proper care, treatment and rehabilitation as per the standard guidelines.

Poisoning and Mental Health

It has been observed that most of those patients who survive suicide and get admitted to the hospital, the majority of them are with poisoning incidences, and poisoning is the most typical method practised. Also, it has been reported that most of the poisoning cases are suicidal (More than 75%), followed by accidental (10, 11). In view of this, the majority of cases of poisoning need care of their mental health.

Substance Abuse, Mental Illness and Toxicology

Substance abuse, i.e., the harmful or hazardous use of psychoactive substances, including alcohol and illicit drugs, is a form of toxicity itself and is an essential part of pharmacology and toxicology. They are taught to undergraduates under the drug dependence chapter of Forensic Medicine and Toxicology. The emergency care of such patients is done at casualty by post-graduates in Internal Medicine and further care in the Psychiatry department. At present, we don't have substance abuse testing labs in hospitals. Essential care of such patients in a routine manner is avoided due to medico-legal reasons. Substance abuse is a shared Medicine, Pharmacology, Forensic Medicine and Psychiatry domain. So, a multi-disciplinary approach is essential for proper care of such patients.

Pharmaceutical Drugs, Environmental Poisons and Toxicology lab

Indiscriminate use of drugs without proper prescription is rampant in the society. This results in toxicity, resistance, chronic renal diseases and various other pathologies. We don't have toxicology labs even at the tertiary care centre for the testing of chronic drug toxicity. Similarly, air pollution, water pollution, household poisons, and other factors resulting in chronic diseases and ill health are totally ignored areas of toxicology management. We need toxicology labs and research in this part to provide proper care for such cases.

Present practice in the care of Poisoning cases and Forensic Medicine and Toxicology

Understanding of the management of poisoning cases is developed among Indian medical graduates through their teaching of the Subject "Forensic Medicine and Toxicology" during their second or third professional. However, Forensic Medicine and Toxicology faculties are not practically involved in the care of poisoning patients. They develop their training only theoretically.

Poisoning cases at tertiary care centres are dealt mainly as emergency cases. Post-graduates in Internal Medicine provide emergency symptomatic care to the patients along with other routine emergency patients. At our hospital, ACMO (Assistant Casualty Medical Officer, mostly Post-graduate students of different disciplines posted temporarily in the casualty) sees all patients coming to casualty first, including poisoning cases. In poisoning cases, ACMO takes the patient's history, notes vitals, and categorizes the patient as stable or unstable. In case of an unstable poisoning patient, he gives a distress call to Anesthesia. The Anesthesia team does resuscitative measures and accordingly takes to a ventilator or stabilizes the patient. Once the patient is stable, Gastric lavage is done, and the patient is referred to the Medicine unit in case of an adult. Most antidotes for poisoning are unavailable. Routinely, Normal saline and sometimes charcoal are used. In the Medicine unit, routine blood testing for non-critical poisoning cases includes CBC, LFT, KFT, ABG and ECG (sometimes) are done. If nothing abnormal in the above parameters, only symptomatic supportive treatment is given, and the patient is observed for up to 24 hours and then discharged. In case of any abnormal parameters, the patient is managed in the ICU or CCU ward. In most cases, no MLC is prepared, and neither gastric lavage is preserved for MLC purposes. Also important to note is that all the care related to poisoning is done along with other emergency or ward cases. Poisoning cases in government or private are medico-legal cases, whether accidental, suicidal or homicidal. This becomes another reason for the cold approach in the care of such patients. Proper Medico-legal formalities are not done, and cases are usually sent to the home after recovery without proper medico-legal formalities.

Also, the doctors of Internal Medicine don't get any separate training for poisoning cases, but they manage patients like other routine emergency cases based on the knowledge of Forensic Medicine and Toxicology taught long back. So, overall, poisoning management is developed more theoretically than practically, i.e. preaching without practice. This results in a gross deficiency in the quality of care for poisoning cases. Most tertiary centres face the unavailability of toxicology management related medicines like activated charcoal, various antidotes, etc., as well as the availability of other resources and space constraints. To overcome this, Faculties and Residents of Forensic Medicine and Toxicology need to be involved in managing poisoning patients and dedicated centres for the care of Toxicology patients are the need of the hour, particularly at the tertiary care centres. Since toxicology care is multi-disciplinary, we propose a Drug and Toxicology unit.

Drug and Toxicology Unit

We are proposing one single centre as a Drug and Toxicology unit at every tertiary care centre, corroborating Internal Medicine, Forensic Medicine and Toxicology, Pharmacology, Psychiatry and various other disciplines dealing with all the aspects of Substance abuse, Drugs and Poisons for better care and compliance with such patients. It shall be established near the hospital's emergency department for better patient care and to admit patients of the above categories after their emergency care.

The unit shall have The Drug and Toxicology Division and the Substance Abuse and Mental Health Division. The following parts shall be attached to each division, as shown in Fig. 1.

Figure 1: Different centres under the Drug and Toxicology Division and Substance Abuse and Mental Health Division

Drug And Toxicology Division	Substance Abuse And Mental Health Division
Drug and Toxicology out-patient department Drug and Poison Information Centre (DPC) Diagnostic lab (Drug level estimation) Diagnostic lab (Poison level estimation) Drug and toxicology ward (Min. 20 bed) Antidote Bank	Substance abuse out-patient department Drug de-addiction centre and treatment (DDAC) Outreach and drop-in centres (ODIC) De-addiction drug pharmacy Integrated rehabilitation centre for addicts (IRCA)

Objectives

- A single centre dealing in all aspects of Drugs, Poisonous Substances, Substance abuse and mental health for the convenience of the patients and administration.
- Human resource and workforce development by training medical undergraduates, post-graduates, research scholars, and other staff in all aspects of drugs and toxicology for better running of such centers.

Benefits

- The facility will support the hospital and the public in better diagnosis and management of drug-related events, poisoning cases and substance abuse cases.
- It will have a Drug and Poison information centre that will provide knowledge about all the aspects of Drugs, Poisonous substances and Substance abuse to the public and health care providers, which will save the lives of many.
- All the drug and toxicology-related investigations shall be available in the Drug and toxicology unit. The earliest diagnosis of the Poison can help save the lives of many and support the investigating agencies in regulating the availability of such poisons.
- Unit shall estimate the drug levels through therapeutic drug monitoring (TDM) in case of life-threatening events and low therapeutic index drugs.
- De-addiction and treatment centre (DDAC), an integrated rehabilitation centre for addicts (IRCA), and Outreach and Drop-in centres (ODIC) will be beneficial in the prevention and management of Substance abuse cases.
- A de-addiction pharmacy and antidote bank will provide de-addiction drugs and poison antidotes that will be very helpful in patient care and compliance. De-addiction drug pharmacies will be very supportive of patient of substance abuse to avail their prescribed drugs at ease with following norms as per the NDPS Act, 1985.
- Teaching and training medical undergraduates and post-graduates in clinical pharmacology and toxicology can be imparted.
- Various courses like DM (Pharmacology), DM (Toxicology), DM (Psycho-pharmacology), DM (Addiction Psychiatry) along with PhD programs, MSc, DMLT and other related courses in clinical pharmacology, toxicology and Substance abuse may be undertaken.
- New Research avenues may be inculcated through this unit.
- We can collaborate with institutes of high eminence for further enhancement.

We can also generate good revenue from various sources, as mentioned in Table 1. For substance abuse management and care, the Department of Social Justice and Empowerment provides massive funding to such centres.

Table 1: Revenue for the above unit can be generated from the below sources

Drug And Toxicology Division	Substance Abuse And Mental Health Division
Ward admission charges	Ward admission charges
OPD charges	De-addiction pharmacy
Drug and poison estimation charges	EEG
Therapeutic Drug Monitoring charges	Bio-feedback
Different academic and training courses	MBT (Aversive Therapy)
Antidote bank charges	Motivational enhancement therapy
	Social skill Training
	Funding by department of Social justice and empowerment.

Our Proposal under HEFA

Higher Education Financing Agency (HEFA) is a joint venture of the Ministry of Education, Government of India and Canara Bank to finance the creation of capital assets in premier educational institutions in India. This idea of the Drug and Toxicology unit evolved from inter-departmental activity that started while preparing such proposals that will be a revenue-generating model. HEFA provides funds for infrastructure and equipment, with the condition that they return 10% of the amount in 10 years. In brief, we have proposed an infrastructure with the Ground and first floors having the Drug and Toxicology division and the Second and third floors having the Substance abuse and Psychiatry division (as shown below in Fig. 2-5).

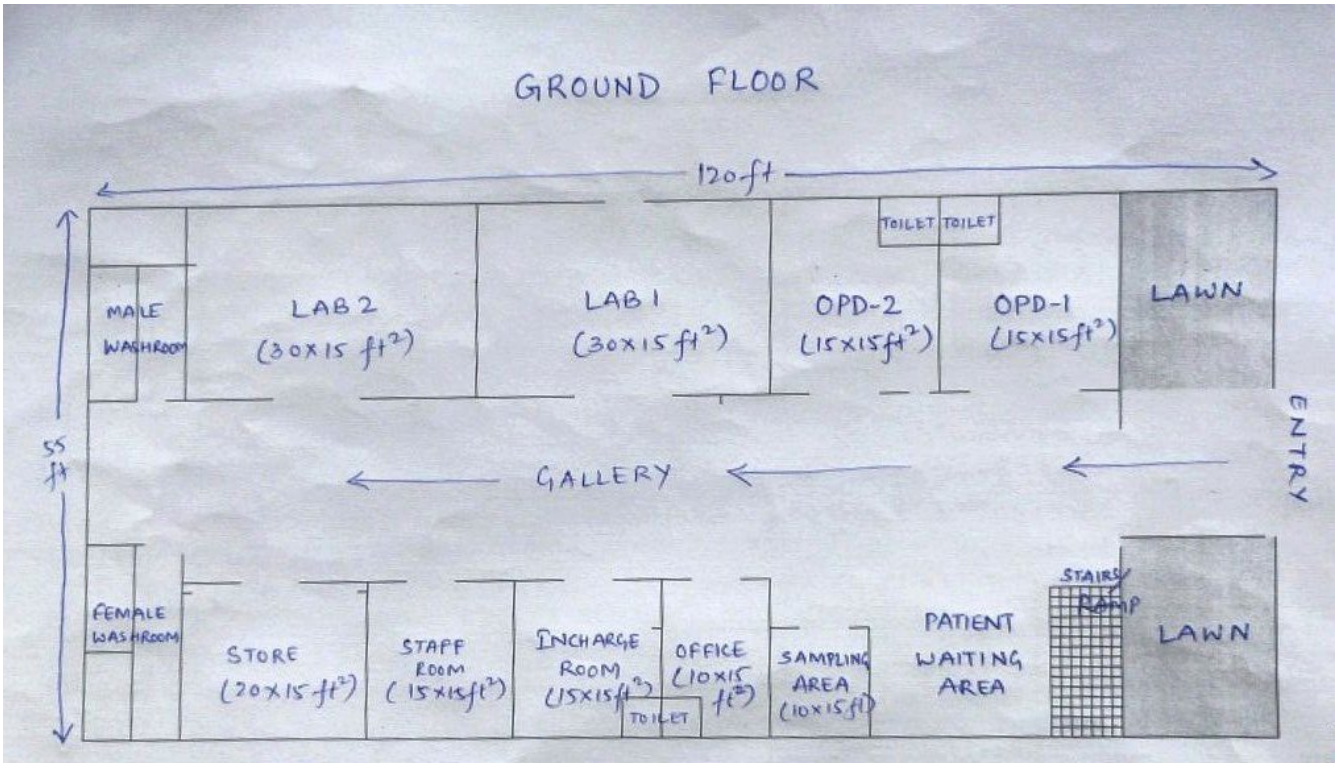

Figure 2 : Layout plan for ground floor

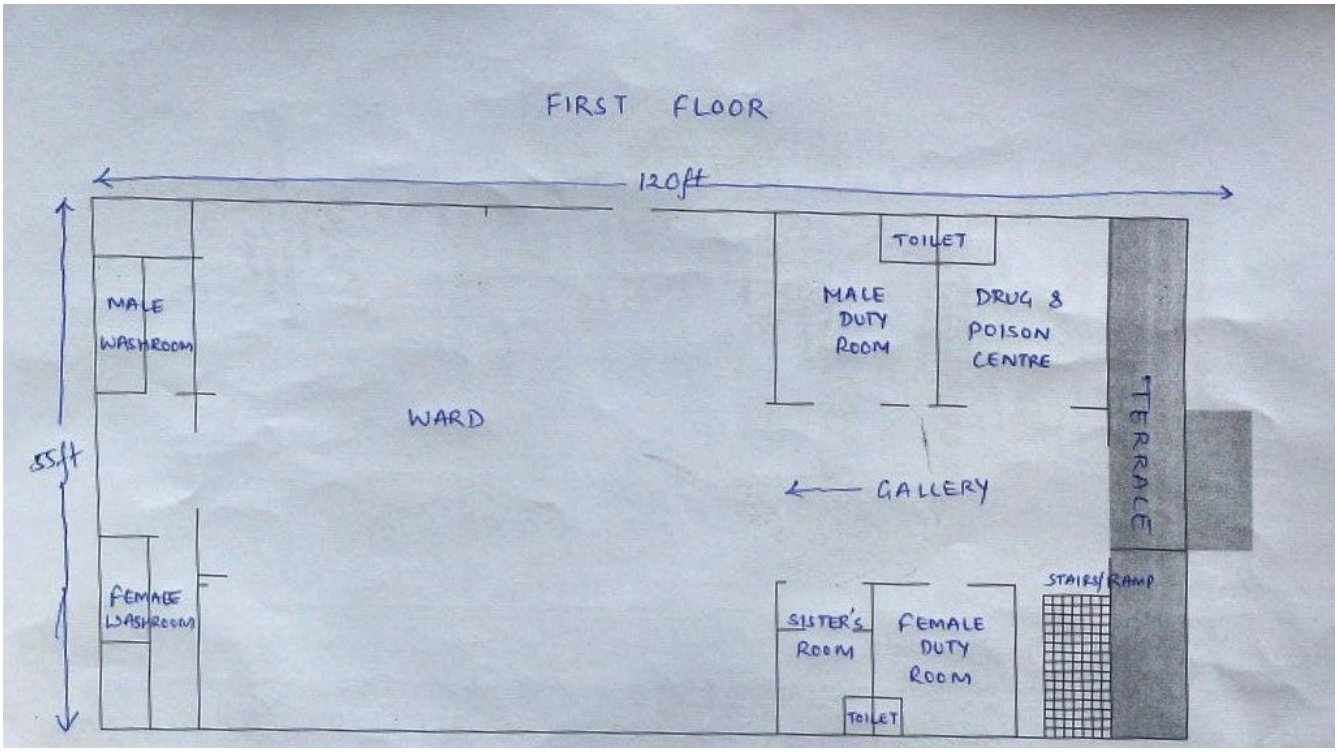

Figure 3 : Layout plan for first floor

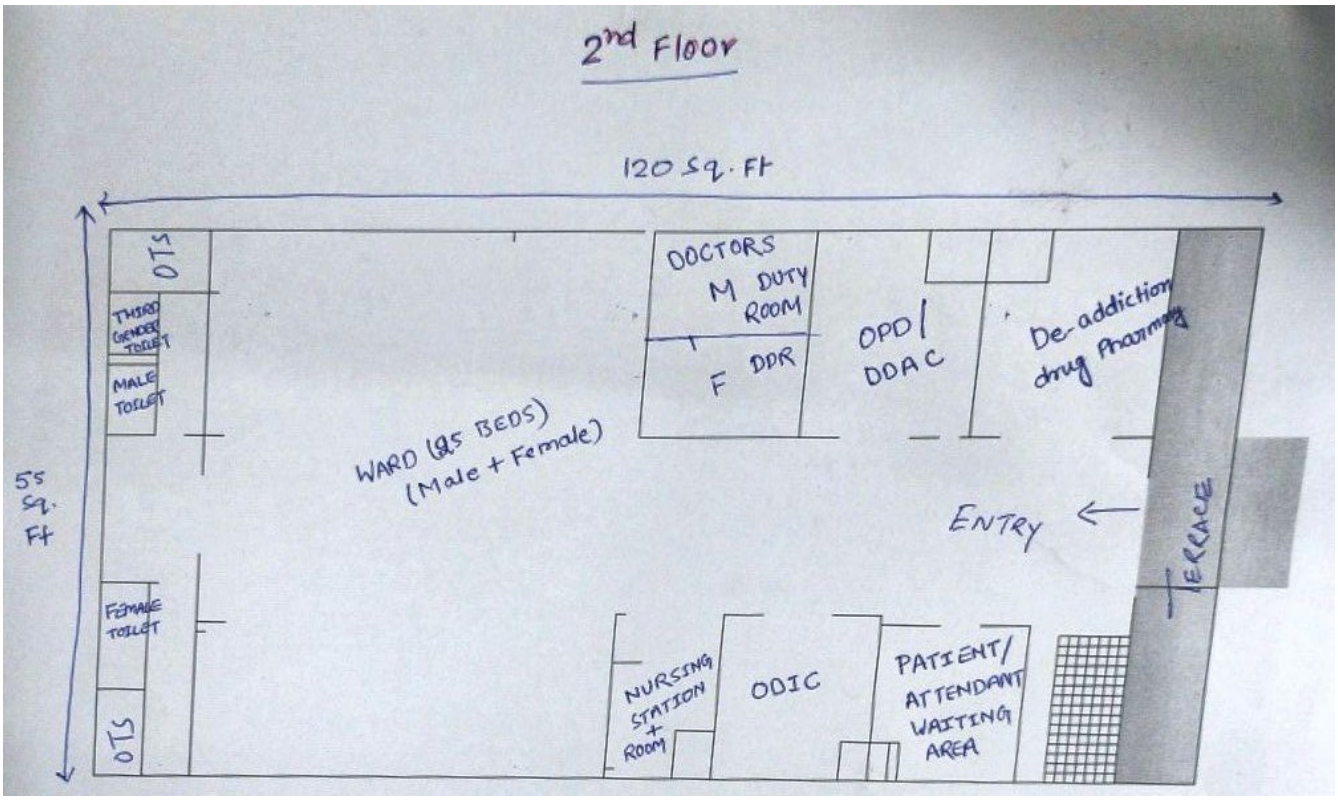

Figure 4 : Layout plan for second floor

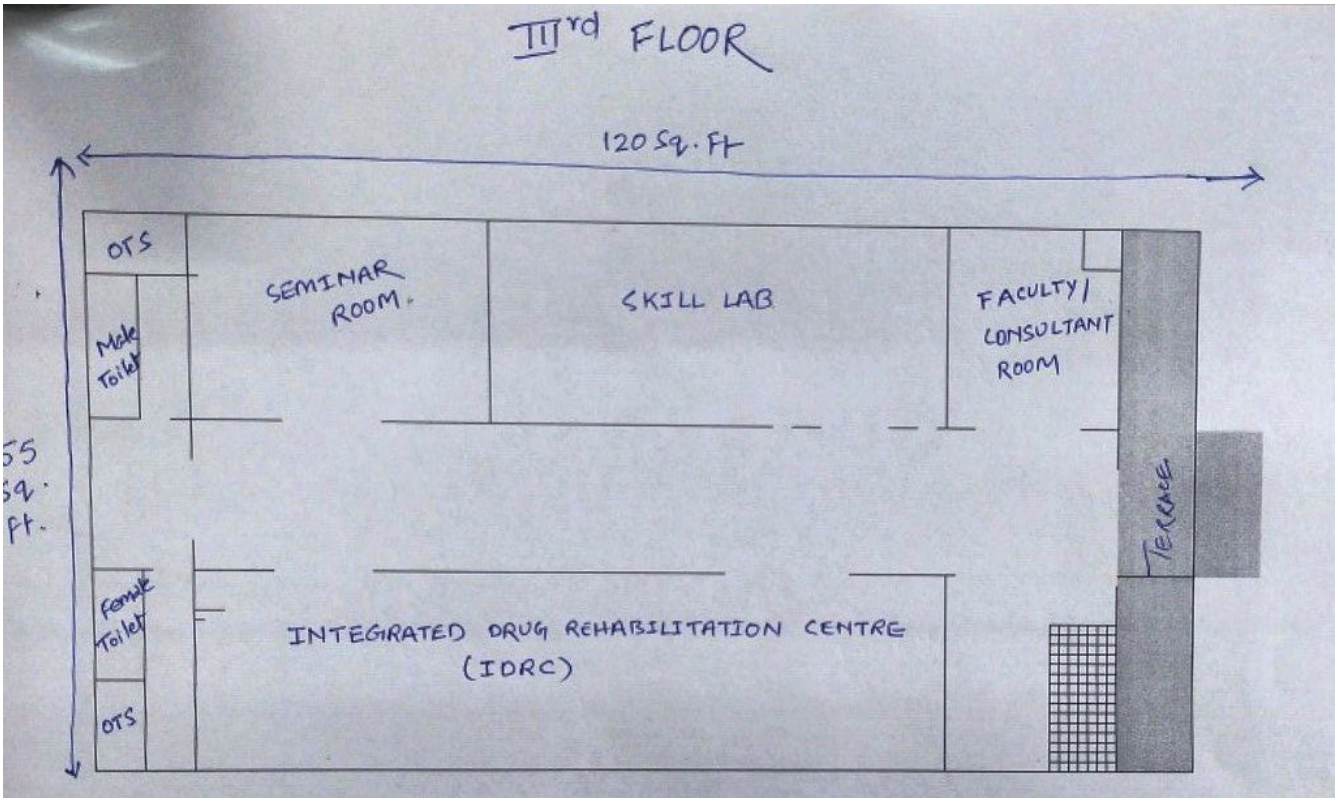

Figure 5 : Layout plan for third floor

Tentative Cost And Revenue Generation

We estimated the cost of infrastructure and equipment separately as per government norms for both divisions, along with tentative revenue generation as shown in Table 2.

Table 2: Tentative cost and revenue generation for the Drug and Toxicology unit as calculated forour proposal under HEFA

	Drug and Toxicology Division	Substance abuse and Mental health division
Tentative cost	Building (Ground + First floor) = 6.07 crores Instruments/Lab=20.30 crores Total cost= 26.37 crores	Building (Second + Third floor) = About 6 crores Instruments/ Lab= 6.35 crore Total cost= 12.42 crores
Tentative revenue	About 3150 patients were considered per month as per the current hospital load. Ward admission + OPD Charges + Lab investigations (Drug and Poison analysis + TDM) may generate a revenue of about 28.23 lakhs per month and approximately four crores per year.	About 750 patients were considered per month as per the current hospital load. Ward admission + OPD charges + De-addiction drug pharmacy + EEG + Biofeedback + MBT + Motivational enhancement therapy + Social skill training = 7,47,500 per month and 89.7 lakh per year further funding by the Ministry of Social Justice and Empowerment approximated to be about 1.46 crore per year for DDAC's, IRCA's, ODIC and Nasha Mukti Abhiyan. Total revenue generation = About 2.5 crore

Similar Successful Projects

As per our information, we could not find any such unit that incorporates drugs, toxicology and Substance abuser care under one centre all over India. However, many centres run separately for each division, with limited facilities.

Drug and Toxicology Division

All India Institute of Medical Sciences, Raipur, has started caring for poisoning patients under the Forensic Medicine Department and is also running a DM course in toxicology with two intakes per year. They are taking patients with poisoning cases after the emergency stabilization.

The Poison Information Centre is being run at various centres, mainly under the Pharmacology department like AIIMS, New Delhi, which runs the National Poison Information Centre with toll-free (1800 116 117).

Amrita School of Medicine, Cochin, runs the Poison Control Centre and Clinical Forensic Medicine with an Analytical toxicology laboratory attached and accredited by the NABL under the Forensic Medicine department. They are not directly involved in the treatment of patients.

Substance Abuse and Mental Health Division

National Drug Treatment Centre, Ghaziabad (NDDTC), under AIIMS, Delhi, has been established as the apex centre for the management of drugs and substance abuse disorders in India. The centre provides clinical care to patients through community-based OPD and In-patient care, speciality

clinics, wards, etc. Health education & preventive measures for substance abusers are done on a community basis. The centre works as a nodal centre for evaluating the prevalence of addiction in society. The centre is involved in staff training and human resources development to cater to such services nationwide, apart from testing, documentation and research in substance abuse disorders. PhD Programme and DM in the area of Addiction Psychiatry running under this centre. Also, they are designated as a WHO Collaborating Centre on Substance Abuse (12).

Further, 90 DDAC, 95 ODIC, and 375 IRCA are running under the Ministry of Social Justice and Empowerment all over the country at present (13).

Conclusion

Healthcare management is interdisciplinary and involves teamwork rather than individual activity. Both the poisoning patients and patients of substance abuse need the care of their mental health. All the poisoning cases and substance abuse cases are medico-legal cases and need the support of Forensic Medicine and Toxicology for Management and other formalities. Hence, the proposed Drug and Toxicological unit at tertiary care centres, with the collaboration of the Departments of Internal Medicine, Pharmacology, Forensic Medicine & Toxicology and Psychiatry for effectively managing substance abuse and poisoning patients, can be paramount. Also, their support in estimating the drug and poison level will help adequately plan healthcare management. Such centres can be nodal centres for the training and research on all aspects of substance abuse and toxicology, including general, pharmaceutical, occupational, environmental, household and others.

1. What is already known on the topic?

Answer: Poison information centre is a known concept where the diagnostic facility is also provided at many centres run under Pharmacology and Forensic Medicine. Various centres for the care and management of Substance abuse are also running under the various social initiatives by the WHO and the Government of India.

2. What this study adds?

Answer: The paper puts forward a concept of a single centre for the care and management of poisoning cases, substance abuse cases and accessibility of all the aspects of toxicology under a single umbrella, like a One-stop center in case of sexual assault cases. This will improve the quality of care of poisoning and substance abuse case. Also, this paper highlights the need of involvement of Forensic Medicine and Toxicology Department in the management of poisoning cases.

3. Suggestions for further development.

Answer: Such a Toxicology unit may be proposed under the different health schemes and government policies to be established at tertiary care centres for streamlined management of poisoning and substance abuse cases.

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