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BETTER EDUCATION. BETTER HEALTH.

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Introduction

The World Journal of Medical Education and Research (WJMER) (ISSN 2052-1715) is an online publication of the Doctors Academy Group of Educational Establishments. Published on a quarterly basis, the aim of the journal is to promote academia and research amongst members of the multi-disciplinary healthcare team including doctors, dentists, scientists, and students of these specialties from around the world. The principal objective of this journal is to encourage the aforementioned, from developing countries in particular, to publish their work. The journal intends to promote the healthy transfer of knowledge, opinions and expertise between those who have the benefit of cutting edge technology and those who need to innovate within their resource constraints. It is our hope that this will help to develop medical knowledge and to provide optimal clinical care in different settings. We envisage an incessant stream of information flowing along the channels that WJMER will create and that a surfeit of ideas will be gleaned from this process. We look forward to sharing these experiences with our readers in our editions. We are honoured to welcome you to WJMER.

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A WELCOME MESSAGE FROM THE EDITORS

Dear Reader,

It is our great pleasure to bring you the thirtieth edition of the World Journal of Medical Education and Research (WJMER). This edition consists of several intellectual articles in order to provide an insight into the innovative research that is being conducted around the world.

The opening article by Mehrotra et al. reports an exceptionally rare case of a three-day-old newborn diagnosed with both Ebstein's anomaly (EA) and double-outlet left ventricle (DOLV), two uncommon congenital heart defects. EA involves the abnormal placement of tricuspid valve leaflets, while DOLV is characterised by both the aorta and pulmonary artery originating from the left ventricle. The coexistence of these two conditions is extremely rare.

In the following article, Haque examines the recent expansion of postgraduate pharmacology seats in India, prompted by rising demand for skilled pharmacologists. While this move by the National Medical Commission (NMC) is a positive step toward strengthening healthcare and research, concerns remain about the uneven distribution of seats, quality of education, and exploitation of graduates. The paper stresses that although industry growth and policy support have driven demand, the rapid increase in MD pharmacologists has led to challenges such as low pay and burnout. It concludes with a call for careful monitoring to ensure that educational quality and professional well-being are not sacrificed in the pursuit of workforce expansion.

Foda et al. investigates final-year medical students' perceptions and performance regarding the Objective Structured Long Examination Record (OSLER) as a formative assessment tool at Newgiza University, Egypt. Survey results from 110 students revealed generally positive attitudes, with many finding OSLER practical, informative, and effective in highlighting both student strengths and teaching gaps. However, some students found it stressful (58.1%) and time-consuming (48.2%). Performance scores were moderate, with an average of 6.45 out of 10. The study concludes that OSLER is a valuable tool for enhancing clinical competence and guiding educational improvements.

Manimekalai analyses the challenges in implementing recent reforms in Indian medical education, such as faculty training programs and competency-based frameworks. While these changes began in elite institutions, applying them broadly has proven difficult due to faculty shortages and high student numbers. The piece highlights the disconnect between policy and practice, questioning the effectiveness of mandatory training modules and calling for more adaptable, context-sensitive reforms that reflect on-the-ground realities.

The study by Mukhopadhaya and Schofield aimed to develop and validate the Obstetrics and Gynaecology Educational Environment Measure (OGEEM), a tool tailored to assess the unique educational climate in O&G training, including factors like wellbeing, resilience, bullying, and inclusion. Using a four-phase methodology—literature review, Delphi method, trainee interviews, and surveys—the researchers created a 37-item questionnaire. The final tool demonstrated high reliability, with a Cronbach's alpha of 0.96, suggesting that OGEEM is a valid and reliable instrument for evaluating the educational environment in O&G settings.

McCormick introduces the concept of a "play triad"—curiosity, divergent thinking, and freedom to fail—as key elements for fostering an effective and healthy learning environment in medical education. It argues that traditional rote learning should give way to small group, collaborative learning focused on adaptability and clinical application. By encouraging curiosity, creative thinking, and embracing failure as a learning tool, educators can promote a growth mindset, creativity, and critical thinking, better preparing students for the complexities of medical practice.

The final article falls under public health education, highlighting the hidden dangers and the long-term health risks of fizzy drinks, energy drinks, and energy bars. This article is part of Doctors Academy's initiative to promote healthy behaviours in society, helping to prevent disease and address health disparities.

We sincerely hope that you find each article in this edition educational, enlightening and interesting to read.

Ms Karen Au-Yeung
Associate Editor

Dr Rebecca Williams
Associate Editor

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Clinical Report and Review
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World Journal of Medical Education and Research:
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Dreadful Coexistence of Ebstein's Anomaly with Double Outlet Left Ventricle in a Neonate – A Rarest of Rare Case Report with Review of Literature

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Abstract:
Ebstein's anomaly (EA) is a rare congenital heart disease that presents with apical displacement of the septal and posterior leaflets of the tricuspid valve. The incidence of Ebstein's anomaly is about 1 per 200,000 live births. Likewise, double-outlet left ventricle (DOLV) is a scarce congenital heart disease entity, seen in 5 in 100,000 new born comprising 1% of all congenital heart defects where both aorta and pulmonary artery arise from the left ventricle. Herein we are reporting a rarest of rare coexistence of EA with DOLV, in a 3 day old neonate.

Key Words:
Ebstein's Anomaly, Double-Outlet Left Ventricle, Congenital, Heart Disease, Pulmonary Atresia.

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Introduction

Ebstein's anomaly is a rare congenital heart disorder occurring in ≈1 per 200,000 live births and accounting for <1% of all cases of congenital heart disease.1,2

Ebstein's anomaly is characterised by various degrees of inferior displacement of the proximal attachments of the tricuspid valve (TV) ring, TV dysplasia, right ventricular dysplasia, and abnormalities of the distal attachments of the TV (Figures 1-4).

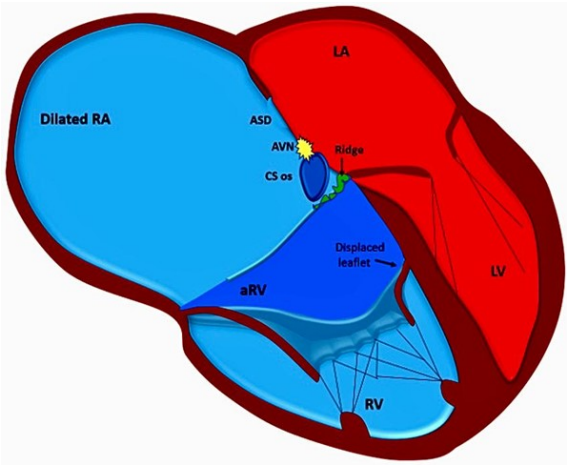

Figure 1*: Diagrammatic illustration of a heart with Ebstein's anomaly highlighting the anatomical abnormalities. The right atrium (RA) and tricuspid annulus is dilated. The septal tricuspid leaflet is apically displaced (arrow). The coronary sinus (CS) ostium is dilated, AV node (AVN) is irregular. ASD, atrial septal defect; aRV, atrialised RV; LA, left atrium; LV, left ventricle; RV, right ventricle.*

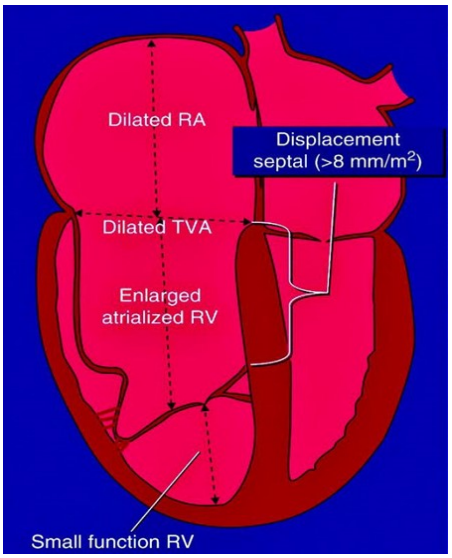

Figure 2*: Diagram of the "displacement index." The distance from the hinge point of the anterior mitral leaflet is measured to the hinge point of the delaminated septal tricuspid leaflet. This measurement divided by the body surface area equals the displacement index. A displacement index >8 mm/m2 is diagnostic of Ebstein anomaly. A small functional right ventricle (RV) is present inferior to the coaptation point of the tricuspid valve. RA, right atrium; TVA, tricuspid valve annulus.*

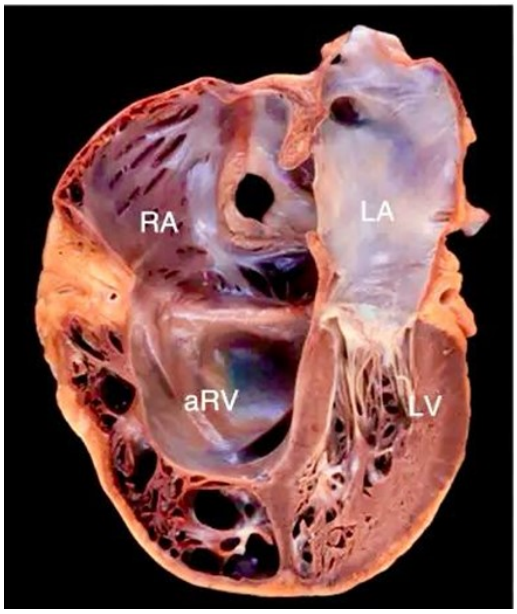

Figure 3: *Severe Ebstein's anomaly: pathology specimen aRV, atrialised right ventricle*

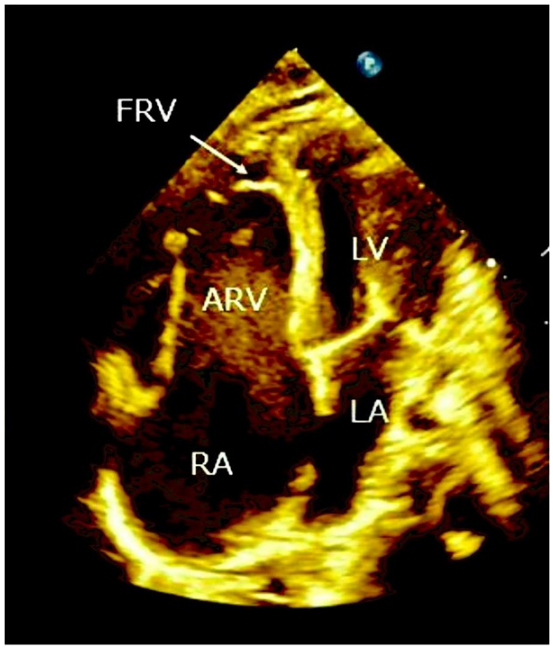

Figure 4: *Transthoracic echocardiography apical four chamber view. RA, right atrium; LA, left atrium; ARV, atrialised right ventricle; FRV, functional right ventricle.*

These morphologic deformities, in widely different degrees of severity, are associated with a variety of hemodynamic alterations leading to cyanosis, congestive heart failure, and arrhythmias. Refinement of tricuspid valvuloplasty and plication techniques[3,4] has opened the way to a satisfactory long-term outlook for the majority of older children and adults, who generally are only mildly or moderately symptomatic. Ebstein's anomaly presenting in neonates and young infants, however, has considerably less favorable natural history with a reported mortality rate of as high as 75%.[5,6]

Double-outlet ventricles with concordant AV connection account for 1% of all cases of congenital heart disease, and DOLV accounts for <5% of those cases[7,8] (Figure 5). The exact incidence is not known, but <1/200,000 live births have been reported.[7]

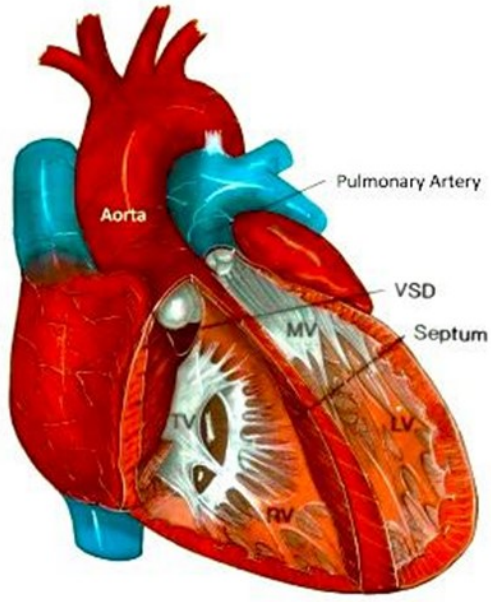

Figure 5(A): *Diagram of the most common form of DOLV showing situs solitus and AV concordance, rightward/anterior or right/lateral Ao with subvalvar or valvar pulmonary stenosis. MV, Mitral valve; TV, tricuspid valve.*

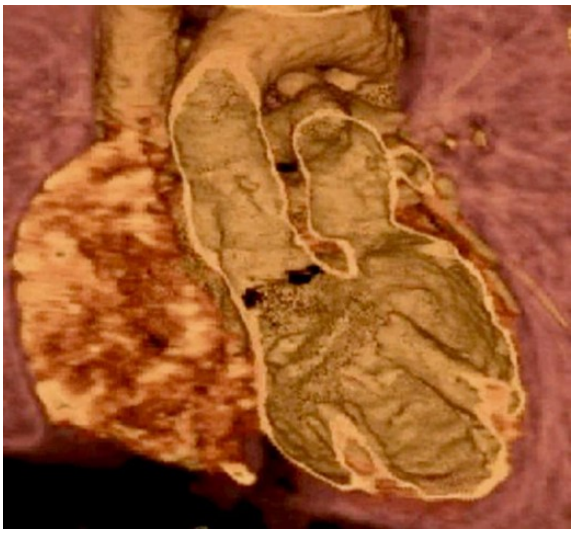

Figure 5(B): *Cardiac CT with 3D reconstruction of a patient with DOLV . The great arteries are lying side by side and originating from LV.*

After deep search of the literature, only a handful of cases of EA accompanying with DOLV could be encountered.[9-11] Chang et al.[9] reported a case of Ebstein's anomaly with DOLV, subaortic VSD and pulmonary stenosis in association with esophageal atresia with tracheo-esophageal fistula (so-called VACTERL association) in a neonate. The patient underwent Blalock-Taussig shunt. Bharati et al.[10] mentioned in their series of DOLV that there was only one autopsied case of associated Ebstein's anomaly. In that remarkable case the aorta emerged completely from the left ventricle over a well-developed conus. The pulmonary trunk overrode the septum over a posteriorly placed VSD, but emerged mostly from the left ventricle. The aorta was anterior and to the right of the pulmonary trunk and the latter was related to the mitral valve. The VSD was related to the tricuspid but not the mitral valve. This case was associated with fetal coarctation and PDA. Van Praagh et al.[11] narrated in their series of 109 cases of DOLV; only one autopsy case, presented with DOLV, sub aortic, VSD, pulmonary stenosis and Ebstein's anomaly.

It is noteworthy that all of these patients of DOLV coexisting with EA had a malignant course of illness, leading to very early mortality.

Case Report

A 3-day-old female neonate was referred to us for a comprehensive cardiovascular evaluation.

She was a full term delivery by Caesarean section and was delivered at a private hospital, from a primipara woman of 21 years of age. There was no history of maternal risk factors of CHD (obesity, diabetes, febrile illness, smoking, alcohol intake, teratogenic drug use, or radiation exposure). On clinical examination, the child was very "sick-looking" and was in congestive heart failure as evidenced by the presence of respiratory distress, intercostal retractions, tachypnea, facial edema and swelling in all the four extremities (Figure 6 A-D).

Figure 6: *(A) Facial edema, (B) Pectus excavatum, intercostal retractions, (C) Cyanosis of fingers, (D) Cyanosis of toes.*

She was of average built, highly irritable and persistently crying. Her weight was 3.7 kg, respiratory rate was 38/min, pulse rate was 98/mm, blood pressure was 80/60 mmHg, and SPO2 was 65% at room air. The child was cyanosed with bluish coloration of tongue, lips, all the fingers, and toes. There was a typical pectus excavatum deformity of the chest without any other musculoskeletal anomalies. All the peripheral pulses were normally palpable without any radio femoral delay. Rest of the systemic examination was unremarkable.

On cardiovascular examination there was presence of Grade 2/6 pansystolic murmur over precordium, best head over lower left sternal border.

Xray chest (AP view) (Figure 7) revealed massive cardiomegaly with a cardiothoracic ratio of 0.78. Moreover, there was severely diminished pulmonary blood flow.

Resting ECG exhibited sinus tachycardia with a ventricular rate of 98/min, partial RBBB with a right axis deviation, and "Himalayan" P waves (Figure 8).

Figure 7: *Xray chest A-P view: massive cardiomegaly with cardiothoracic ratio of 0.78 and pulmonary oligemia.*

Figure 8: *Resting ECG shows sinus tachycardia, partial RBBB, right axis deviation and "Himalayan" P waves.*

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Transthoracic color doppler echocardiography (Figures 9-14)

Standard transthoracic color doppler echocardiography was performed by the author in the classical subcostal, parasternal long axis (LX), parasternal short axis (SX), 4-Chamber (4CH), 5-Chamber (5CH) and suprasternal views. The echocardiographic characteristics of the neonate are outlined:

I. Levocardia
- Situs Solitus
- Concordant D-Bulboventricular Loop
- AV Concordance
- DOLV – Both great arteries are arising from LV with D-malposition of great arteries.
- Left Aortic Arch
- Confluent pulmonary arteries.
- Normal pulmonary venous drainage.
- Normal systemic venous drainage.

II. EBSTEIN'S ANOMALY - (Carpentier Type D)
- TRICUSPID REGURGITATION (SEVERE)
- Septal leaflet of TV is apically displaced.
- Tricuspid septal leaflet displacement of 13 mm from the mitral insertion.
- The anterior leaflet is large and immobile with the tips adhered to the lateral wall of RV.
- TV orifice is displaced downwards into the RV cavity.
- Low velocity TR jet present (TR velocity 1.69 m/sec).
- On color flow mapping TR jet area 4.15 sq.cm; occupying 45 % of RA area, central jet .

III. ATRIAL SEPTAL DEFECT (LARGE)
- Ostium secundum type
- Size 6.3 mm
- Rt. to Lt. Shunt.

Superior and inferior rims of ASD are flail and hyper mobile.

IV. DOUBLE OUTLET LEFT VENTRICLE
- Both great arteries are arising from the left ventricle.

V. D-MALPOSITION OF GREAT ARTERIES
- Aorta is anterior and to the right of pulmonary artery
- Pulmonary artery is posterior and to the left of Aorta

VI. ATRESIA OF THE PULMONARY VALVE along with
- Severe hypoplasia of branch pulmonary arteries.
  MPA(D) 3.0 mm
  LPA(D) 2.2 mm
  RPA(D) 2.3 mm
- A thin solitary aorta-pulmonary collateral was visualized connecting descending aorta to the left pulmonary artery with left to Rt shunt.

VII. Huge RA (Atrialised RV)
- Dilated RV
- Normal biventricular systolic function.
- Normal LVEF = 50 %
- No regional wall motion abnormality present.

VIII. No evidence of ventricular septal defect, coarctation of aorta or bicuspid aortic valve.

Figure 9: *Subcostal View shows dilated RV and huge RA.*

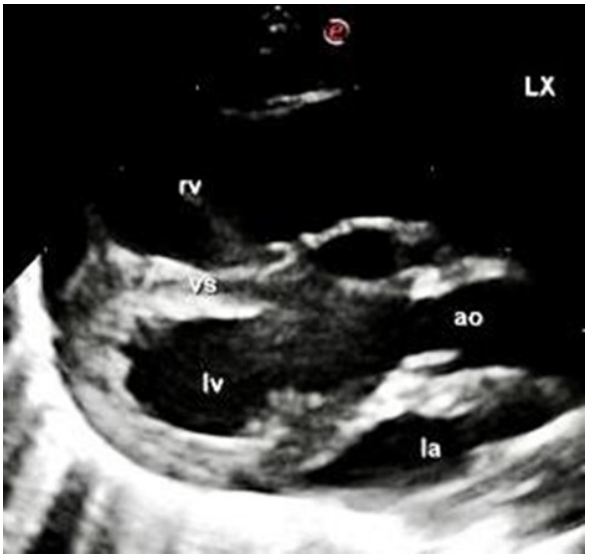
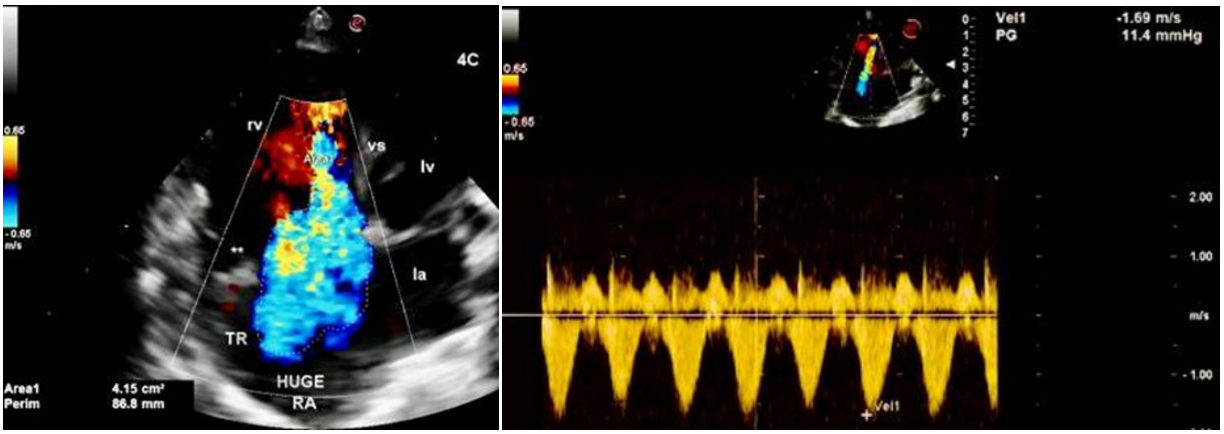


Figure 10: *LX View exhibits dilated RV and normal LV size.*

A B

Figure 11: ***(A)*** *4CH View(systolic frame) displays normal sized LV,LA, dilated RV, Huge RA (Atrialised RA), solitary oblique arrow denotes large anterior leaflet adhered to the lateral right ventricular free wall , dilated TV annulus is measuring 37.4 mm (designated as 1), sl and two oblique arrows indicate rudimentary septal leaflet of TV ,tricuspid septal leaflet displacement from mitral insertion is 13.2 mm (designated as 2), which is consistent with severe grade of Ebstein's anomaly - (Carpentier Type 4).* ***(B)*** *4CH View (systolic frame) - this image represents enlarged view of Figure 11(A).*



A B

Figure 12: ***(A)*** *4CH view . On color flow mapping a severe tricuspid regurgitation (TR) jet is visualised.* ***(B)*** *On continuous wave Doppler analysis across TV , a low velocity signal of TR jet is delineated(TR velocity 1.69 m/sec).*

Figure 13: *Subcostal View exhibits a large ostium secundum ASD with huge RA.*

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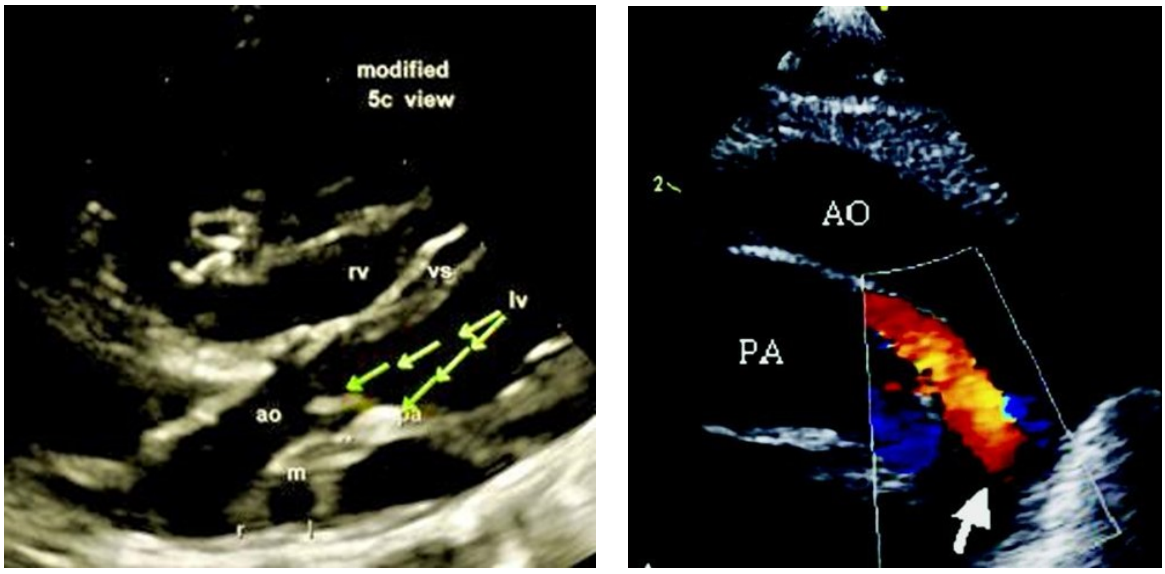


A *B*

Figure 14: (A) *Modified 5CH View clearly delineating Double Outlet Left Ventricle with D- malposition of great arteries- (aorta is anterior and to the right of pulmonary artery) with atresia of the pulmonary valve (designated as pa and **) with hypoplasia of main, left and right pulmonary arteries, m, main pulmonary artery, l, left pulmonary artery, r, right pulmonary artery.* ***(B)*** *Suprasternal View. A solitary aorto-pulmonary collateral is delineated by thick arrow.*

The detailed transthoracic echocardiography illustrates an extremely rare and lethal combination of neonatal Ebstein's Anomaly, DOLV, large ASD with right to left shunt, atresia of the pulmonary valve, hypoplatic branch pulmonary arteries, severe TR with advanced heart failure and hypoxia. Hence, the patient's parents were advised for admission and management of the child at a tertiary care pediatric cardiovascular institution.

Review of Literature

Tricuspid Valve Anatomy in Ebstein's Anomaly

Normally, the TV has three valvar leaflets referred to as the anterosuperior, the septal and the mural leaflets. However, in EA, the anterosuperior is the largest, redundant anterior leaflet, which contains fenestrations. It stretches from the infundibulum anteriorly to the inferolateral wall posteriorly, whereas the septal leaflet, the smallest, arises medially from the annulus above the interventricular septum. Posterior leaflet attaches along the posterior margin of the tricuspid annulus from the septum to the inferolateral wall.[12] Embryonic failure of delamination of the septal, inferior and anterior leaflets of the TV results in the apical displacement of the tricuspid leaflets to the underlying RV myocardium. Such failure in delamination creates the characteristic downward (apical) displacement of the functional orifice and dilation of the atrialised right ventricle (aRV), with various degrees of hypertrophy and thinning of the wall. This malformation is characterized by the displacement of the points of attachment, or the hinges, of the septal and posterior leaflets into the right ventricle, away from the atrioventricular junction. As the anterosuperior leaflet has a different developmental origin, its junctional hinge usually retains a normal position.[13,14] The failure in delamination also results in various degrees of displacement of TV leaflets, and the movement of the tricuspid hinge points both anteriorly and toward the right ventricular apex. The adherent portions of the valvar leaflets usually have little or no motion. This generally leads to tricuspid regurgitation or rarely to stenosis.[2,12,15] Chordae tendinea of anterior leaflets are generally short, tethered, poorly formed and severely deformed. Therefore, the only mobile leaflet tissue is displaced into the right ventricular outflow tract (RVOT), where it may cause obstruction or forms a large sail-like intracavitary curtain. The septal and mural leaflets are usually rudimentary, dysplastic or may be absent due to failure of delamination. These leaflets may be freely mobile or adhered (tethered) to the endocardium.[16] The maximal displacement is at the commissure level between the mural and septal leaflets of the TV.[14] Apical displacement of the septal leaflet by at least 8 mm/m2 of body surface area is considered as a diagnostic feature of EA in the echocardiographic evaluation.[2] There is often a marked dilatation of the true TV annulus, and the aRV separating this true annulus from the

functional right ventricle (fRV).[2,17]

Atrium and Atrioventricular Annulus

The right atrium is usually very much dilated, and the right atrioventricular junction, or true annulus of the TV, is enlarged circumferentially. The valve of the inferior vena cava (eustachian valve) is often very prominent.[14,16]

Right Ventricle

Because of the displaced TV, the RV is divided into two regions in Ebstein's anomaly: the inlet portion [atrialised right ventricle (aRV)] and the trabecular or outlet portion [functional ventricle (fRV)]. The inlet portion, directly involved with the malformation, is functionally integrated with the right atrium, whereas the outlet portion constitutes the functional RV. The aRV usually has a thinner wall than the fRV and may account for more than half of the RV volume in extreme cases, instead of its usual location in one-third of the RV.[13,16] There is often a marked dilatation of the true TV annulus and a large chamber separating this annulus from the functional RV. Two-thirds of EA cases possess dilated RV, which commonly involve the functional RV apex and outflow tract. In some cases, RV dilatation is so significant that the ventricular septum bulges leftward, compressing the left ventricular (LV) chamber, and may cause episodic left ventricular outflow tract (LVOT) obstruction.[13] In such cases, the short-axis view demonstrates a circular right ventricle and a crescentic left ventricle.

Ebstein's Anomaly-Classifications

There are multiple classifications for the description of the anatomic severity of EA. The amount of displacement and tethering of the leaflets and the degree of RV dilatation are assessed.

1. Adult congenital heart disease anatomical and physiological classification (ACHD AP)

The new adult congenital heart disease anatomical and physiological (ACHD AP) classification system[18] defines EA as a lesion of anatomically moderate complexity (anatomical type II) (Table 1).

CHD Anatomy
I. Simple Native disease Repaired conditions II. Moderate Complexity Repaired or Unrepaired conditions III. Great Complexity (or Complex)
Physiological Stage
NYHA FC I symptoms NYHA FC II symptoms NYHA FC III symptoms NYHA FC IV symptoms

Table 1. *ACHD AP Classification (CHD Anatomy + Physiological Stage = ACHD AP Classification)*

ACHD, adult congenital heart disease; AP, anatomic and physiological; FC, functional class.

A recent publication showed that such anatomical cardiac malformations carried an operative mortality risk varying from 1% (0.69–1.37%) in the physiologically lowest level of severity (IIA), to 5% (3.05-7.91%) in the highest level of severity (2D).[19]

2. Simple Classification

Mild
Moderate
Severe

The amount of displacement and tethering of the largest and the degree of RV dilation are assessed

3. Clinical classification of Ebstein's anomaly

Ebstein's anomaly is classified into three types according to the clinical features, heart catheterisation data, angiocardiographic and anatomical findings obtained on surgery or autopsy.[20]

Tricuspid Stenosis Dominant Type

- Cyanosis
- Severe symptoms
- Mild to moderate cardiomegaly
- "Double ball sign" on angiocardiography

Tricuspid Insufficiency Dominant Type

- Cyanosis
- Mild symptoms
- Severe cardiomegaly
- "Double ball sign" pesent

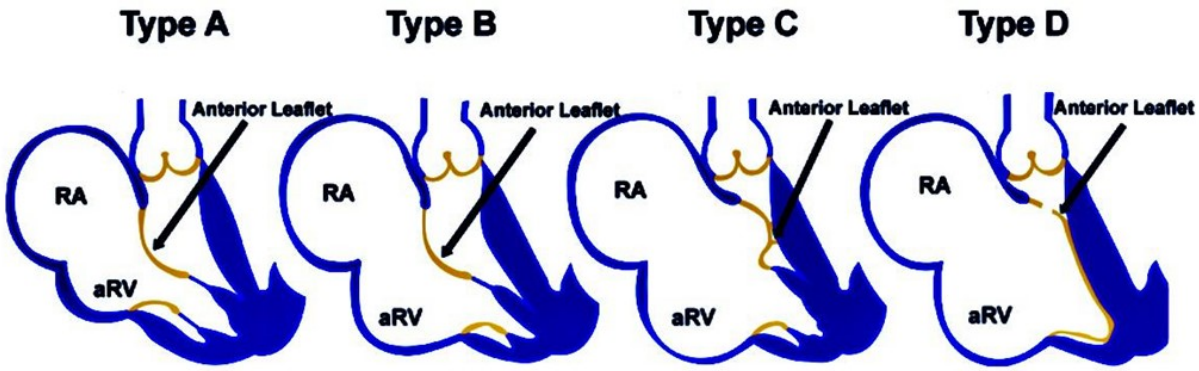
Mild Type

- Mild Cyanosis
- No or mild symptoms
- Mild to moderate cardiomegaly
- No "Double ball sign" present

4. Carpentier Classification

According to the classification of Carpentier,[3] EA was divided into four types (Figure 15).

- Type A: Mild apical displacement of the tricuspid valve leaflets with the adequate functional right ventricle.
- Type B: Moderate apical displacement of the tricuspid leaflets with a moderate reduced size but adequate functional right ventricular volume with freely mobile anterior leaflet.
- Type C: Severe apical displacement of the tricuspid valve leaflets with a small functional right ventricle. Anterior leaflet movement is restricted due to abnormal chordal attachments that cause right ventricular outflow tract obstruction.
- Type D: Complete non-delamination of the tricuspid valve leaflets with almost complete atrialisation of the right ventricle, only infundibular portion of the right ventricle remaining: "Tricuspid sac".



	A	B	C	D
Septal/Posterior Leaflet Displacement	Mild	Moderate	Severe	Extremely Severe (Tricuspid Valve Sac)
Anterior Leaflet	Normal Morphology and Mobility	Abnormal Attachments with Normal Mobility	Partial Adhesions to the Ventricular Free Wall and Restricted Motion	Severe Adhesions to the Ventricular Wall
"Atrialized" Ventricle	Small/Preserved Function	Moderate/Reduced Function	Large/Reduced Function	Very Large/Minimal Function
Functional Ventricle	Normal/Preserved Function	Reduced/Preserved Function	Small/Reduced Function	Infundibulum/Depressed Function

Figure 15: *Carpentier Classification*

Celermajer Classification

The Celermajer classification of EA[21] was according to echocardiographic measurements calculating the ratio of the combined area of the right atrium and aRV to that of the fRV and the left heart in a four-chamber view at the end diastole (GOSE = RA + aRV/fRV + LV + LA) . This is an echocardiographic grading score for neonates with Ebstein's anomaly, The Great Ormond Street Echocardiography (GOSE) score, with grades 1 to 4 (Figure 16). Increasing severity, that is, a higher grade, was associated with a high mortality rate. This classification is particularly helpful with neonatal Ebstein's anomaly.[22] GOSE score and mortality rate are demonstrated in the Table 2.

GOSE score	Ratio	Mortality rate (%)
Grade 1	<0.5	5–8
Grade 2	0.5–0.99	8–10
Grade 3	1–1.49	45 (acyanotic) 100 (cyanotic)
Grade 4	>1.5	100

***Table 2**: GOSE score and mortality rate*

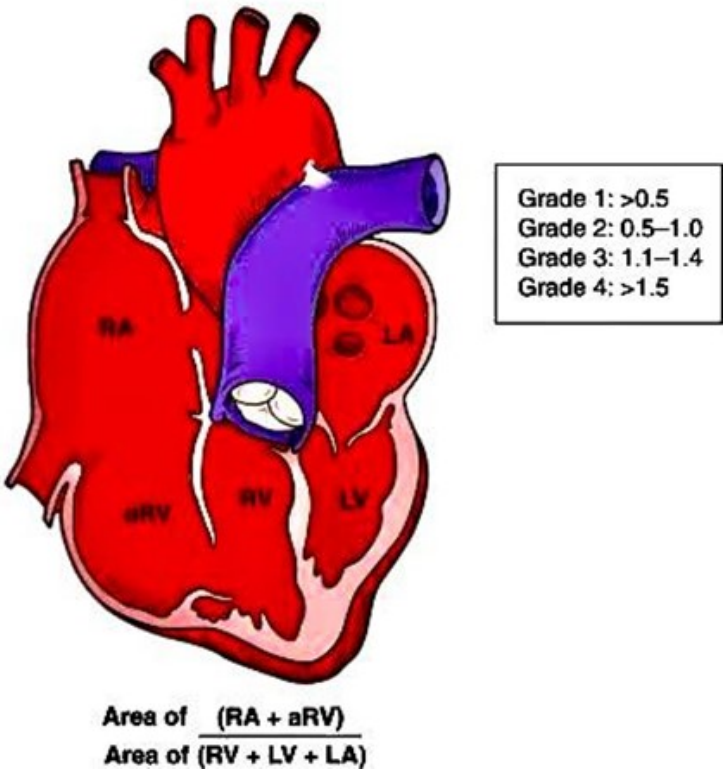


***Figure 16:** GOSE score. RA, right atrium; aRV, atrialised right ventricle; LA, left atrium; LV, left ventricle.*

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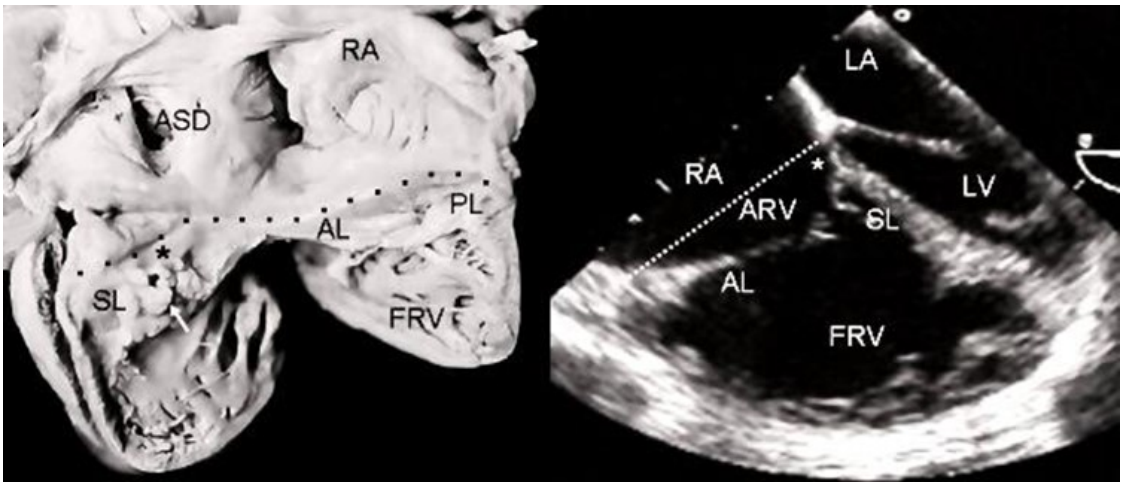
6. SAS prognostic score

The SAS (Simpson Andrews Sharland) score is another prognostic score[23] that uses as a weighted model to predict mortality. The cardiothoracic ratio, the Celermajer index, pulmonary valve flow, duct flow, and left-right ventricular ratio are graded 0, 1, 2, points each to generate a score. In studies, a score of 5 predicted 100% mortality, and a score of less than or equal to 3 predicted 91% survival.

7. Becker's dysplasia classification

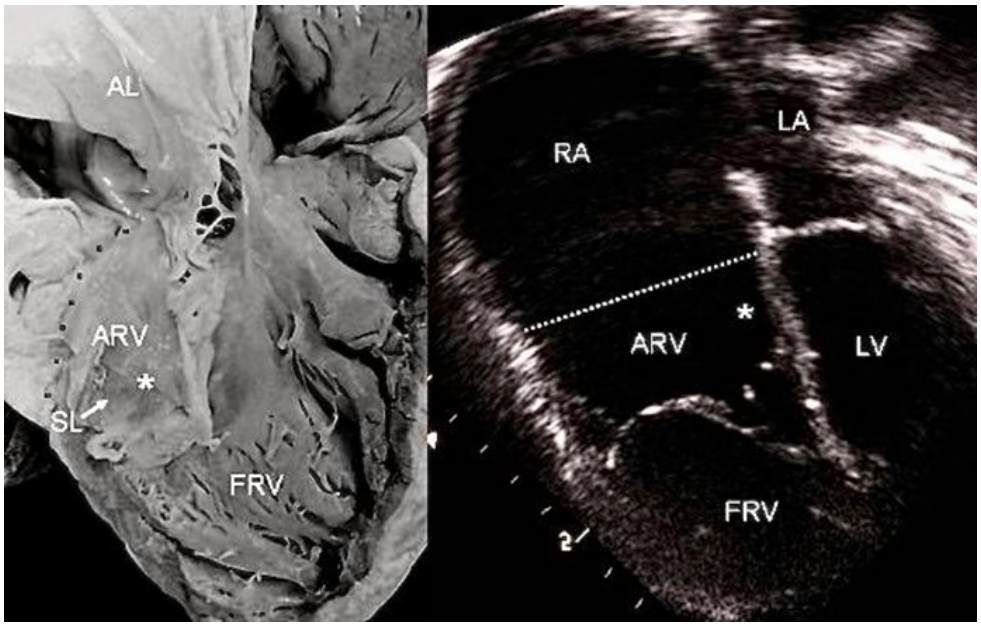
A modified version of Becker's dysplasia classification[24] of Ebstein's valve is described (Figure 17-19). The degrees of leaflet tethering to the ventricular wall were calculated according to their extension:

Grade I - up to 25% of the distance from the atrioventricular junction to the apex.
Grade II - 25-50% of the distance
Grade III - > 50% of the distance.



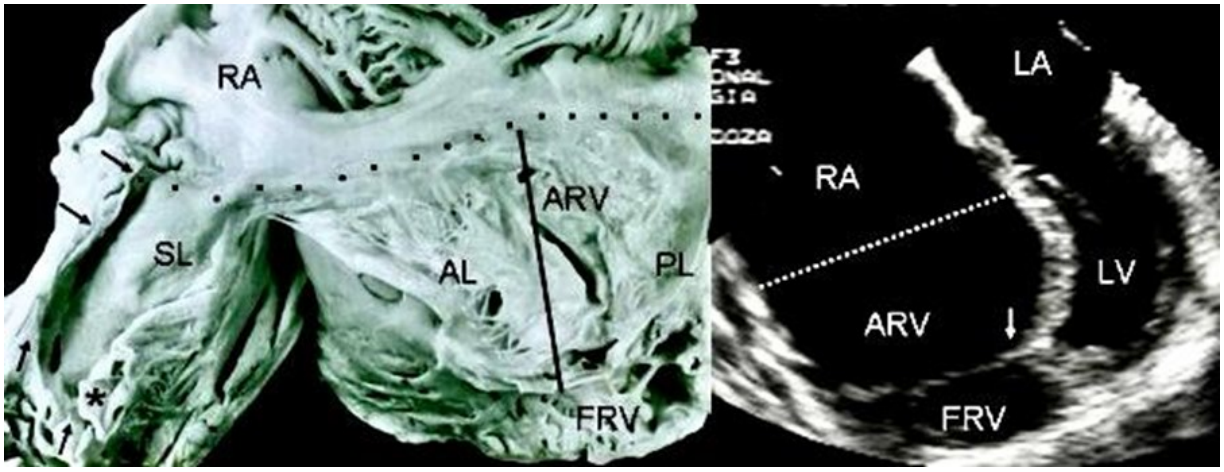
A B

Figure 17: *(A) Internal view of the right chambers of a heart with Ebstein's anomaly with mild (Grade I) tethering of the septal leaflet (asterix). Thickening of the free portion of the leaflet (arrow) is evident. The dotted line represents the atrioventricular junction where the tricuspid fibrous ring is located. (B) The 4 chamber echocardiographic image shows the same type of findings seen in the anatomic specimen. The dotted line indicates the plane of atrioventricular junction. RA: Right atrium; ARV: Atrialised right ventricle; FRV: Functional right ventricle; AL: Anterior leaflet; PL: Posterior leaflet; SL: Septal leaflet; ASD: Atrial septal defect; LA: Left atrium; LV: Left ventricle.*



A B

Figure 18: *(A) Internal view of the right ventricle shows grade II tethering of the tricuspid septal leaflet (asterisk). (B) The 4 chamber echocardiographic image shows discontinuous leaflet tethering similar to the anatomic specimen.*



A *B*

Figure 19: *(a) Internal view of the right chambers of a heart shows grade III tethering of the tricuspid septal leaflet. The arrows point to tethering of the posterior leaflet. The flap of the free portion of the septal leaflet can be seen (asterisk) as well as the redundant anterior leaflet with 3 accessory openings. (b) The 4 chamber echocardiographic image shows the same features and the greater size of the atrialised portion of the right ventricle with significant reduction of the functional portion.*

Pathophysiology in the neonate

The pathophysiology and clinical presentation vary depending on the anatomical severity of the disorder. At its extreme end (types C and D), there is severe displacement of the tricuspid valve leading to an ineffective RV and severe valve regurgitation. This results in severe cardiomegaly with consequent lung hypoplasia and cyanosis as most of the systemic venous return in shunted across the atrial septal defect. Persistent elevation in pulmonary vascular resistance (PVR) is a major impediment of successful antegrade ejection from the smaller and less effective RV. The pulmonary blood flow is hence dependent upon the patent ductus arteriosus as there is no effective flow generated by the small RV ("physiologic pulmonary atresia"). Often there can be true right ventricular outflow tract obstruction ("anatomical pulmonary atresia"). The left ventricle is often pancaked by the enlarged RV. When the disease is less severe (types A and B), the RV can establish effective antegrade flow as PVR decreases and this is accompanied by clinical improvement in symptoms. Neonates with severe tricuspid regurgitation or gross cardiomegaly who are otherwise asymptomatic have an associated mortality of 45% within the first year of life without intervention.[22,25] The natural history of EA during infancy is thus gloomy. However, those who survive early childhood can expect reasonable longevity. When the disease is mild, symptoms are related to exercise intolerance from progressive tricuspid regurgitation later in adult life.

Transthoracic Colour Doppler Echocardiography

Echocardiography remains the mainstay in the diagnosis of patients with Ebstein's anomaly and guides management decisions regarding surgical strategy. Each patient with the Ebstein anomaly should undergo a comprehensive transthoracic echocardiogram that allows evaluation of the right atrial size, right ventricular size, and function, the accurate anatomy of the tricuspid valve, the right ventricular outflow tract, the pulmonary valve, the atrial and ventricular septum, and left ventricle. This evaluation is crucial for decision-making before surgical repair.[26] Table 3 summarises the important details elucidated by echocardiogram that need to be evaluated in patients with Ebstein's anomaly.

Tricuspid valve anatomy and function.	• Inferior displacement of septal and posterior/inferior leaflets • Attachments/tethering of leaflets • Rotation of the tricuspid valve orifice toward the right ventricular outflow tract. • Coaptation point of TV leaflets • TV function – stenosis and insufficiency • Muscularisation of leaflets
Right ventricle	• Size of atrialised RV • Functional RV size • Abnormal appearing RV myocardium • RV function (2D wall motion, tissue Doppler measurements, TR gradient, 3D measures) • Abnormalities of right ventricular outflow tract
Pulmonary valve	• Pulmonary valve morphology • Pulmonary atresia (functional or anatomy) • Insufficiency • Pulmonary stenosis • Supra-valvar pulmonic stenosis
Right atrium	• Atrial septal defect • Right atrial size
Left ventricle	• Compression/abnormal geometry • LV diastolic dysfunction • Abnormal septal wall motion • Left ventricular non-compaction
Associated lesions	• Ventricular septal defect, ASD or PFO • Congenitally corrected TGA • AV canal defect • Pulmonary stenosis/atresia (20-25%) • PDA • TOF • DORV • Right sided aortic arora, COA, • MV prolapse and stenosis • WPW syndrome • Down, Marfan, Noonan syndromes

LV, left ventricle; RV, right ventricle; TGA, transposition of the great arteries; TV, tricuspid valve.

The most sensitive and specific echocardiographic finding to diagnose Ebstein's anomaly is the apical displacement of the septal leaflet of the tricuspid valve. This can be best seen in apical four-chamber views by echocardiography. When indexed to the body surface area, the distance between the hinge point of the septal leaflet of the tricuspid valve and the anterior leaflet of the mitral valve is called the displacement index. A displacement index above 8 mm/m2 is considered diagnostic of Ebstein's anomaly.[26]

Prognosis and outcome

Celemajer et al.[22] reviewed the presentation and outcome of 50 patients with neonatal Ebstein's anomaly seen from 1961 to 1990. The majority (88%) presented in the 1st 3 days of life; cyanosis (80%) was the most common presenting feature. Associated defects, present in 27 infants (54%), included pulmonary stenosis in 11 and atresia in 7. Nine patients (18%) died in the neonatal period; there were 15 late deaths (due to hemodynamic deterioration in 9, sudden death in 5 and a noncardiac cause in 1) at a mean age of 4.5 years (range 4 months to 19 years). Actuarial survival at 10 years was 61%.[22]

According to the GOSE criteria, cardiac death occurred in 0 of 4 infants with grade 1, 1 (10%) of 16 with grade 2, 4 (44%) of 9 with grade 3 and 5 (100%) of 5 with grade 4. In a multivariate analysis of clinical and investigational features at presentation, echocardiographic grade of severity was the best independent predictor of death. Augmented cardiothoracic ratio, presence of associated defects and increasing severity of GOSE score was significantly associated with death in a univariate analysis model.[22]

Similarly, Lee et al.[27] reviewed 20 consecutive neonates (10 male, 10 female) who ranged from 0 to 6 days old on admission. The authors concluded that 1) No identifiable risk factors reliably predict mortality in this population with complex congenital heart disease; 2) The presence of associated cardiac lesions and severe tricuspid valve displacement are possible predictors of the need for surgical palliation in the neonatal period; 3) Early mortality from neonatal Ebstein's Anomaly has dramatically improved int the current era.

Neonates with Ebstein's anomaly have a high early mortality rate and those surviving the 1st month of life remain at high risk of late hemodynamic deterioration or sudden death.

Conclusion

The natural history of neonatal Ebstein's Anomaly is extremely variable, but symptomatic presentation in the neonatal period has been associated with a high mortality rate of ≈50%.[27] Prior studies suggest that outcome in neonates may be related to the degree of tricuspid valve displacement, severity of tricuspid regurgitation, cardiothoracic ratio, associated cardiac defects and oxygen saturation. Management of neonates with Ebstein's anomaly may therefore be based on the knowledge of echocardiographic grade and the presence or absence of associated defects. Most neonates with grade 1 or 2 disease and no associated defects will survive the neonatal period with supportive treatment only and have a good prognosis; those with associated defects may require surgery for these and may also expect a good outcome . Neonates with grade 3 or 4 disease have a much worse outlook; many die in early life, and tricuspid valve surgery may not alter the poor prognosis. Those who do survive the 1st month of life must have careful clinical follow-up, with particular attention to left ventricular function and cardiac rhythm.

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Increase in PG Seats in Pharmacology: A Boon or a Bane?

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Abstract:
The realm of pharmacology is vital to medical science, encompassing drug development, therapeutic interventions, and pharmacovigilance. This review explores the effects of the recent increase in postgraduate (PG) pharmacology seats to meet the growing demand for skilled pharmacologists. Historically, Indian medical institutes have undervalued pharmacology postgraduate research training programmes, leading to a significant gap in quality and quantity. The NMC's initiative marks a crucial first step in addressing this issue, aiming to enhance the quality of healthcare and research in India.
An overview of the historical and current scenarios reveals a significant rise in pharmacology seats across India, with notable increments post-2020. This uneven distribution among institutions raises questions about resource allocation and the quality of education.
The review also highlights factors contributing to the increased demand for pharmacologists, including the growth of the healthcare industry, advancements in medical science and technology, and supportive government policies. Despite these positive aspects, the sudden influx of MD pharmacologists has led to potential exploitation by the industry and private medical institutions, resulting in compromised salaries, overburdening, and negative impacts on their physical, psychological, and social well-being.
The review concludes by acknowledging the policymakers' efforts to increase the skilled MD pharmacology workforce. Still, it emphasises the need for vigilance regarding real outcomes versus hypothetical ones. If outcomes are compromised, it is crucial to revisit, rethink, re-strategise, and reconsider the increase in MD pharmacology PG seats without compromising the quality of education.

Key Words:
Healthcare, MD Pharmacology, Medical Education, NMC Policies, PG Seats

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Introduction

The realm of pharmacology stands as a cornerstone in the edifice of medical science, offering right from the new drug development to the therapeutic interventions.[1] This itself is evident in the quality maintenance of pharmacology as a branch, which is a guarantee for quality therapeutics, new drug development, and the process in therapeutics, along with pharmacovigilance, which is covered directly or indirectly by pharmacologists.[2] This creates a need for optimal and dignified quality pharmacologists. Until now, most Indian medical institutes were giving less weightage to pharmacology postgraduate research training programmes in terms of quantity (and quality too).

The National Medical Commission (NMC) in India, keeping in mind the importance of the number of quality pharmacologists, has recently initiated the increase in postgraduate seats in medical institutions, a much-needed first attempt towards fulfilling the gap.

The significant increase in PG seats demonstrates the government's dedication to delivering accessible and high-quality healthcare to all citizens, reflecting the nation's strong commitment to improving public health.[3] This growth also invites careful consideration of its consequences, leading us to question whether the expansion of PG seats is ultimately beneficial or detrimental to the field.

In modern healthcare, pharmacology encounters various challenges, emphasising the necessity to integrate pharmacology education into clinical practice, rather than confining it to traditional lecture halls.[4] Pharmacology plays a vital role in finding solutions by connecting research with practical medicine.[5] However, the effectiveness of drug treatments depends on having skilled pharmacologists who know how to find, develop, and use medicines properly, not just on scientific knowledge alone.[6]

In this attempt, the NMC has issued several guidelines for the allotment and training of postgraduate medical students in institutions under the guidance of faculty members.[7] Relaxation of the number guided by each faculty member is one of them. Institutions started utilising this and getting sanction for more and more MD pharmacology seats based on the number of faculty members in the department (plus facility for research and teaching). Though it was a welcome and much-needed initiative from the NMC, it probably fails to justify the over-sanction of seats.

Every human has limitations, including an MD pharmacology guide. A faculty member can focus justifiably on a certain number of topics as well as scholars. We have reviewed in this, the advantages and possible disadvantages of increasing the MD pharmacology seats in medical institutions.

Historical Perspective

The journey of pharmacology as a discipline has seen substantial evolution. Initially, the number of institutions offering PG programmes in pharmacology in India was limited, with stringent admission criteria and fewer seats. Over the years, recognising the critical role of pharmacologists, educational institutions and governments have expanded the number of PG seats.

Current Scenario

In the previous decade, significant investments have been made to increase medical seats, with a 109% increase in PG seats since 2014, bringing the total to 65,335 PG seats across the country. To further increase PG seats, support has been extended to states in two phases. In phase I, 72 medical colleges in 21 States/UTs were approved for an increase of 4,058 PG seats, and in phase II, 60 colleges were approved for an increase of 3,858 PG seats.[8]

Current Scenario of Pharmacology Seats

In 2012, 553 MD Pharmacology seats were accredited by the Medical Council of India (MCI).[9] Currently, there are a total of 1,296 MD Pharmacology seats across India, with a notable increase in seats occurring in most colleges after 2020.[10]

Disparity in the Increase of PG Pharmacology Seats Among Colleges

Institutional dormant policy led to disparity in the number of PG seats in pharmacology in medical colleges. Not only this, but the over-enthusiasm shown by the institutions led to the sanction of a mammoth number of MD pharmacology postgraduate seats (in some institutions, more than 20 per year, with more than 70 postgraduates at one time in the department). As we can appreciate, the research and teaching facilities of institutions in India maintaining the quality research and teaching of more than 20 students (justifiable work allotment) become a huge challenge. This has started a deterioration in the quality of PG output candidates in day-to-day discipline, teaching, and research environment.

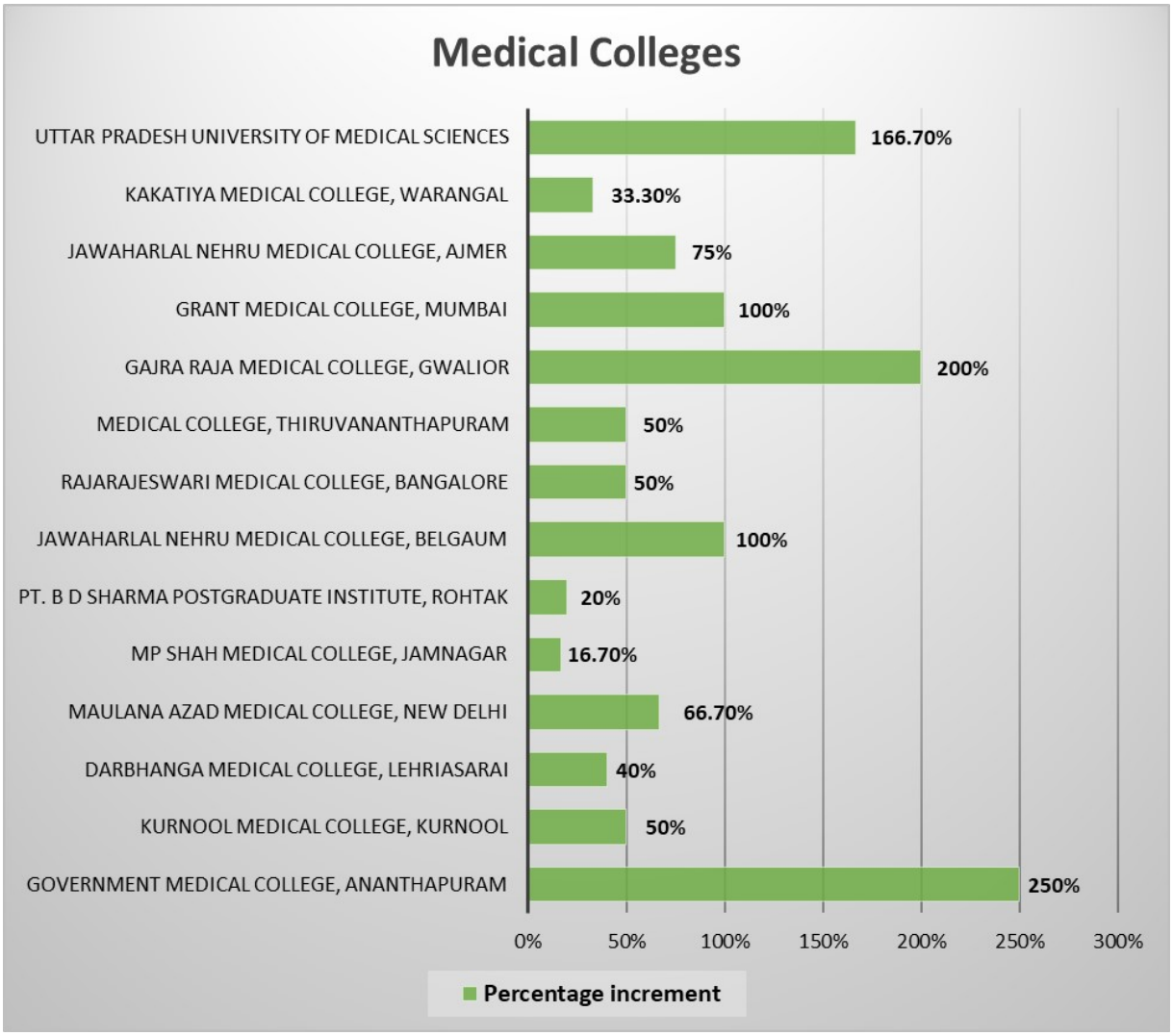
Overview of the Sudden Increase in PG Pharmacology Seats

The total has risen to 1,296 MD pharmacology seats nationwide. A significant portion of this increase has been observed after 2020, with certain colleges experiencing a more substantial rise than others. This uneven distribution raises questions about resource allocation, faculty availability, and the quality of education across different institutions.

S. No	College Name	State	Seats Previously Recognized	Seats Increased to (2023-2024)	Percentage Increase
1.	Government Medical College, Ananthapuram	Andhra Pradesh	2	7	250%
2.	Kurnool Medical College, Kurnool	Andhra Pradesh	2	3	50%
3.	Darbhanga Medical College, Lehriasarai	Bihar	5	7	40%
4.	Maulana Azad Medical College, New Delhi	Delhi	3	5	66.7%
5.	MP Shah Medical College, Jamnagar	Gujarat	6	7	16.7%
6.	Pt. B D Sharma Postgraduate Institute, Rohtak	Haryana	5	6	20%
7.	Jawaharlal Nehru Medical College, Belgaum	Karnataka	2	4	100%
8.	Rajarajeswari Medical College, Bangalore	Karnataka	4	6	50%
9.	Medical College, Thiruvananthapuram	Kerala	4	6	50%
10.	Gajra Raja Medical College, Gwalior	Madhya Pradesh	1	3	200%
11.	Grant Medical College, Mumbai	Maharashtra	3	6	100%
12.	Jawaharlal Nehru Medical College, Ajmer	Rajasthan	4	7	75%
13.	Kakatiya Medical College, Warangal	Telangana	3	4	33.3%
14.	Uttar Pradesh University of Medical Sciences	Uttar Pradesh	3	8	166.7%

Table 1: *Steady increment in PG Pharmacology Seats in Certain Colleges (2023-2024)*

The colleges listed in Table 1 show a steady and planned increase in the number of PG pharmacology seats. These increments generally range from 16.7% to 250%, reflecting a measured approach to expanding capacity, likely based on available resources and incremental adjustments.

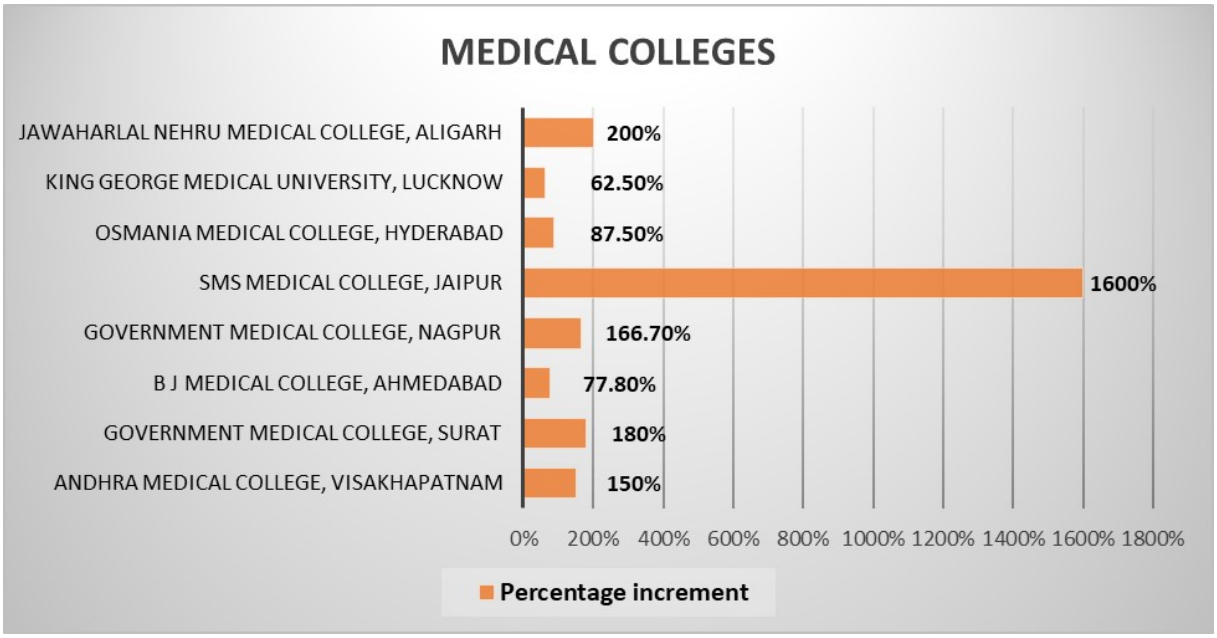


Graph 1: *Percentage Distribution of steady Increment in MD Pharmacology Seats Across Medical Colleges (2023-2024)*

S. No	College Name	State	Seats Previously Recognized	Seats Increased to (2023-2024)	Percentage Increase
1.	Andhra Medical College, Visakhapatnam	Andhra Pradesh	4	10	150%
2.	Government Medical College, Surat	Gujarat	5	14	180%
3.	B J Medical College, Ahmedabad	Gujarat	9	16	77.8%
4.	Government Medical College, Nagpur	Maharashtra	6	16	166.7%
5.	SMS Medical College, Jaipur	Rajasthan	1	17	1600%
6.	Osmania Medical College, Hyderabad	Telangana	8	15	87.5%
7.	King George Medical University, Lucknow	Uttar Pradesh	16	26	62.5%
8.	Jawaharlal Nehru Medical College, Aligarh	Uttar Pradesh	4	12	200%

Table 2: Misaligned Increment in PG Pharmacology Seats (2023-2024)[10]

The colleges listed in Table 2 experienced a more abrupt increase in PG pharmacology seats, with percentages ranging from 62.5% to an astonishing 1600%. These sudden increments might indicate a rapid response to increased demand, changes in policy, or a strategic push to quickly expand medical education capacity.



Graph 2: *Percentage Distribution of misaligned Increment in MD Pharmacology Seats Across Medical Colleges (2023-2024)*

Factors Contributing to the Increase

Demand and Supply: The significant growth of the healthcare industry has driven a higher demand for pharmacologists.[11] As medical treatments become more complex and evidence-based, there is a growing need for experts who can manage intricate medication therapies, conduct advanced pharmacological research, and contribute to the development of new drugs.[12] The expanding role of pharmacologists in clinical settings, pharmaceutical companies, pharmacovigilance and research institutions highlights the necessity for more trained professionals in this field.[13]

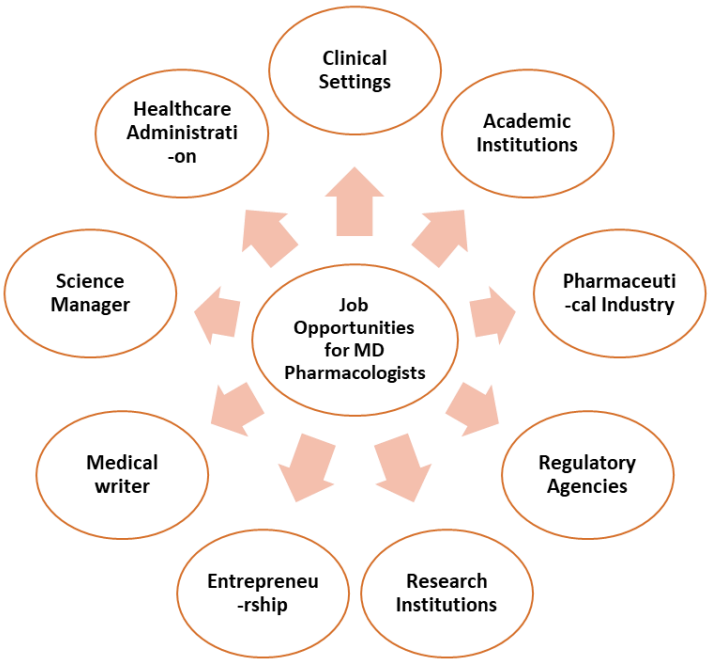


Figure 1: *Career Paths for MD Pharmacologists; Diverse Opportunities in Healthcare and Beyond*

According to the NMC, job prospects for medical pharmacologists include positions in academia, the pharmaceutical industry, clinical research organisations, government research institutions, regulatory bodies, and roles as scientific writers or science managers. Therefore, a postgraduate (MD) student in pharmacology should be well-prepared to fulfil the job requirements in these diverse fields.[14]

The goal of postgraduate education is to develop specialists who deliver high-quality healthcare and contribute to scientific progress through research and training.[14]

Government Policies

Various governmental initiatives and supportive policies have played a crucial role in the expansion of postgraduate (PG) seats in pharmacology. The NMC allows the initiation of post-graduate courses alongside undergraduate courses in medical colleges, as per the current regulations for new institutions, course additions, and seat increases. These regulations include:

1. The Post-Graduate Medical Education Regulations (PGMER)
2. Teachers Eligibility Qualifications
3. Minimum Standards of Requirements (MSR)
4. Curriculum needs as updated by the Post-Graduate Medical Education Board (PGMEB)

Non-teaching government hospitals can also start PG courses without an undergraduate programme if they meet these criteria. The procedures for increasing PG seats are the same as those for new course permissions, and such increases are automatically recognised for student registration. Standards of medical education are monitored annually, and colleges must pay fees for evaluation and affiliation. The MSR guidelines ensure the necessary infrastructure, staff, and clinical materials are in place for comprehensive PG training, with updates notified by PGMEB.[7]

Being human, the guide, as well as the postgraduate faculty, has their limitations in maintaining the quality of teaching, research, and discipline among postgraduate students. On the other hand, PG students are also human, and if not supervised properly, it leads to the development of poor quality in research, teaching, and discipline, resulting in output not up to the expectations.

Technological Advancements

Advances in medical science and technology have significantly broadened the scope of pharmacology.[15] The introduction of new therapeutic areas, such as gene therapy, personalised medicine, and biologics, along with innovative drug delivery systems, has created a demand for specialized knowledge and skills.[16] These advancements require a larger pool of trained pharmacologists who can navigate the complexities of modern drug development and therapeutic practices. However, the sudden increase has often resulted in poor outcomes due to insufficient faculty, inadequate infrastructure, and compromised training quality.

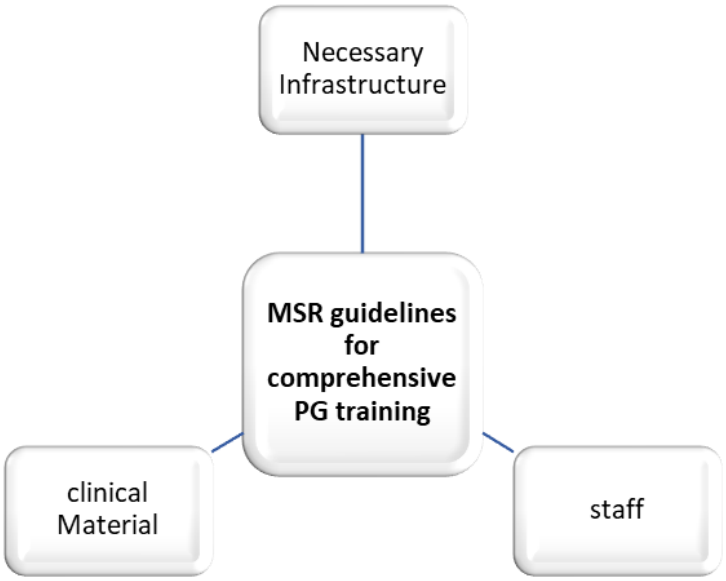


Figure 2: *Minimum requirements according MSR (Minimum Standards of Requirements) guidelines*

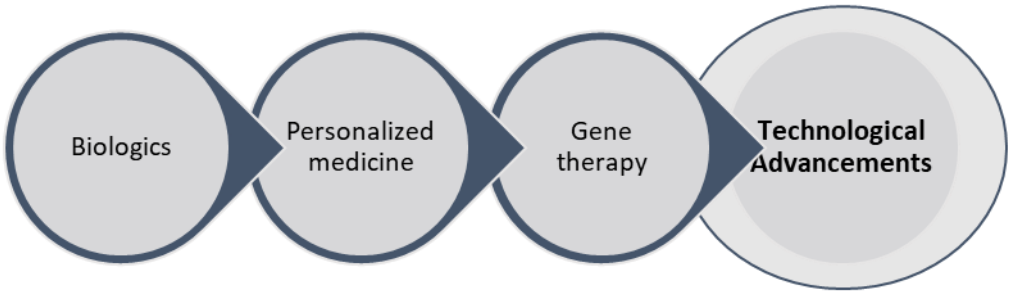


Figure 3: *Technological advancements in the field of Pharmacology*

These advancements require a larger pool of trained pharmacologists who can navigate the complexities of modern drug development and therapeutic practices. However, the sudden increase has often resulted in poor outcomes due to insufficient faculty, inadequate infrastructure, and compromised training quality.

The Possible Impacts of Sudden Increased Supply of MD Pharmacologists

Misalignments in the Training and the Job Expectation:

The possible exploitation of new budding pharmacologists by the industry and private medical institutions in the form of compromised salaries and perks and overburdening can lead to compromised self-esteem and negatively impact their physical, psychological, sociological, and social life. This will lead to:

1. Increased competition: With more MD pharmacologists entering the job market, competition for available positions would intensify, making it harder for individuals to secure desired jobs.

2. Lower salaries: An oversupply of pharmacologists could lead to downward pressure on salaries and benefits as employers take advantage of the larger pool of candidates.

3. Job market saturation: Some regions or institutions may experience an oversupply of pharmacologists, leading to underemployment or unemployment for some professionals.

Academic and Educational Effects:

1. Overcrowded programmes: An oversupply of pharmacologists can lead to overcrowded programmes and researches, potentially straining resources and diminishing the quality of education. Many medical colleges include "research institution" in their name for administrative purposes, yet their actual research activities are minimal.[17]

2. Balanced student-to-faculty ratio: An increased number of pharmacologists could improve the student-to-faculty ratio (provided good quality) in academic institutions, potentially leading to better educational outcomes. However, if not managed properly, it could also result in overcrowded programmes and strained resources, potentially impacting the quality of education.

Pharmaceutical Industry Effects:

1. Efficiency in trials: With more pharmacologists available, pharmaceutical companies could conduct clinical trials more efficiently and effectively, accelerating the time-to-market for new drugs.

2. Job security issues: Increased supply might lead to job cuts or reduced job security as companies try to balance workforce sizes with their needs**.**

3. Market saturation: Overabundance of pharmacologists can lead to saturation in certain areas, reducing job opportunities.

Economic and Societal Effects:

1. Healthcare cost reduction: Improved medication management and reduction in adverse drug reactions could lower overall healthcare costs, benefiting the economy and patients.

2. Migration issues: An oversupply in one region may lead to migration challenges as pharmacologists seek employment in other regions or countries.

Professional Development and Career Path Diversification:

1. Skill underutilisation: High competition may result in some pharmacologists working in positions that do not fully utilise their skills and training.

2. Career frustration: Increased difficulty in finding desirable positions may lead to professional dissatisfaction and frustration.

3. Entrepreneurial opportunities: Some pharmacologists might pursue entrepreneurial opportunities, such as starting their own consulting firms, research labs, or healthcare technology companies.

Institutional and Policy Effects:

1. Policy adjustments: Regulatory bodies and healthcare institutions might adjust policies and guidelines to accommodate the increased supply of pharmacologists, ensuring optimal utilisation of their

skills. However, increasing the number of doctors alone may not resolve the issue, as many are unwilling to work in the government health system, especially in rural and remote areas.[18]

2. Funding and grants: Increased competition for research funding and grants could arise, necessitating higher standards and more innovative proposals to secure financial support.

Colleges must now submit details on an NMC portal, which will be publicly accessible to ensure transparency and replace physical inspections. These measures aim to enhance transparency, efficiency, and accountability in assessing medical institutions, ensuring compliance with regulations.[22]

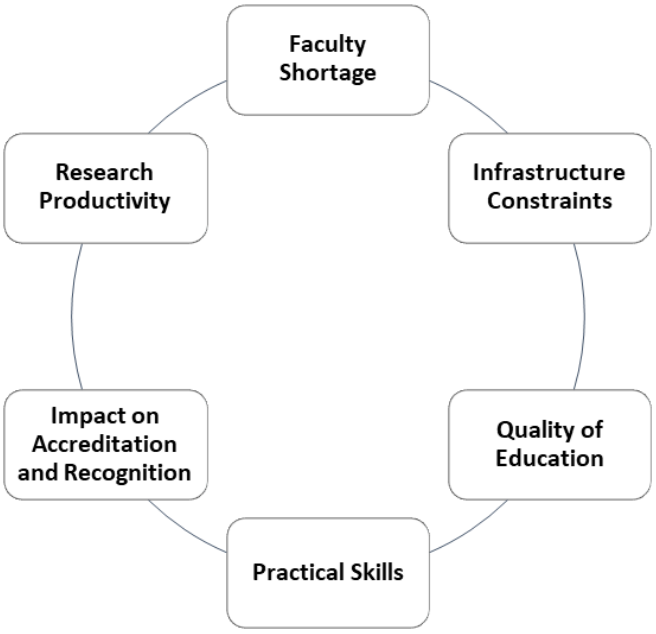


Figure 4: *Factors contributing to poor medical performance after sudden increase in MD Pharmacology Seats*

Factors Contributing to Poor Medical Performance After Sudden Increase in MD Pharmacology Seats

The sudden increase in PG pharmacology seats can lead to poor medical performance due to several factors. Faculty shortages may arise, resulting in compromised teaching quality and limited mentorship opportunities.[19] Infrastructure constraints, such as inadequate laboratory facilities and overcrowded classrooms, can hinder practical training and research experiences. This may affect the overall quality of education, leading to a gap between theoretical knowledge and practical skills. A good infrastructure is necessary for active research, which in turn exposes students to good research methods and practices.[20] Additionally, poor medical performance can jeopardise programme accreditation and recognition, impacting the institution's reputation and future prospects.[21]

NMC Introduces Stricter Penalties for False Information in Medical Colleges

Though NMC has started penalising the institutions for not adhering to the guidelines, this does not guarantee quality education and research specialisation for postgraduates.

Conclusion

The surge in postgraduate (PG) seats in pharmacology reflects both the growing demand for skilled professionals in healthcare and the government's commitment to expanding medical education. However, this expansion brings with it a myriad of challenges and considerations.

While the increase in PG seats presents opportunities for improved access to specialised care, enhanced research output, and economic benefits, it also raises concerns regarding job market saturation, compromised educational quality, and infrastructure deficiencies. The disparities in seat increments among institutions further highlight the need for equitable resource allocation and quality assurance measures.

Governmental initiatives, technological advancements, and regulatory actions play pivotal roles in shaping the landscape of pharmacology education. Stricter penalties for misinformation and enhanced transparency mechanisms introduced by the NMC signify a shift towards quality-focused evaluations.

In navigating the complex landscape of PG seat expansion in pharmacology, it is imperative for stakeholders to prioritise quality over quantity. Balancing the supply of trained pharmacologists with the demands of the healthcare sector requires strategic planning, robust infrastructure development, and continuous monitoring of educational standards. Ultimately, the success of this endeavor hinges on collaborative efforts between policymakers, academic institutions, healthcare professionals, and regulatory bodies. By fostering a culture of excellence and innovation, we can harness the full potential of pharmacology education to advance medical science and improve public health outcomes for all.

To conclude, the policymakers deserve appreciation for increasing the skilled MD pharmacology workforce, but they need to be more vigilant about the real outcomes versus the hypothetical ones. If the outcomes are compromised, it is the most appropriate time to revisit, rethink, re-strategise, and reconsider the increase in MD pharmacology PG seats without compromising the quality of education.

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The Objective Structured Long Examination Record (OSLER) as a Tool for Formative Assessment of Clinical Competency: Analysis of Students' Perceptions and Performance

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Abstract:
This study aims to explore students' perceptions and performance on the use of the Objective Structured Long Examination Record (OSLER) as a formative assessment tool for evaluating clinical competencies. This study was conducted among final year medical students at Newgiza University, Egypt following the completion of Senior Clerkship Module. Students' perceptions on OSLER exam quality, assessment and organisation were collected via self-administered questionnaire. OSLER performance was assessed using a 10-item analytical checklist. A total of 110 students answered the survey. This study demonstrated students' positive attitudes towards the overall quality and organisation of the OSLER exam. Students agreed that OSLER was practical and useful (66.3%), helped in identifying their strengths and weaknesses (69.1%), covered a wide range of knowledge (59.1%), assessed a wide range of clinical skills (57.3%), and assisted in recognising teaching deficiencies (59.1%). 58.1% of students reported that the exam was stressful, while 48.2% indicated it was time-consuming. All components exhibited average OSLER scores, with mean clinical competence scores of 6.45 ± 2.56 out of 10. The implementation of OSLER in formative assessment provides opportunity for students to strengthen their clinical competencies and allows educators to identify teaching deficiencies, thereby improving learning outcomes.

Key Words:
OSLER, Clinical Competency, Students' Perceptions, Senior Clerkship, Clinical Assessment

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Introduction

Clinical clerkships facilitate undergraduates' transition from classroom-based learning to hands-on clinical practice. They involve rotations through various medical specialities, allowing students to encounter diverse clinical scenarios and patient demographics. Assessment of clinical competence ensures that medical students have the knowledge and skills needed to provide safe and effective medical care.

Formative assessment is becoming a significant assessment tool in medical education in recent years, enhancing learning through assessment during the clinical training period.[1] The goal is to identify students' strengths and weaknesses, and facilitate progress through the provision of feedback that highlights the shortfall between the students' current skill and given standards.[2] In addition to enhancing clinical competence, formative assessment serves as a valuable tool to ensure that students achieve acceptable competence levels, thereby meeting minimum safety standards and identifying incompetent doctors.[3]

Various assessment methods have been used to assess the clinical competency of medical students, such as long cases, viva voce, short cases and objective structured clinical examination (OSCE). In Egypt, and specifically at Newgiza University (NGU), the traditional long case and OSCE are the primary methods for assessing students' basic clinical competencies. However, the concerns regarding their reliability have raised questions about their acceptability as fair assessment tools. Although the OSCE is highly effective in assessing particular components of clinical competence, it does not typically facilitate the evaluation of the student's overall patient care.[4] Meanwhile, long-case examination uses a single clinical case to generalise the candidate's competence across a wide range of clinical scenarios and lack individual assessor observation as the student elicits history and examines the patient.[5-8]

The Objective Structured Long Examination Record (OSLER) is a more systematic and objective evaluation method that utilises a 10-item analytical framework to enhance the objectivity, validity, and reliability of clinical assessments.[9] The OSLER's

primary advantage is its ability to assess the candidate's holistic approach to the patient and the authenticity of the doctor-patient interaction comparable to the real-life practice of medicine. The 10-item mark sheet is a structured, non-intrusive guide that permits examiners to focus on the candidate's performance. The OSLER also ensures that all examiners evaluate the same competency characteristics, thereby promoting greater standardisation and ensuring consistency. The standardised structured clinical case evaluation system effectively identifies weaknesses and encompasses a wide range of clinical skills assessment, resulting in higher mean scores for students and an overall positive perception among students and examiners.[10]

Despite the great potential of formative assessment in medical education, studies have shown that its implementation often unsuccessful and challenging since it takes place in the context of complex clinical practice.[11] The lack of assessment and feedback has been emphasised as one of the most serious deficiencies in current medical practice.[12] Moreover, studies related to OSLER exam experiences, particularly in the Middle East are understudied. Therefore, this study attempted to integrate the OSLER into the formative assessment of final year medical students to provide them with exposure to a more systematic and holistic approach to clinical examination. The evaluation of medical students via empirical observation, such as OSLER, is a new approach. Therefore, it is imperative to investigate the perspectives of students in order to gain a deeper understanding of their viewpoints. Hence, this study aims to explore students' perceptions and performance on the use of the Objective Structured Long Examination Record (OSLER) as a formative assessment tool for evaluating clinical competencies.

Methods

Study Design and Sample Characteristics

A survey was conducted among 182 final-year medical students in the School of Medicine, Newgiza University, Egypt following the completion of 21 weeks of Senior Clerkship Module. The study was conducted for three months, July - September 2023. The OSLER exam in this study was part of the formative assessment; therefore, participation was voluntary.

Study Instruments

A self-administered questionnaire was developed based on specific items previously identified from the literature.[4,13] The 8-item questionnaire assessed students' perceptions on the quality, contents, organisation and assessment of the OSLER exam, as well as feedback on their clinical performance. Responses were rated using 5-point Likert scale; strongly disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5). Informed consent was obtained from all participants. All components of the research tool were reviewed by two academics, and the Cronbach's Alpha coefficient showed internal consistency of 0.836, indicating good reliability.

Data Collection Methods

The questionnaire was manually distributed to the students following the completion of the OSLER examination. The OSLER exam involved one station that comprised of four sections; (i) Section 1 (15 minutes) - History taking and physical examination, (ii) Section 2 (5 minutes) - Time organization, presentation of patient history and physical examination findings, (iii) Section 3 (10 minutes) - Discussion with the examiner(s), and (iv) Section 4 (5 minutes) - Feedback from the examiner. Each student spent 30 minutes in the station and 5 minutes feedback, resulting in a total time of 35 minutes. The student was presented with a case scenario of either surgery or medicine and was given a fixed time period to perform a limited history and examination on a real patient before presenting their findings to the examiner. One examiner was assigned for each student. All examiners were briefed on OSLER assessment before the exam. Students were assessed using a standard 10-item analytical record, with a total cumulative mark of 100.

Statistical Analysis

Data analysis was carried out using IBM Statistics SPSS Version 26. Descriptive analysis was conducted, and data were presented in frequency (N), percentage (%) and mean ± SD. The Mann-Whitney U test was performed to assess the differences between two independent samples.

Results

Demographic Profile

A total of 110/182 final year medical students completed the survey; 43 (39.1%) were males, and 67 (60.9%) were females. Most students were 18 - 24 years old, 105 (95.5%), while five students were 25 or older (4.5%). The majority of the students were Egyptian, 108 (98.2%) (Table 1).

Variables	Frequency, N	Percentage, %
Age:		
18-24	105	95.5
25-30	3	2.7
>30	2	1.8
Gender:		
Male	43	39.1
Female	67	60.9
Nationality:		
Egyptian	108	98.2
Others	2	1.8
Total	110	100.0

Table 1: *Demographic Profile (N = 110).*

Students' Experiences with OSLER

The students reported a favourable experience with the OSLER examination. In particular, 73 (66.3%) students agreed and strongly agreed that the exam was practical and useful, while 66 (60%) students indicated that it motivated them to learn more about the topics covered. A total of 76 students (47.3% agreed and 21.8% strongly agreed) reported that OSLER exam helped them to identify their strengths and weaknesses. Additionally, 65 students (39.1% agreed and 20% strongly agreed) felt that OSLER exam was a lot like a real-life clinical encounter. When students were asked about the stress associated with OSLER exam, 27 (24.5%) agreed, and 37 (33.6%) strongly agreed that the exam was stressful/exhausting, while 22 (20%) agreed and 31 (28.2%) strongly agreed that exam was time consuming. Majority of students believed that additional pre-exam preparation is necessary, 92 (20.9% agreed and 62.7% strongly agreed), and more faculty training is needed to effectively conduct OSLER, 86 students (23.6% agreed and 54.5% strongly agreed). Male and female students did not exhibit any significant differences in their experiences with the OSLER exam, as indicated by the Mann-Whitney test ($p>0.05$) (Table 2).

Quality, Contents, Assessment and Organisation of OSLER Exam

Most students agreed and strongly agreed that OSLER covered a wide range of knowledge, 65 (59.1%), and assessed a wide range of clinical skills, 63 (57.3%). In terms of the exam organisation, a large majority of students agreed and strongly agreed that the exam was well structured, 63 (57.2%), the time provided was adequate, 60 (54.6%), instructions and questions were clear and unambiguous, 57 (51.8%), and the sequence of station components was logical and appropriate, 73 (66.3%). Regarding the quality of OSLER assessment, half of the students, 48 (43.6%) disagreed and strongly disagreed that the OSLER assessment criteria were standardised, while another half, 51 (46.4%) agreed and strongly agreed that the assessment criteria provide an accurate measure of fundamental clinical skills. A high number of students, 65 (59.1%) expressed agreement that OSLER is beneficial for teachers in identifying teaching deficiencies. There were no significant differences in students' perceptions of the quality, content, and organisation of the OSLER Exam between genders (Table 3).

Items	Strongly Disagree N (%)	Disagree N (%)	Neutral N (%)	Agree N (%)	Strongly Agree N (%)	P-value
OSLER helped me to identify my strengths and weaknesses.	8 (7.3)	5 (4.5)	21 (19.1)	52 (47.3)	24 (21.8)	0.827
OSLER was a lot like a real-life clinical encounter.	8 (7.3)	15 (13.6)	22 (20.0)	43 (39.1)	22 (20.0)	0.674
OSLER evaluated my skills fairly.	18 (16.4)	16 (14.5)	26 (23.6)	35 (31.8)	15 (13.6)	0.362
OSLER motivated me to learn more about the topics covered.	12 (10.9)	7 (6.4)	18 (16.4)	47 (42.7)	26 (23.6)	0.936
The tasks in OSLER reflect those taught.	17 (15.5)	13 (11.8)	21 (19.1)	43 (39.1)	16 (14.5)	0.876
More pre-exam preparation needed.	4 (3.6)	3 (2.7)	11 (10.0)	23 (20.9)	69 (62.7)	0.935
More faculty training is required to conduct OSLER.	4 (3.6)	8 (7.3)	12 (10.9)	26 (23.6)	60 (54.5)	0.384
OSLER exam is very stressful/exhausting.	7 (6.4)	9 (8.2)	30 (27.3)	27 (24.5)	37 (33.6)	0.977
OSLER exam is time consuming.	11 (10.0)	20 (18.2)	26 (23.6)	22 (20.0)	31 (28.2)	0.860
I was fully aware of nature of the exam.	7 (6.4)	12 (10.9)	26 (23.6)	37 (33.6)	28 (25.5)	0.980
OSLER is practical and useful experience.	11 (10.0)	3 (2.7)	30 (27.3)	46 (41.8)	20 (18.2)	0.485

Independent samples Mann-Whitney U Test showed no significant differences on students' experiences with OSLER between genders, $p>0.05$.

Table 2: Misaligned Increment in PG Pharmacology Seats (2023-2024)[10]

Items	Strongly Disagree N (%)	Disagree N (%)	Neutral N (%)	Agree N (%)	Strongly Agree N (%)	P-value
Wide knowledge of area covered.	9 (8.2)	14 (12.7)	22 (20.0)	51 (46.4)	14 (12.7)	0.298
Exam is well structured.	11 (10.0)	10 (9.1)	26 (23.6)	48 (43.6)	15 (13.6)	0.836
Wide range of clinical skills covered.	7 (6.4)	15 (13.6)	25 (22.7)	52 (47.3)	11 (10.0)	0.678
Time provided was adequate.	15 (13.6)	14 (12.7)	21 (19.1)	40 (36.4)	20 (18.2)	0.121
Instructions/questions were clear and unambiguous.	10 (9.1)	17 (15.5)	26 (23.6)	42 (38.2)	15 (13.6)	0.980
The tasks asked to perform were fair.	16 (14.5)	16 (14.5)	23 (20.9)	45 (40.9)	10 (9.1)	0.244
Sequence of station components is logical and appropriate.	9 (8.2)	8 (7.3)	20 (18.2)	58 (52.7)	15 (13.6)	0.865
OSLER assessment criteria (rubrics) are standardized.	25 (22.7)	23 (20.9)	29 (26.4)	23 (20.9)	10 (9.1)	0.181
OSLER assessment criteria provide true measure of essential clinical skills.	13 (11.8)	12 (10.9)	34 (30.9)	41 (37.3)	10 (9.1)	0.141
Exam setting and context are fair.	14 (12.7)	22 (20.0)	28 (25.5)	37 (33.6)	9 (8.2)	0.283
OSLER exam helps teacher to identify defects in teaching.	10 (9.1)	8 (7.3)	27 (24.5)	48 (43.6)	17 (15.5)	0.572

Independent samples Mann-Whitney U Test showed no significant differences on students' perceptions between genders, $p>0.05$.

Table 3: *Students' Perceptions on the Quality, Content, and Organization of OSLER Exam (N = 110).*

Students' Perceptions on OSLER **Exam Performance**

The majority of the students perceived good performance in all seven components. In addition, approximately, 40 (36.4%) and 47 (42.7%) students indicated excellent performance in two particular components; History Taking and Communication Skills, respectively. It is also noteworthy to mention that 15 (13.6%) and 13 (11.8%) students expressed poor performance on the Physical Examination and Presentation components, respectively. Mann-Whitney U test indicated a statistically significant difference in the perceptions of performance in history taking ($p=0.026$), physical examination ($p=0.016$), Management ($p=0.003$) and Clinical acumen ($p=0.018$) between male and female students (Table 4).

OSLER Components	Poor N (%)	Fair N (%)	Good N (%)	Excellent N (%)	P-value
History Taking	2 (1.8)	18 (16.4)	50 (45.5)	40 (36.4)	0.026*
Physical Examination	15 (13.6)	40 (36.4)	44 (40.0)	11 (10.0)	0.016*
Presentation	13 (11.8)	36 (32.7)	48 (43.6)	13 (11.8)	0.997
Investigation	4 (3.6)	33 (30.0)	48 (43.6)	25 (22.7)	0.220
Management	8 (7.3)	42 (38.2)	45 (40.9)	15 (13.6)	0.003*
Clinical acumen	5 (4.5)	30 (27.3)	50 (45.5)	25 (22.7)	0.018*
Communication skills & professionalism	3 (2.7)	11 (10.0)	49 (44.5)	47 (42.7)	0.141

*Independent samples Mann-Whitney U Test showed significant differences between genders, $p<0.05$.

***Table 4**: Students' Perceptions on OSLER Exam Performance (N=110).*

Students' OSLER Scores

A total of 132/180 students participated in the OSLER exam. Out of 40 total marks, the mean score for the physical examination component was 23.92 ± 9.26, with a maximum score of 38 and a minimum score of 2. The history taking component recorded a mean score of 14.52 ± 3.91 out of 20, with the highest score being 20 and the lowest score being 3. Communication skills and systematic presentation were assessed in the history taking component. The mean score for the case management component was 11.31 ± 5.30 out of 20 marks. The investigations and clinical competence stations showed mean values of 6.87 ± 2.49 and 6.45 ± 2.56 out of 10 marks each, respectively (Table 5).

The overall performance on the OSLER assessment indicated that only 29 students (22%) achieved scores exceeding 81 marks, whereas 32 students (24.2%) did not pass, scoring below 50 marks. A total of 71 students, representing 53.8%, achieved scores ranging from 51 to 80.

Component Scores	Mean ± SD	Minimum	Maximum
History Taking (20 Marks)	14.52 ± 3.91	3	20
Physical Examination (40 Marks)	23.92 ± 9.26	2	38
Investigations (10 Marks)	6.87 ± 2.49	0	10
Management (20 Marks)	11.31 ± 5.30	0	20
Clinical Acumen/Competence (10 Marks)	6.45 ± 2.56	0	10

Footnote: History taking scores are inclusive of communication skills and systematic presentation.

***Table 5:** Students' OSLER Component Scores (N=132).*

Discussion

Assessment serves a deeper role, transitioning from merely assessing learning to facilitating learning. Formative assessment regulates learning through the provision of feedback. Nevertheless, a true feedback culture is not fostered within medical education. As such, formative evaluation should be central to student training, rather than just for accrediting purposes.[14] In this study, OSLER was conducted as part of the formative assessment to improve the reliability and objectivity of clinical competence evaluation. To the best of our knowledge, this is the first study that reported on quantitative findings pertaining to the experiences and perspectives of medical students in Egypt utilising OSLER.

The majority of students provided positive feedback and reported satisfaction with their overall experience regarding the OSLER examination. The students perceived that the OSLER exam encompassed a wide range of knowledge and assessed a diverse array of clinical skills comparable to those encountered in real-life clinical settings. This approach assists them in recognising their strengths and weaknesses. Previous studies demonstrated similar viewpoints, indicating that OSLER provided a valuable opportunity for knowledge acquisition.[4,13] OSLER is intended to evaluate students in a comprehensive way, thereby fostering active engagement in clinical skills practice and enhancing clinical performance. The method of assessment implemented in OSLER enables students to identify areas of less competence as broader topics are being covered.[15] Additionally, the application of OSLER in clinical postings provides immediate, specific feedback to students based on the checklist, thereby improving their learning experience.

Most students in this survey recognised the OSLER exam as beneficial for educators in identifying teaching deficiencies. The modified OSLER serves as a tool for assessing student progress and performance during clinical clerkships.[16] This allows for the early identification of students experiencing academic challenges, enabling suitable remedial measures. Moreover, OSLER can function as a feedback tool for educators to determine the need for greater emphasis on a topic when a substantial number of students fail to perform a task or miss any particular step.[17]

When it comes to the quality of OSLER assessment, many students expressed dissatisfaction with the assessment criteria, despite the fact that they were evaluated on a standardised check list, uniform examiners in a standardised scenario, and consistent time limit for all students. We postulated that this perspective stemmed from their unfamiliarity with the OSLER exam format, in contrast to their greater experience with the OSCE. OSLER represents a rigorous assessment method wherein examiners uniformly evaluate candidates based on identical competence criteria utilising a 10-item analytical record. The validity is enhanced due to the presentation of a real-time patient problem necessitating a comprehensive response.[18] Furthermore, the examiners formalised the case's difficulty to achieve standardisation, thereby promoting a high level of standardisation that was lacking in the long case.[9,19]

In the present study, more than half of the students responded that the OSLER exam was both stressful and time-consuming. A comparable finding was reported among postgraduate students in Anaesthesiology, with 50% indicated that the OSLER exam was stressful.[18] The high prevalence of stress among medical students is rather concerning as it may influence their behaviour and affect their learning capabilities and patient care. This study suggests that insufficient practice and poor time management skills contribute to the high stress levels among students. Once students become familiar to the OSLER exam format, their stress level will reduce.

Most students asserted that faculty training is essential for efficient handling of the OSLER exam. Despite existing studies suggest that examiner training minimally affects reliability,[20] student-examiner debriefing sessions are crucial for the effective conduct of the process. Previously, it was shown that examiners' judgements were influenced by clinical practice and sociocultural factors.[21-22] Therefore, examiners were trained using standardised examinees.[23-24] A number of modifications have been suggested to enhance the reliability of the examiner's assessment which include providing examiners with lists of competencies, assessing more aspects of competence, and utilising examiner-observed student-patient interactions.[25]

This study revealed that students achieved average scores across all OSLER components including clinical acumen. The OSLER exam was conducted as part of the formative exam, which likely contributed to the students' lack of preparation. Formative assessment does not include marks/grades or contribute to summative assessment; rather, it provides feedback to enhance learner performance and identify areas of weakness. Furthermore, students lacked familiarity with the nature of OSLER exam, as this was their first encounter with it. It was observed that the OSLER scores improved significantly in the second encounter of OSLER compared to the first.[26] The vast majority of the

students in this study perceived their performance in history taking and communication skills components as exceptional. OSLER has an advantage of assessing communication skills which was not typically done in formative assessments. In contrast, OSCE does not provide sufficient time and attention to assess interpersonal skills including communication.[27] The students also perceived poor performance in the physical examination and presentation components. Incorporating OSLER into formative assessment provided students the opportunity to practise, thereby familiarising them with the method, enhancing their proficiency in weaker areas, and ultimately improving their clinical performance by the end of the course.

Study Limitations

This study was conducted within a single private institution and involved one cohort of medical students. This study requires replication on a larger scale, involving both private and public institutions to validate the findings. Given the large number of students and limited resources as the exam was conducted in a busy hospital, this study utilised one station and one examiner per student. Future examinations should increase the number of cases and employ two examiners to reduce marking bias and improve OSLER reliability and validity. Despite the challenges, this study may serve as the base for more consideration on the function of OSLER as part of the formative and summative clinical assessments.

Conclusion

This study demonstrated students' positive attitudes towards the OSLER examination, despite it being their first experience with the assessment. OSLER was perceived as an effective instrument for formative assessment that provides substantial learning opportunities for medical students. It is beneficial for monitoring students' progress and performance during clinical clerkship, as well as for reflecting on their strengths and weaknesses. Frequent clerkship evaluations are essential to maintain the standard quality of clinical performance and providing feedback can potentially enhance its formative value, as well as contribute in structuring the educational setting.

Ethical Approval

This study protocol was reviewed and approved by the Research Ethics Committee, New Giza University, Egypt (N-12-2023).

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Bridging the Gap: Medical Education Theory vs. "Ground Reality"

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Abstract:
Medical education in India has undergone significant transformation, particularly with the introduction of structured faculty training programs and competency-based frameworks. Originating in well-resourced Institutes of National Importance (INIs), these reforms have often proved challenging to implement uniformly across institutions with larger student loads and limited faculty. This article critically examines the practical gaps between theoretical frameworks and real-world teaching environments. It highlights faculty concerns, institutional disparities, and the questionable effectiveness of mandatory training modules, ultimately advocating for context-sensitive, flexible reforms rooted in ground reality.

Key Words:
Medical Education, Faculty Development, CBME, Implementation Gap, India

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Introduction

What is Medical Education? Medical education is the structured process of training individuals to become competent, ethical, and skilled healthcare professionals. It encompasses the science of teaching, learning, assessment, and curriculum design tailored for medical students, residents, and practicing professionals. In India, structured medical education training for faculty gained momentum in elite institutions, particularly Institutes of National Importance (INIs), where small student batches and abundant faculty allowed for innovation.

However, as we reflect on its evolution and the current scenario across India's medical colleges, many questions arise about the feasibility, uniformity, and effectiveness of medical education programs in practice.

Historical Perspective

The structured approach to medical education in India found its roots in INIs like All India Institute of Medical Sciences (AIIMS) in Delhi, Post Graduate Institute of Medical Education and Research (PGIMER) in Chandigarh, and Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER) in Pondicherry. These institutes, with student intakes of only 50–60 and over 30 highly qualified faculty (including MDs, MSs, MSc-PhDs, MD/MSc postgraduates, and post-MSc PhDs), served as fertile grounds for educational experimentation.

Short-term Medical Education Units (MEUs) were introduced, often running for 7–10 days. These courses were innovative and refreshing, designed to move beyond traditional lecture-based teaching and explore:

- Competency-based learning
- Adult learning principles
- Bloom's taxonomy
- Miller's pyramid of clinical competence
- Reflective practice and feedback models

Objective structured clinical examinations (OSCEs)
Initially optional, these programs later became mandatory through initiatives like the *Basic Course Workshop (BCW)* and *Curriculum Implementation Support Program (CISP)* under MCI/NMC directives.

Ground Reality and Feasibility in Non-INIs

In contrast to INIs, many government and private medical colleges across India face:

- a higher student load (often 250+ MBBS students per batch)
- faculty shortages and administrative overburden
- infrastructure limitations
- rigid academic calendars.

This makes implementing innovative teaching-learning strategies an uphill task. Questions commonly raised include:

- Are these frameworks, developed under ideal INI conditions, scalable to all institutions?
- Have these methods been proven to enhance student outcomes across diverse settings?
- Why is there a lack of national data assessing the real impact of MEUs and CBME?

Even among well-staffed institutions, implementing *every taxonomy and module* prescribed in workshops is often impractical. Day-to-day teaching is dictated more by curriculum deadlines, examination pressures, and clinical commitments than by idealised educational theory.

Impact on Faculty and Teaching Culture

Faculty members have always been dedicated to student growth. Long before formal MEU training became mandatory, teachers shared clinical experiences, patient variability insights, and practical problem-solving approaches—methods that resonated deeply with students.

With the advent of medical education training:

- faculty are now expected to master theory-heavy pedagogical frameworks
- there is a significant increase in documentation and procedural compliance
- less time is left for actual teaching, mentoring, or personal learning.

Worryingly, many experienced faculty—especially post-retirement—have admitted that these trainings, while intellectually stimulating, offered limited help in real classroom settings across different institutions.

Super-specialty faculty, who may not be involved in MBBS teaching, are also required to undergo these programs, even if they do not participate in undergraduate education. This raises further questions about relevance and applicability.

Structural and Policy Inconsistencies

Despite the NMC's introduction of Competency-Based Medical Education (CBME) and guidelines to reduce the MBBS course duration, many INIs continue to operate with outdated schedules, unaffected by these reforms. Yet, these very institutions are often chosen to train faculty from colleges that are expected to implement CBME rigorously.

This leads to uncomfortable contradictions:

- Why do MBBS programs differ in duration across institutions?
- Why are model institutions exempt from the very reforms they promote elsewhere?
- Where is the evidence that CBME implementation has improved graduate quality?

Key Gaps and Challenges

1. **Lack of Outcome Research**: There is minimal national data comparing student performance before and after implementation of CBME or MEUs.
2. **Mismatch in Vision vs. Ground Reality**: Recommendations assume ideal faculty-student ratios, which are rare.
3. **Fragmented Implementation**: Uniformity in curriculum delivery is compromised due to varying institutional policies and leadership priorities.
4. **Faculty Fatigue**: Overburdened teachers experience burnout, worsened by repeated training mandates and administrative duties.

Student Learning Outcomes: There is insufficient evidence that all this translates into better clinical judgment, empathy, or decision-making among students.

Recommendations and the Way Forward

To make medical education reform more effective, the following changes may be considered:

1. Contextual Flexibility

Educational policies should be tailored based on institutional capacity—faculty numbers, infrastructure, student load, and clinical material.

2. Integration with Clinical Reality

Training should focus on aligning medical education principles with real-life patient care scenarios. Workshops should include bedside demonstrations, patient communication strategies, and ethical decision-making.

3. Voluntary Faculty Development

Encourage voluntary and interest-based faculty development rather than enforcing mandates. Passionate teachers make better learners and better educators.

4. Peer Mentoring and Community Learning

Create state-level faculty mentoring networks where experienced educators from varied settings mentor junior faculty using realistic tools.

5. Feedback and Monitoring Systems

Implement longitudinal studies that assess how student competencies evolve with different teaching models. Faculty feedback must be valued in policymaking.

6. Equalising Curriculum Standards

Bring consistency in course duration and curriculum across INIs and non-INIs. No model institution should be exempt from reforms it teaches others to follow.

Conclusion

Medical education in India stands at a crossroads. While reforms like CBME and MEUs are rooted in sound pedagogical principles, their success depends on contextual adaptability, inclusive feedback, and genuine faculty engagement. Mandatory workshops alone cannot transform teaching quality unless supported by institutional readiness and realistic implementation strategies.

Faculty are not just passive recipients of educational theory—they are experienced clinicians, lifelong learners, and frontline mentors. Empowering them with autonomy, relevance, and support—not just mandates—will be the key to unlocking the full potential of medical education in India.

Let us hope for a future where both **students thrive as compassionate, competent physicians** and **teachers find purpose and recognition** in shaping the next generation.

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Development and Validation of the Obstetrics and Gynaecology Educational Environment Measure (OGEEM)

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Abstract:
Background: An environment which fosters high quality social interaction, organisational culture, and values of diversity and inclusion enhances the quality of education. Due to the acuity of obstetrics and gynaecology (O&G), an adverse environmental climate may creep in. Several inventories in medicine exist, however there is no validated inventory to measure the educational environment in obstetrics and gynaecology. The aim of developing OGEEM was to tailor the inventory to O&G and include aspects of the educational climate such as physical wellbeing, resilience, bullying and undermining.
Methods: A detailed literature search was conducted and a methodology was developed which included four phases. A modified Delphi was used in phase 1 and a grounded theory approach in phase 2 with trainee interviews. Phase 3 and phase 4 included an online survey. The final questionnaire had 37 questions with a Likert scale response. The results were analysed on Excel and Cronbach's alpha was calculated.
Results: The results suggested that the final inventory was reliable in measuring educational environment. The Cronbach's alpha for the entire questionnaire was 0.96.
Conclusions: The study suggests that OGEEM has a good validity and reliability in measuring educational environment specific to O&G training.

Key Words:
Educational Environment, Obstetrics and Gynaecology, Inventory, Educational Climate

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Introduction

Kilty *et al.* (2007) identified in their national stakeholder consensus document that there are several challenges within a clinical learning environment, particularly more recently such as overcrowded clinical environments, understaffing and service pressures on clinical workload which can act as a barrier to learning outcomes.[1] The Bawa Garba case in the United Kingdom is a standing example of failure of organisational cultures and lack of senior presence in supporting juniors during patient care.[2] Dr Hadiza Bawa-Garba, a trainee paediatrician in the National Health Service (NHS) was convicted for homicide following the death of a child from sepsis and was given a two-year suspension of practice in 2015. The case unmasked several organisational failures including lack of supervision, support and excessive workload for junior and middle grade doctors.

Gafson (2017) identified six key themes which describe the trainee's feelings towards the environment in O&G: morale and undermining; training processes and paperwork; supporting supervision; work life balance and the realities of life; the NHS environment; and job satisfaction.[3] The reported attrition rate for O&G is 30%.[4] Surgical training in obstetrics and, particularly, gynaecology is dwindling with less operating time, as the majority of gynaecology surgical care is moving into ambulatory care.[5] Within these restraints, it is paramount that the learning environment is kept at a high standard so that the trainees can avail the opportunity to gain surgical and non-surgical skills in theatre and acute settings.

GMC surveys suggest that the highest reports of bullying and harassment amongst all specialties are experienced on labour ward, mainly by consultants and midwives (GMC survey 2014).[6] Undermining behaviours are detrimental to both patient safety and outcome, and to staff morale. In addition to the small numbers experiencing it themselves, many more will have witnessed such behaviours in others, leaving a long-lasting negative impression.

An environment where trainees can voice their concerns, identify areas of weaknesses and formulate learning objectives, creates the foundation for better learning outcomes and

satisfaction.[7] The authors stress in their thematic analysis of descriptive studies how a positive and meaningful learning environment develops a strong educational culture. A poor social environment, on the contrary is characterised by negative attitudes, humiliation, negativity and criticism, inefficient supervision and fewer opportunities to examine patients independently; this overall leads to poor learning outcomes.

There is a growing focus on the effect of wellbeing, resilience and retention of staff within the speciality. There are several new resources that have been added to the RCOG website on improving resilience and the impact of stress in everyday life including intervention programmes designed to reduce stress, improve personal resilience and develop self-awareness (Improving workplace behaviours RCOG, 2020).[4] In one study, Ryder (2020) did a cross sectional survey of O&G trainees in Australia and New Zealand.[8] Over half of the participants identified burnout (55%), personal stress (58%), workplace stress (62%) and depression (45%). These figures are alarming in the numbers and highlight the need for an enhanced support and working environment to allow trainees to remain resilient and develop in their careers.
Although the annual GMC survey questionnaire purports to assess the educational climate, it focuses specifically on workload, bullying and harassment and identifying training problems, (GMC training survey 2019).[9]

Materials
The study followed a structured approach across multiple phases to ensure the questionnaire is relevant and effective. Seven studies were identified that had items that could be adapted to O&G.

DREEM: Developed by Roff and McAleer (2001),[10] the Dundee Ready Educational Environment Measure (DREEM) is a validated tool for measuring the educational environment among medical undergraduates. O&G is a vast specialty with a very different environment in obstetrics compared with gynaecology. The learning environment in obstetrics and gynaecology includes training in clinics, delivery suite, early pregnancy clinics, emergency gynaecology, operating theatres in obstetrics and in elective gynaecology theatres. Using DREEM as a starting point was extremely useful for the design of the OGEEM.

ATEEM: Created by Holt & Roff (2004),[11] the Anaesthetic Trainee Theatre Educational Measure (ATEEM) addresses the educational environment in the operating theatre for anaesthetic trainees. Some aspects of this measure apply to trainees in obstetrics and gynaecology.

STEEM: Designed by Cassar (2004),[12] the Surgical Theatre Educational Environment Measure (STEEM) focuses on the surgical training environment, particularly in operating theatres. It includes pre-operative patient interactions, theatre participation with learning objectives, and clinical supervision.

EBM: Bergh (2014)[13] measured perceptions of the educational environment in Evidence-Based Medicine (EBM). The study included postgraduate trainees from various medical branches and evaluated the effectiveness of a clinically integrated EBM course. The author had a very comprehensive approach on 7 aspects of learning- knowledge and learning materials, learner support, general relationships and support, institutional focus on EBM, education, training and supervision, EBM application opportunities and affirmation of EBM environment. However, this study did not delve into the depths of behaviours and climate in different clinical areas that determine a good learning. Although participants were largely from O&G, this study evaluated the effectiveness of a clinically integrated evidence-based medicine course.

ACLEEM: Developed by Riquelme et al. (2013),[14] the Ambulatory Care Learning Educational Environment Measure (ACLEEM) targets postgraduate doctors in ambulatory care. The survey was designed using DREEM and PHEEM methodologies and involved a mixed approach of qualitative research and the Delphi technique.

NOTTS: Non-Technical Skills for Surgeons (NOTTS) is a behaviour rating system for surgeons, focusing on non-technical aspects of performance during intraoperative surgery. It includes categories such as situation awareness, decision making, communication & teamwork, and leadership.[15,16] It was noted that many complaints and litigations arise because of failure by surgeons to communicate effectively with patients and colleagues especially when things go wrong (Hinshaw, 2016).[17] Ratings and feedback are given on four categories of non-technical skills:

i. Situation Awareness
ii. Decision Making
iii. Communication & Teamwork

Leadership

Increasing Diversity
Maslow's theory (1943)[18] of human motivation and self-actualisation provides a useful premise for establishing a sense of belonging amongst students/ learners. In the current climate, it has to be acknowledged that there has been an increase in growing diversity of student population in terms of

age, gender and cultural background.[19] Discriminatory or hostile learning at environments have a negative effect on learners,[20] and this is quite evident in O&G where there have been several a reports of humiliation bullying and harassment.

Physical Well-Being

There is an increasing recognition of the importance of physical well-being amongst healthcare providers and the fact that poor health can have a direct impact on adverse standards of care. As the demands on doctors have increased in terms of workload, reduced resources and increasing litigation pressures, so do the levels of stress related illnesses amongst the medical fraternity.

Methods

Preliminary Inventory Design: The initial questionnaire was based on GMC guidelines focusing on four domains: knowledge, skills and performance; safety and quality; communications, partnerships and teamwork; and maintaining trust. A Likert scale was utilised for responses.

Phase 1 - Modified e-Delphi Panel: The preliminary inventory consisting of 20 questions was circulated to 58 obstetricians and gynaecologists for feedback. Their comments helped refine the questionnaire without introducing bias.

Phase 2 - Focus Group Discussions: The updated inventory was validated through focus group discussions to ensure specificity and relevance of questions, capturing the perspectives of junior and middle-grade doctors. Twelve registrar-level doctors were selected for interviews, providing insights into their experiences and the learning environment. Consent and confidentiality were emphasised throughout the process.

Phase 3 - Online Survey: A revised questionnaire with 31 items was uploaded to an online platform for further validation by 50 medical educators, focusing on the quality and relevance of the items.

Phase 4 - Final Distribution: The validated survey was distributed to approximately 150 trainees and specialty doctors, with a response rate expected between 60-70%. The survey included provisions for negative items related to workplace issues.

Data Collection Tools: Various methods were employed for data collection throughout the phases, including email, face-to-face interviews, and online surveys to ensure comprehensive feedback and updates to the inventory.

Data Analysis Methodology: The study utilised Excel for quantitative data analysis, employing descriptive statistics and Cronbach's alpha for reliability assessment. A high reliability score (over 0.8) was targeted, indicating internal consistency among questionnaire. Descriptive statistics were reported as mean, median and standard deviation. Reliability index was calculated using Cronbach's alpha for each subheading and for the entire questionnaire. Alpha was calculated by excluding each question from the questionnaire to identify any rogue questions.

Internal consistency values over 0.8 are considered to have a high reliability. Very high reliabilities are not necessarily desirable, as this indicates that the items may be redundant. The goal in designing a reliable instrument is for scores on similar items to be related (internally consistent), but for each to contribute some unique information as well.

Ethical Approval and Considerations: Ethical approval was granted by the Dundee Ethics Committee. The study ensured that participants were informed about the voluntary nature of their involvement and the lack of remuneration for their time.

Confidentiality and Insider Researcher Role: The study maintained participant confidentiality throughout the process, acknowledging potential challenges in safeguarding anonymity.

Results

Phase 1: Preliminary Questionnaire

A preliminary questionnaire with 20 questions was sent to 58 participants in the East of England Deanery, yielding a response rate of 20% with 12 participants providing feedback. The feedback indicated that all questions were relevant, but some suggestions for improvement included grouping questions under specific subheadings related to clinical learning and the training environment. Additionally, language amendments were recommended to enhance clarity, resulting in the expansion of the questionnaire to a 31-item inventory.

Phase 2: Interviews and Thematic Analysis

This involved interviews with 12 doctors, each lasting between 21 to 48 minutes. Participants rated each item on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). The analysis revealed that items with a mean score of 3.5 or above were considered relevant. A detailed analysis of the mean scores for various questions, indicating that some questions were perceived as less relevant and required further clarification or rewording.

Phase 3: Delphi Method and Refinements

50 clinicians from various specialties participated in a modified Delphi process. The response rate was 34%, and many participants provided comments on the quality of questions. Key refinements included adding an "other" option in question 2 to capture non-trainee responses, clarifying questions with multiple components, and incorporating age discrimination into the questionnaire. This phase emphasised the importance of leadership skills and the impact of job-related stress on health and wellbeing.

Phase 4: Final Questionnaire Distribution (Table 1)

The final questionnaire consisted of 44 items divided into five sections, covering clinical skills, induction and supervision, the environment, and overall experience. The response rate was 34%, with 51 respondents from various training levels. The face validity and construct validity were high and the reliability assessed with Cronbach's alpha suggested a high internal consistency of 0.83- 0.92 in each section and 0.96 for the overall questionnaire. The response rate for the final questionnaire was 34% (51/151) which compares well with previous similar surveys (e.g. Gafson 2017)[3].

	Question: 5 options and white boxes for each question	Cronbach's alpha
1	Which hospital do you work in?	
2	What is your level of training?	
3	There are opportunities for achieving the competencies required by the curriculum for my level of training in obstetrics.	0.958
4	There are opportunities for achieving the competencies required by the curriculum for my level of training in gynaecology	0.960
5	I feel valued as a member of the team.	0.961
6	I play an active part during the pre-operative team briefing in theatre.	0.956
7	I have opportunities to acquire the non-technical skills (NOTTS) appropriate to my level of training.	0.961
8	My work load is appropriate for the level of my training and tailored towards my training achievements	0.962
9	The rota allows a good balance of training opportunities and service commitments.	0.962
10	The rota offers me flexibility to pursue activities pertinent to my development e.g. attend courses.	0.961
11	There is regular protected teaching held in my current post.	0.960
12	I have opportunities to learn and practice variety of clinical 3procedures.	0.962
13	The training in this post allows me to develop satisfactorily and helps prepare me for the next stage in my career.	0.961
14	Consultants support me in improving my skills in leadership and human factors.	0.960
15	I had a detailed induction at the start of my post.	0.962
16	I was able to set my goals at the induction meeting with my educational supervisor.	0.961
17	I receive effective supervision from my educational supervisor.	0.962
18	Consultants provide feedback through work based assessment forms in a timely manner.	0.962
19	There is good support & opportunities for trainees who struggle to meet training needs/requirements.	0.962
20	Consultants provide me with constructive feedback on my strengths and weaknesses.	0.962

21	I experience a professional relationship with my consultants which helps create a good learning environment.	0.961
22	I feel comfortable and happy in my post.	0.961
23	I work in collaboration with midwifery and nursing teams.	0.963
24	I feel able to discuss and ask questions relating to clinical care.	0.962
25	I feel able to challenge or voice concerns without the fear of intimidation.	0.961
26	The environment is free from undermining, bullying and harassment.	0.962
27	I have observed others being a target of humiliation, negativity and criticism.	0.962
28	There is sex/race discrimination in this post.	0.962
29	There is age discrimination in this post.	0.963
30	Trainees and non-trainees are treated equally in this post.	0.962
31	Within the environment that I work, there is a culture of promoting mutual respect.	0.961
32	There is a supportive learning culture i.e. learning from incidents rather than a blame culture.	0.961
33	The consultants set a role model that I learn and reflect from.	0.961
34	There is a good social interaction amongst colleagues/peers in the department.	0.961
35	My job does not have a negative impact on my health and wellbeing.	0.962
36a	Would you consider returning to this post for another term?	0.961
36b	Would you recommend this post to a friend/colleague for training?	0.960
37	I found the questionnaire easy to complete.	0.963

Discussion

1. Clinical Skills and Training:

- The study found that opportunities for achieving competencies required by the curriculum in O&G were generally satisfactory. However, there were specific areas where training was lacking, such as obstetric and gynaecological scanning.

The balance between service commitments and training was a significant concern. Many trainees felt that their workload was not appropriately tailored to their training needs, and the rota did not allow a good balance between training opportunities and service commitments.

2. Supervision:

- The education meetings with supervisors were generally positive, with trainees able to set goals and receive effective supervision. However, there was a need for improvement in providing support to trainees who struggle to meet training requirements.

The feedback from consultants was timely, but there was room for improvement in the constructive feedback on strengths and weaknesses.

3. Environment:

- The study highlighted issues of discrimination, bullying, and harassment within the training environment. Many trainees reported experiencing or witnessing sex, race, and age discrimination.

The culture of promoting mutual respect and a supportive learning environment was found to be lacking in some areas. More trainees witnessed bullying and harassment than experienced it themselves, indicating a broader issue within the environment.

4. Questionnaire Feedback:

The final OGEEM questionnaire was found to have high reliability and internal consistency, with a Cronbach's alpha of 0.96 for the entire questionnaire and was easy to complete.

The study provides valuable insights into the educational environment for trainees in obstetrics and gynaecology, identifying strengths and areas for improvement. The findings underscore the necessity for ongoing evaluation and adaptation of training practices to enhance the educational experience for all trainees.

Limitations of the study: The study faced challenges including low response rates, particularly in phases I and the impact of the COVID-19 pandemic on data collection. Despite these challenges, the feedback received was valuable and the final response rate of 34% was comparable to previous studies.

Implications for future research: The OGEEM inventory can be effectively utilised across various hospitals to assess the educational environment in obstetrics and gynaecology. A follow-up survey post -COVID restrictions and with workload changes/ waiting lists recently could reveal changes in the educational environment and identify areas for improvement in teaching and training.

Conclusions and Recommendations:
Measuring educational environment in medical specialties is not a new concept. There have been several researches done in various specialties but no existing inventory specific to O&G exists. Based on the literature review and analysis of methodologies used in the existing studies, an inventory (OGEEM) was developed specifically for the educational environment in O&G. O&G has been a specialty that has been an outlier in the GMC annual surveys conducted for trainees and the feedback has highlighted the highest rates of bullying and undermining. The RCOG have put in several measures to enhance the training experience and to help with the trainees' physical wellbeing and resilience. With this background, the OGEEM was thought to be a valuable tool to measure the training environment in O&G.

High levels of interest and engagement from trainees and consultant colleagues in contributing to the validation of OGEEM indicated the study was worthwhile. It is also an evidence of the passion that many educationists have in helping to develop a high quality educational environment. Use of the questionnaire in other deaneries and globally with research into how it is received both by trainees and trainers and its perceived usefulness is also recommended. Finally some key areas (e.g. empathy and resilience) were missing from previous inventories. It is recommended these are reviewed, modified and revalidated with these themes in mind.

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Creating a Classroom Culture in Medical Education: The Power of Play

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Abstract:
This paper proposes a "play triad" of curiosity, divergent thinking, and a freedom to fail which fosters a healthy learning environment for successful medical education. Traditional medical education has focused on individual mastery and rote memorisation, but a shift towards small group learning centering on adaptability, collaboration, and clinical application of knowledge is needed. The success of this communal learning is fostered through the elements of play, a curiosity-driven exploration of hidden potential. Curiosity is the importance of moving from knowing right answers to slowing down and grappling with the why behind the answers we hold true. Divergent thinking builds on the complexity of medical education and being willing to value creative exploration and multiple perspectives. Finally, freedom to fail is the awareness that "wrong answers" are often our greatest teachers. By framing learning around the elements of play, educators can cultivate a growth mindset, creativity, and critical thinking, enabling students to navigate the uncertainties and challenges of the medical profession.

Key Words:
Medical Education, Adaptability, Curiosity, Creativity, Innovation

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As a parent, I would often take my 1-, 2- and 5-year -old daughters to the science centre, seeking a fun activity that a sleep-deprived parent could still navigate. One of our favourite stops was the chemistry kitchen, where science came to life through cooking. Fruit flambé in which fruit is cooked in a pan with alcohol creates a huge flame that captured my girls' attention and the opportunity to talk about the key components of fire. The fire triad teaches that a spark, fuel, and oxygen, must all be present for the fireball to form in the pan. This playful approach to teaching my daughters the chemistry of fire through cooking has made me consider, what is needed to ignite a healthy learning environment in medical education? I propose a play triad: curiosity as the spark, divergent thinking as the fuel, and freedom to fail as the oxygen that fosters collaboration, creativity and growth.

Traditional medical education has long emphasised individual mastery of knowledge and technical skills. Students are required to absorb and retain vast amounts of information through didactic instruction, then prove proficiency via standardised testing. However, the landscape of medical education has shifted in recognition that adult learners need to focus less on rote memorisation and more on the adaptability, application, and collaboration of knowledge in clinical settings. The shift has led medical education to move from traditional lecture halls to small group classrooms.[1] Yet, the transition to small group learning is only the starting point and requires the development of a collaborative, creative, and safe space that enables learners to flourish together. One potential approach to fostering a healthy classroom culture is to focus on play, including the key components of curiosity, divergent thinking, and the freedom to fail.[2]

This paper explores the importance of integrating a playful mindset into the culture of medical classrooms. It argues that the attributes of flexibility, innovation, and growth mindset fostered through play are essential for creating a safe and effective learning environment. By framing the educational experience around the dynamics of play, medical educators can better equip students to navigate the uncertainties of the medical profession, develop collaborative team skills, and cultivate a growth mindset.

Curiosity

Curiosity is the first spark of a playful culture. My oldest daughter when she was three years old was part of a soccer club. During games, she would

often stop in the middle of the field to pick a flower and show it to her friend. Curiosity is the child-like desire to slow down and explore, learn, and understand about hidden goodness in plain sight. In the context of medical education, curiosity is essential for students to move beyond rote memorisation and engage with each other in a meaningful way. Curiosity allows students to ask questions, dig deeper into concepts, and challenge existing paradigms.[3]

A classroom culture that encourages curiosity focuses on the ability to slow down and not just cover information but rather grapple with the "why." The key is how to create a space that values quality over quantity of information. This conceptually makes sense, but the practicality of it is more challenging. The first step is we must name the reality. Medicine is a career where everything is always moving faster, until there is a blur of urgency instead of understanding the present. Therefore, we must purposefully choose to slow down and see the now, we must practice mindfulness. One simple practice is to start each session with a 5-minute reflection exercise linked to your case for the day. If you are studying heart failure, then ask your students to write everything they know about heart failure for 4 minutes, and then in the last minute, ask them to write 3 questions they still have about the topic. The practice of reflection allows students to start with an opportunity to centre on the topic and have space to consider their questions before jumping into the avalanche of information. Curiosity is the spark that ignites the healthy learning environment.[4]

Divergent Thinking

The second component, divergent thinking, is the fuel that drives collaborative inquiry. With divergent thinking, the aim is to generate multiple possible solutions to a given problem. Unlike convergent thinking, which focuses on finding the one correct answer, divergent thinking values creative exploration and multiple perspectives. In medical education, divergent thinking is vital for developing clinical reasoning where there may not be a single, clear solution.[5]

A playful classroom culture actively encourages divergent thinking by presenting students with scenarios that do not have one "right" answer. Traditional medical education relies on fact retrieval of tests to identify key "buzz" words that lead to the one correct answer. In clinical case workshops, students might be asked to approach a scenario where symptoms are ambiguous, requiring them to think broadly and consider a range of possibilities. By providing students with opportunities to brainstorm solutions, explore multiple avenues of thought, and weigh different approaches, educators can cultivate a mindset that values creativity and flexibility.[6] Divergent thinking is a muscle that must be exercised to be maintained. One technique to support this process is the use strategic "stretch activities." The opportunity to allow students to step away from the grind of the medical mindset and participate in small group activities that encourages this mindset. An example of this is the paperclip activity, in which students are given a standard paperclip and asked to think of as many uses for that paper clip in 2 minutes as possible. At the end of this exercise, I share with the students that the average adult comes up with 10-15 uses while the average kindergartener will come up with approximately 200 uses in 5 minutes. As adults we have learned all the rules that put our thought processes in boxes that restrict creativity, therefore these exercises can be important to challenge this convergent mindset.[7] As we make these "stretch activities" part of the rhythm of our classroom, it becomes the culture that we are able lean into our divergent thinking when we get stuck in a clinical case. I will even name that we are going to remember to be playful and think outside the box when a student respond that they don't know the answer. I will say something like, "well tell me what you do know and how do you think that helps you with a possible answer." We remember that wrestling with the answer to the question even with a wrong answer is the first step in truly learning.

Furthermore, Divergent thinking also promotes collaboration. We often challenge those stuck points in our thinking when we allow a collaborative multi-perspective approach drive our problem solving process. In real-world medical practice, multiple specialists often need to contribute their expertise to solve complex patient problems. By encouraging students to think divergently, educators help them develop the collaborative practices needed to work effectively in multidisciplinary teams. It also prepares students to handle the ambiguity and uncertainty inherent in patient care, where multiple plausible explanations may exist for a given set of symptoms.[8]

Freedom to Fail

In the fire triad the oxygen is necessary to feed the flame and in the same way the psychological safety of a freedom to fail gives life to the playful learning environment. Without the creating of a space to take risks curiosity and divergent thinking will flicker out. In traditional educational settings, failure is often viewed as an individual negative outcome to be avoided at all costs. However, research in educational psychology has shown that failure can be one of the most powerful learning experiences, provided it is framed as an opportunity for growth.

In medical education, where stakes are high, students often feel intense pressure to know and answer every question correctly. However, a culture that allows for failure can foster resilience, perseverance and safety.[9]

Crucially, this freedom to fail must be situated within an environment where students feel psychologically safe. In such a learning environment, students are not only free to make mistakes but are also supported in reflecting on and learning from those mistakes without fear or judgement. When educators establish a culture of trust, where mistakes are viewed as part of the process rather than as a source of shame, students are more likely to take risks and engage in critical thinking. This culture of safety and support helps to reduce the anxiety often associated with failure, allowing students to approach challenges with greater openness and creativity.[9]

Developing this culture is rooted in relationships and a crucial element of this learning environment triad. As such, one techniques or skills does not achieve a culture of trust, but there **are** tools available to help facilitate this culture. One key aspect is the "roll-out speech." When a new cohort of students is introduced, the teacher must set clear expectations or rules for the small group. For example, the teacher should emphasise that "wrong answers" are expected and are essential for learning.

As the group matures, techniques like cold calling, with a focus on voice equity, ensure that all students contribute. Even if an answer is not fully correct, the teacher should encourage the group to build on answers, working together to achieve success. Finally, gamification, such as using "Jeopardy" or "Quizlet," allows students to test their knowledge in real time within a fun environment. This not only boosts cohort morale but also helps students identify their strengths and areas for improvement.

Failure in the context of the learning environment helps students confront the uncertainty and complexity of medicine. The ability to make decisions in the face of ambiguity, experiment with different approaches, and learn from errors is essential for lifelong learning and professional development. A safe environment encourages this kind of exploration, providing students the psychological space to test hypotheses, pivot when necessary, and grow from each experience. By cultivating a classroom environment where failure is seen as part of the learning process, educators can help students build the resilience needed to thrive in the challenging and dynamic field of medicine.[10]

Conclusion

As my kids grew up, our street had over forty children on one block which meant that summer was a time to run up and down the street from house to house and explore. One of the favourite activities was development of a play. The kids would spend all day being curious to develop a story about some funny aspect of the street, usually about the adults. They would think divergently as they developed their costumes and set with whatever was available, including those things we thought of as broken or waste. Finally, they would perform their drama for the adults even in its unpractised form without fear or doubt. This natural demonstration of play created an atmosphere of safety, creativity and collaboration.

The incorporation of play into medical education offers a promising pathway to developing the next generation of physicians. By fostering curiosity, encouraging divergent thinking, and embracing the freedom to fail, educators can create a classroom culture that is engaging, supportive, and conducive to lifelong learning. Play, far from being a frivolous activity, serves as a powerful tool to cultivate the qualities of creativity, innovation, adaptability, and collaboration that are essential in a healthy learning environment.

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The Hidden Dangers of Fizzy Drinks, Energy Drinks, and Energy Bars: Long-Term Health Risks One Must Know

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Abstract:
Fizzy drinks, energy drinks, and processed energy bars are widely consumed and aggressively marketed as convenient, performance-enhancing products. However, growing evidence highlights their harmful effects on long-term health. These items often contain high levels of sugar, artificial sweeteners, caffeine, preservatives, and chemical additives that disrupt normal metabolic function, appetite regulation, and gut health. Regular intake is associated with serious conditions including obesity, type 2 diabetes, hypertension, cardiovascular disease, non-alcoholic fatty liver disease, poor bone density, and dental erosion. Energy drinks in particular may cause immediate side effects such as palpitations, anxiety, and gastrointestinal upset. Despite being promoted by fitness influencers and commercial advertising, these products offer no real nutritional value and may worsen public health outcomes. This Q&A document explores their contents, health impacts, and misleading marketing strategies, while offering practical guidance on reducing consumption and choosing healthier alternatives. Awareness and informed decision-making are essential to prevent long-term harm and support better health.

Key Words:
Ultra-processed Foods, Energy Drinks, Artificial Sweeteners, Metabolic Health, Chronic Diseases, Public Health Risks

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Introduction

Fizzy drinks, energy drinks, and processed energy bars have become common features of modern diets, often promoted as harmless, energising, or even essential to a healthy lifestyle. However, these products pose serious and often overlooked risks to long-term health. Whether high in sugar or marketed as "zero calorie" or "sugar-free," these drinks and snacks contain artificial sweeteners, stimulants, preservatives, and chemical additives that can disrupt normal body functions.

Scientific research has linked regular consumption of these products to a range of health problems, including obesity, type 2 diabetes, high blood pressure, heart disease, stroke, liver disease, poor bone health, and dental damage. Many of these effects are not immediately noticeable but develop gradually with continued use. Energy drinks, in particular, can also cause short-term symptoms such as palpitations, insomnia, anxiety, and gastrointestinal upset.

This Q&A document aims to explain what these products are, why they are harmful, and how their marketing misleads consumers. It also offers practical advice on healthier alternatives. By understanding the hidden risks and making informed choices, individuals can protect their long-term health and reduce their risk of serious chronic conditions.

1. What are carbonated soft drinks, energy drinks, and energy bars?

These are highly processed, mass-marketed products designed for taste, convenience, and profit rather than health.

- Carbonated soft drinks (e.g., Coca-Cola, Pepsi, Fanta, Sprite) are sugary or artificially sweetened beverages with fizz from carbon dioxide.
- Energy drinks (e.g., Red Bull, Monster, Relentless) contain caffeine, sugar, sweeteners, and stimulants like taurine or guarana.
- Energy bars (e.g., Grenade Carb Killa, Clif Bars, Trek Protein Flapjacks) are ultra-processed snacks marketed as health foods, often with added sugar, fats, and synthetic protein blends.

2. How are these products aggressively marketed to the public?

These items are relentlessly promoted through

social media, fitness influencers, celebrity endorsements, and sports sponsorships. They are portrayed as harmless, performance-boosting, and even essential to an active lifestyle. This marketing creates a false association between health and consumption of unhealthy, ultra-processed products.

3. Why should we be sceptical of claims like "Coke Zero" and "zero calorie"?

There is no such thing as a truly "zero calorie" or "zero sugar" drink. These terms are marketing myths. "Coke Zero" and similar products contain artificial sweeteners (e.g., aspartame, sucralose) and chemical additives that alter your metabolism, disrupt your gut microbiota, and condition your brain to crave sweetness. They do not nourish your body; they deceive your physiology, trick your appetite, and drive long-term health problems. Don't be fooled: "zero" doesn't mean safe, natural, or healthy.

4. What artificial additives are commonly found in these products?

Many fizzy drinks and bars contain:

- Sweeteners: aspartame, sucralose, saccharin
- Preservatives: sodium benzoate, potassium sorbate
- Acids: citric acid, phosphoric acid
- Caffeine and stimulants: guarana, taurine, synthetic caffeine
- Synthetic flavours and colours

These ingredients can have adverse physiological effects when consumed regularly.

5. What are the immediate health effects of consuming these products?

In the short term, consumption may lead to:

- caffeine-related symptoms: jitteriness, insomnia, palpitations
- sugar spikes: rapid energy followed by fatigue
- gastrointestinal upset: bloating, acid reflux, cramps
- dental erosion from acids and sugars

6. What are the intermediate risks from regular consumption?

With frequent use, people may experience:

- weight gain due to increased calorie intake or compensatory eating
- elevated blood sugar and insulin resistance
- habit formation and dependence (particularly with caffeine)
- mood fluctuations and poor sleep

7. What are the long-term health consequences?

Chronic consumption is associated with serious and often irreversible health problems, including:

- increased risk of stroke due to vascular inflammation, elevated blood pressure, and metabolic disruption
- greater likelihood of heart attack and cardiovascular disease, particularly in regular consumers of artificially sweetened and high-sugar drinks
- Type 2 diabetes from repeated blood sugar spikes and insulin dysregulation
- obesity driven by liquid calorie overconsumption and metabolic disruption
- hypertension and cardiovascular disease from excessive caffeine, sugar, and sodium
- non-alcoholic fatty liver disease due to fructose and artificial sweeteners
- metabolic syndrome (a cluster of deadly risk factors for heart attack and stroke)
- increased risk of depression, anxiety, and cognitive decline
- poor bone mineral density from phosphoric acid leaching calcium from bones
- increased risk of dental caries, gastrointestinal disease, and chronic inflammation

8. How do gym culture and fitness influencers contribute to the problem?

Many personal trainers, gym instructors, and fitness influencers promote energy drinks and bars as part of a fitness routine. These recommendations are often uninformed and driven by sponsorships or gym vending contracts. This creates a false narrative that these products are necessary or beneficial for performance, which is misleading and dangerous.

9. What are healthier alternatives?

- Drinks: water, herbal teas, coconut water, diluted fruit juice (in moderation)
- Energy boosts: a banana, a handful of nuts, natural yoghurt, boiled eggs, oats
- Post-exercise snacks: fresh fruit, hummus with vegetable sticks, Greek yoghurt with berries

10. What practical steps can people take to reduce intake?

- Read labels critically: beware of health claims on packaging.
- Avoid keeping fizzy drinks or energy bars at home.
- Replace one sugary drink per day with water or tea.
- Don't shop hungry; it increases impulse purchases.
- Be aware of the marketing tactics used by companies and promoters.

Figure 1: *A Collection of Industrially Produced Protein Bars Promoted Falsely as a Healthy Option in a Gymnasium*

Figure 2: *A Collection of Energy Drinks, Protein Shakes and Sports Water Promoted Falsely as a Healthy Option in a Gymnasium*

Conclusion

Regular consumption of fizzy drinks, energy drinks, and processed energy bars carries significant health risks. These products are linked to obesity, type 2 diabetes, cardiovascular disease, liver dysfunction, dental erosion, and poor bone health. Artificial sweeteners and stimulants can disrupt metabolism, appetite control, and sleep, while promoting dependence and long-term harm. Despite their widespread promotion as lifestyle or fitness aids, they offer no genuine health benefit and may contribute to serious chronic conditions. Reducing intake and choosing natural, whole-food alternatives is a vital step towards safeguarding physical and mental well-being across all stages of life.

Key Take-Home Messages

- There is no such thing as a safe or healthy fizzy or energy drink. Every sip harms your health.
- Zero sugar and zero calorie labels are marketing lies. They contain chemicals that deceive your body.
- Fitness influencers and gym instructors are not qualified to give nutritional advice. Don't trust their endorsements.
- Long-term consumption of fizzy and energy drinks contributes to obesity, diabetes, liver disease, and early death.
- Choose water and real food over chemicals, hype, and hidden harm.

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