



# Pulse

Volume 21

March 2020

## GENDER EQUALITY



## IN HEALTH-CARE

CONTRIBUTORY HEALTH SERVICES SCHEME



सत्यमेव जयते

भारत सरकार

Government of India

भाभा परमाणु अनुसंधान केंद्र

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## MMC accredited multispecialty CMEs 2019-20

Date	Department	Topic	Speaker
16/08/2019	Psychiatry Anaesthesia Radiology	Endocrinology & Mental Health Advances in Chronic Pain Management Cardiac CT	Dr. Kersi Chavda Dr. Jitendra Jain Dr. Vipul Chemburkar
18/10/2019	Orthopaedic  Paediatric Pathology	Current Concepts in Osteoporosis & related Orthopaedic problems Spectrum of Spinal Dysraphism New Approach in Infectious Disease Diagnosis	Dr. Gauresh Palekar  Dr. Sonal Bangde Dr. Biyani
20/12/2019	Surgery Medicine Gynaecology & Obstetrics	Emergencies in Urology Emergencies in Gastroenterology Acute Abdomen in Pregnancy	Dr. Percy Chibber Dr. Chetan Bhatt Dr. Shashank Parulekar

## Clinical Meet Year [2019-20]

24.01.2020	Paediatrics	Screen time and language development	Dr. Pallavi Bapat
13.12.2019	Surgery	Demography and outcome of prostate cancer - single centre study	Dr. Rahul Sakale Dr. Satish Mishra
08.11.2019	Dispensary	Job stress & its management ergonomics in occupational set-up & occupational skin disorder	Dr. Ashok Kattimani Dr. Lankeshwar Dr. Vivek Dabade
11.10.2019	Psychiatry	Psychiatric disorders presenting with gastrointestinal symptoms	Dr. Vaibhav Shrivastava Dr. Snehal Thamke Dr. Apurva Ungratwar
13.09.2019	Dispensary	Maladie D 'Alzheimer'	Dr. P. S. Shankar Prof. Emeritus, Geriatrics
23.08.2019	Dispensary	Lipid lowering agents	Dr. Sonali Shejul



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Cover Design by  
 Dr. Sheetal Chiplonkar

Dear Readers,

*International Women's Day 2020 was celebrated recently with the theme 'EachforEqual' and it is only fitting that we pause and dwell on the concepts of gender equality and equity in the context of healthcare in India. Gender equality means rights, responsibilities, and opportunities will not depend on whether one is born male or female. Gender equity is another term that is often used in this relation but these terms are not interchangeable. Gender equity is fairness of treatment for men and women according to their respective needs. Hence, it may include treatment that is considered equivalent (not necessarily equal) in terms of right, benefits, obligations and opportunities. Equity forms the base for equality.*



*Equality in healthcare for women is one of the key yardsticks to measure social progress. An empowered woman sets in motion a virtuous spiral wherein women with greater independence actively participate in society, have greater bargaining power, have fewer children, more access to health services, control over health resources and less likely to suffer domestic violence. Further, their children are more likely to survive, receive better childcare at home and in general be looked after better.*

*It is said that the health of the society is related to the health of the women in the society. However, it is often disregarded in India where over 45% women in rural areas are still not having access to menstrual hygiene products. While the government is working on menstrual hygiene management facilities and better healthcare access through various schemes under 'National Health Mission', like 'Swachha Bharat', 'Rashtriya Bal/Kishore Swasthya Karyakram', 'Ayushman Bharat', 'Mission Indradhanush etc, greater collaboration and coordination is required. Women's health initiatives should progress from being mere events to campaigns with clearly defined milestones. Robust monitoring mechanisms have to be in place to measure the impact of these initiatives and take course correction measures where required.*

*A recent study performed in AIIMS, India, concluded that only 34% of their outpatient population were women. Women from non-reproductive age group were often unable to access healthcare. Likewise, families were less likely to travel long distance to access healthcare for a woman compared to a man. They also reported a gender bias in children with congenital heart disease with the likelihood of a male child undergoing corrective cardiac surgery 3.5 times higher compared to a female child.*

*The bias in favour of the male population in accessing medical care needs to be corrected in order to truly progress as a society. Globally, structural gender inequalities in the allocation of resources, such as income, education, health care, nutrition and political voice are causing poor health, reduced physical and mental wellbeing of millions of girls and women.*

*Social reforms and executive action can be the agents of change that would drive us to the desired destination. One example of executive action was the Affordable Care Act (ACA) that was passed by the US Senate in 2010. Prior to the act, insurance companies attached a higher risk weightage to health care policies for women. Events like pregnancy,*

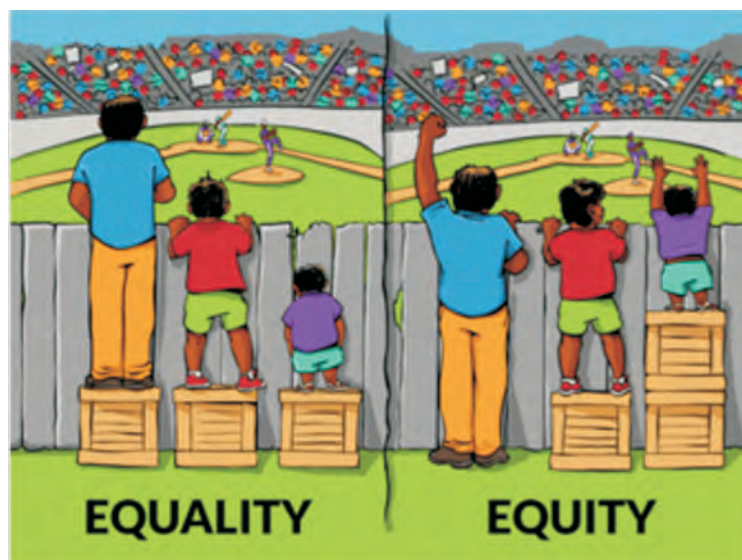
past pregnancies, history of receiving infertility treatments, or experience with sexual assault or intimate partner violence impacted a woman's access to quality health care because of higher premium. It is generally acknowledged that the ACA addressed a lot of such issues and the number of women who became eligible to receive healthcare in the US improved after the ACA was implemented.

In India, the government has launched 'Mahila E-haat, a digital initiative for women to showcase their work to a boarder market. 'Betibachao, Betopadhao' aims to bridge the gap in sex ratio while 'Sakhi', has created one stop centres at various locations for victims of violence. 'STEP i.e support to training and employment program for women' provides skills to women which improves employability or enables self-employment. Thus, executive action can go a long way in ensuring that women have access to health care.

However, society needs to achieve equitable status for women before achieving equality in healthcare in order to emerge as a healthy nation and equal society. It is often said that a picture is worth a thousand words and the illustration below conveys all.\*\*

*Shrividya*

Dr. Shrividya Chellam  
Chief Editor, Pulse



Dear Readers,

The current coronavirus outbreak has immensely affected global activities negatively. Infectious agents such as these viruses have been in existence long before humanity. Despite the rapid advances in science and technology, viral infections remain a major cause of morbidity and mortality amongst humans and have remained an ever-present threat to mankind all throughout our long history.



Civilizations and communities have been wiped off the map due to the outbreaks of infectious pandemics throughout the ages. A small-pox pandemic hit modern-day Greece and killed over 5 million people, consuming entire tribes and villages. In the 1340s, bubonic plague hit Europe and killed more than 100 million, thus crippling the entire continent for centuries. As recently as the 1950s, major flu pandemics killed around 2 million people in China and US. The influenza virus pandemic of 1918–1919 smashed the globe including America, Europe, Asia, and Africa. In 1957 and 1963 influenza pandemics resulted in a massive death toll. Epidemics such as AIDS, measles, malaria, and tuberculosis cause the deaths of millions of people each year. For a large, densely populated country like India, pandemics remain a major threat to societal health.

The problem remains ever-existent due to the continuous and ever-lasting mutations of the viruses, and the complexity in the disease transmission mechanism. Thus, prevention and control of infectious diseases are important for public health. Worldwide efforts are speeding up the developments to fight these emergent and re-emergent infectious diseases. Scientists from different fields extending from medicine, molecular biology to computer science and applied mathematics have come together for rapid assessment of potentially urgent situations. Human behaviour plays an important role in the spread of infectious diseases. Understanding the influence of behaviour on the spread of diseases can be key to improving control efforts. Sense of civic behaviour is highly questionable in India! Coughing, sneezing without covering face, cleaning nose and spitting at public places are some disgusting habits which are responsible for spread of droplet infection, which lead to dangerous respiratory diseases. Dumping garbage, open dustbins and littering at open spaces is regularly visible. Feeding birds and stray animals lead to a different set of problems and create man made health hazards. Hepatitis A and E can be significantly controlled if eating unhygienic, open road side food stuff is avoided. Habit of burning garbage in open areas is dangerous to living being. It is high time that significant proportion of our population modify their behaviour and take preventive measures such as safe distancing, following social etiquettes and conventional preventive measures like frequent hand washing etc.

The rapid technological and theoretical progress has enhanced the ability to fight epidemics. Mathematical models incorporating behavioural immunity as 'behavioural change models' (BCMs) are being extensively used which are useful to describe the dynamics of infectious diseases and predict the likely impact of control interventions. Application of artificial intelligence from available data pool can be helpful for rapid assessment of the situation. Simulation can also be used when the cost of collecting data is prohibitively expensive. Statistical methods for surveillance of outbreaks during a real epidemic can be helpful for future planning and forecasting of the evolution of an ongoing epidemic. Public-health organizations throughout the world use such models. It has been possible to

*produce effective vaccines and antiviral drugs based on knowledge such as the molecular structure of a variety of viruses. Intensive international research is evolving for the design of better drugs, vaccines, and future preparedness. However, factors related to host, pathogen and ecological, social, economic, and demographic conditions across the globe are real difficulties. Technical issues like time lag between vaccine prototype development and commercial production are ever-challenging.*

*Majority of Indians are unique in their social and civic behaviour. More and more medical, scientific and research communities in India also need to be involved in this global effort to combat pandemics. Their valuable contribution in the field will give more robust answers to our unique health issues and help develop indigenous policies for ever-emerging epidemics.*

*AR Kulkarni*

*Dr Anjali R Kulkarni  
Head Medical Division*

# Foetal life to adolescent: anatomical and physiological development

**Dr. Snehalata Dhayagude, DA, FRCA, Former Head,  
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## Introduction

A paediatric anaesthesiologist caters to a wide range of age and weight of children along with wide variety of diseases and clinical conditions. To offer optimized anaesthetic care to patients for variety of procedures and surgeries, it is essential to understand the normal anatomical and physiological development at different age groups of children. Physiological changes during growth do not occur in a linear manner. Premature babies, neonates and infants require special considerations as their organs display incomplete functional maturity.

## Foetal growth

During 4<sup>th</sup> to 8<sup>th</sup> week of gestation, tissues and organs get differentiated from three primitive layers namely ectoblast, mesoblast and endoderm. The embryonic plate folds laterally and its cranial and caudal ends expand, limbs develop and acquires human like shape. During 5<sup>th</sup> to 8<sup>th</sup> week of gestation primitive heart tube undergoes process of looping, remodeling and septation to form four cavities. The embryo acquires the shape of foetus at the beginning of 3<sup>rd</sup> month. During 3<sup>rd</sup> to 5<sup>th</sup> month, foetal growth in length is rapid, approximately 5cm per month. In the last two months of third trimester, weight gain occurs approximately 700gms per month.

## Prematurity

The incidence of prematurity is about 6-11% of all live births.<sup>[1]</sup>



**Dr. Snehalata Dhayagude**

## Paediatric population according to age group can be divided as

- Premature according to gestational age or birth weight
- Neonate: infant in the first 28 days after birth
- Infant: child upto 12 months of age
- Toddler child: 1 to 4 years of age
- Young child: 4 to 12 years of age
- Adolescent: 13 to 18 years of age

Full term neonate weighs 2.5 to 3.5 Kg and has height of approximately 45-50 cm. On an average, birth weight (BW) is doubled by 5 months of age and tripled by 1 year of age. Birth length is doubled by 4 years of age. Within 12-15 years the child's weight will be 12 times BW (>1200%) and height more than 3 times (>300%).<sup>[2]</sup> It is important to know body surface area (BSA) as it closely matches variations in basal metabolic rate (BMR) measured in kilo calories per hour

## Classification of prematurity (Table 1)

According to gestational age	According to birth weight[BW]
Preterm: born before 36 weeks of gestation	Low birth weight: less than 2500 gms
Moderately premature: born between 31-36 weeks	Very low birthweight: less than 1500 gms
Severely premature: born between 24-30 weeks	Extremely low birth weight: less than 1000 gms



per square meter. It is more important than age or weight in judging basal fluid and nutritional requirements. BSA calculation formula is based on standard growth chart written by DuBois and DuBois i.e.  $BSA (M^2) = 0.007184 \times \text{height}^{0.725} \times \text{weight}^{0.425}$ [3]

**Physiological values at different ages (Table 2)**

**Lungs and thorax**

In the uterus, lungs do not participate in the gas exchange. It is taken care of by mother via the placental blood flow. During first 8 weeks of gestation, lung buds are formed from groove in the ventral foregut. The cartilage, muscle, elastic tissue and lymph vessels originate from mesenchymal elements surrounding the lung buds. [4]By 12 weeks, the formation of airway system begins and goes from glandular stage to canalicular and then saccular stage. This

development is completed by 16 weeks of gestation. Cortisol and thyroxin administered to mother or directly to foetus accelerates maturation of lungs resulting in early appearance of type II pneumocytes and surfactant. [5] At birth alveoli are in the form of primitive saccules and their number is 20–50 millions. By 8<sup>th</sup> month of age, their number is 300 million. By 18<sup>th</sup> month, saccules become alveoli and microvascular maturation also occurs. By 8 years of life, number of alveoli reaches adult level of 400–500 millions. The production of the lung surfactant by type II pneumocytes starts at 22 weeks of gestation and rapidly increases, peaking at 36 weeks. It stabilizes the alveoli and prevent collapse by decreasing inspiratory force required for expansion of the lungs. The elastic recoil pressure of infant's chest wall is extremely low due to its compliant cartilaginous rib cage with poorly developed

**Table 2**

	Premature	Term neonate	2months to 2 years	2 years to adolescent	Adult
<b>Weight Kg</b>	< 2.5	2.5--4	4--10	10 --40	70
<b>Water content TBW %</b>	85--90	75 -- 80	75	70	60 -- 65
<b>Blood volume ml/kg</b>	90 -- 100	80 -- 90	75 -- 80	70 -- 75	55 -- 65
<b>Heart rate beats /min</b>	➤ 120	100 -- 150	85 -- 125	65 -- 115	60 -- 90
<b>Blood pressure mm Hg</b>	45-50/24-36	60/35	75-95/40 45	95-115/55-65	120/65
<b>Cardiac output ml/kg/min</b>	>200 ml	200ml/kg/min			100ml/kg/min
<b>Respiratory frequency bpm</b>	40 -- 60	30 --50	20 -- 30	16 -- 20	12 --16
<b>Total lung capacity ml/kg</b>		60	70	75	80
<b>Oxygen consumption ml/kg/min</b>		6 -- 8			3 -- 4
<b>Body surface area m<sup>2</sup></b>	0.1	0.2	0.2—0.57	0.57—1.59	1.59—1.74

thoracic muscle mass. Therefore infants are more prone to lung collapse especially under general anaesthesia when inspiratory muscles are more relaxed. Upper airway receptors are more sensitive in infants. In response to inhalational anesthetics, reflex coughing, breath holding and laryngospasm are commonly encountered. Inspiration is produced mainly by contraction of the diaphragm which creates negative intrathoracic pressure that draws air into the lungs. Expiration is produced passively by elastic recoil of the lung and thorax. Control of breathing depends on interrelated neural and chemical controls.

### Development of ventilatory muscles

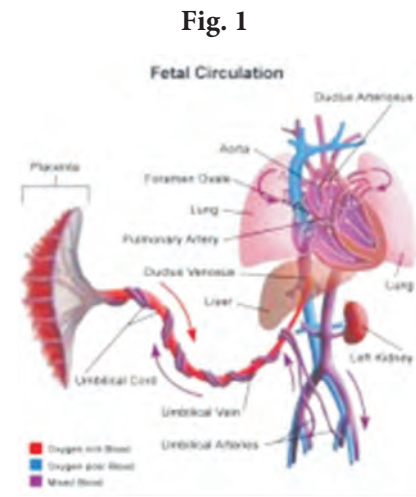
Because of immaturity of respiratory control mechanism, central apnoea (cessation of breathing lasting longer than 15-20 seconds) is common in premature neonates. However periodic breathing in which rhythmic breathing is interspersed with short apnoeic spells lasting less than 10 seconds without cyanosis or bradycardia may be seen in premature as well as full term neonates during sleep and wakefulness. Extra-uterine viability is primarily determined by lung maturity which occurs around 24 weeks. During first 6 months of extra-uterine life, physical growth continues at a rapid pace, and then tapers off gradually by about 2 years of age and then again accelerates at puberty.

### Heart and Circulation

The vascular system of the human embryo starts appearing during third week of gestation. Subsequently heart tube begins to differentiate into epicardium, endocardium and myocardium. The heart begins to beat around 23<sup>rd</sup> day of gestation. Four cardiac chambers are formed between 27-37 days of gestation and cardiac valves begin to develop between 6 and 9 weeks of gestation. Thus, heart starts functioning and contributing to foetal circulation at the end of 1<sup>st</sup> trimester.<sup>[6]</sup> Foetal circulation is dominated by parallel flow patterns of the pulmonary and systemic circulations. Foetal cardiac output is combined total volume of blood ejected by both the ventricles. Ventricular and vascular pressures are similar throughout gestation in both the systems and average pulmonary artery and aorta pressures are 70mm Hg as systolic and 45mmHg as diastolic.

### Foetal circulation (Fig 1)

Immediately after birth the left ventricular pressure increases dramatically resulting in faster development of



left myocardium.<sup>[7]</sup> At birth contractile elements comprise about 30% of the neonatal myocardium as compared to 60% in the adult. Hence small infants cannot increase their cardiac output under stress or hypovolemia (Fig 1).

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Immature heart utilizes lactate as its primary substrate and metabolizes both glucose and amino acids. Heart gradually matures to rely on metabolism of fatty acids as primary substrate by 1 to 2 years of age. Ability of the heart to metabolize amino acids anaerobically is retained throughout the neonatal period. Hence neonatal myocardium shows greater tolerance to hypoxic ischemic insults than the mature myocardium.<sup>[8]</sup> Neonatal myocardium is less compliant because it contains mainly type I collagen while mature myocardium contains type III collagen. Over the first 5 months of life the proportion of contractile protein relative to collagen increases to adult values.

### Central nervous system

Neural tube development occurs during first 56 to 60 days. By third week of gestation, the neural plate appears. The three main subdivisions of forebrain, midbrain, and hindbrain are evident by 5 weeks of gestation. Dorsal horn cells in the spinal cord form synapses with the developing sensory neurons as early as 6 weeks of gestation.<sup>[9]</sup> These sensory neurons grow peripherally to reach the skin of the limbs, trunk and remaining cutaneous and mucosal surfaces by 11, 15, 20 weeks respectively.<sup>[10]</sup> Klimach and

Cooke have shown that somato-sensory evoked responses (SER) are present from 28 weeks of gestation.<sup>[11]</sup> Anatomically development of pain pathways starts at around 7<sup>th</sup> week of conception and is complete by 36 weeks, but it matures to final completion over next 2 years. Central and peripheral myelination is completed by 5 years of age. The lack of myelin and reduced size of nerve fiber favor penetration of local anaesthetics (LA) and rapid onset of nerve blockade. Hence, children require lower concentration of LA and are prone for its toxicity. The autonomic nervous system is relatively well developed in newborn in contrast to central nervous system. Sympathetic components get fully developed by 4-6 months of age.

Blood Brain Barrier (BBB) is highly selective permeable barrier that separates circulating blood from the brain extracellular fluid. The development of BBB is incomplete in newborns and infants. BBB protects brain from many common bacterial infections. It restricts large or hydrophilic molecules into the cerebrospinal fluid (CSF) but allows diffusion of small hydrophobic molecules (oxygen, carbon dioxide, hormones). Cerebrospinal fluid is largely secreted by choroid plexus located in cerebral ventricles and absorbed through arachnoid villi and ependymal lining of ventricles. Total CSF volume in a neonate is 4ml/kg approximately compared to 2ml/kg in an adult. Rate of CSF production in infant is around 0.3-0.5ml/min. It increases gradually to reach 60% of adult value (400-500ml/day) by 2 years of life.<sup>[12]</sup>

### Foetal hemoglobin (HbF)

In the neonate, 70 to 80% of hemoglobin is fetal hemoglobin which reacts poorly with 2,3 DPG. Consequently red blood cells' affinity towards oxygen is very high and oxygen delivery at tissue level is low in spite of increased levels of hemoglobin. For an infant more than 3 months of age hemoglobin level of 8.2 gm% is equivalent to 10 gm% in an adult in terms of tissue oxygen delivery. On the other hand, for a 2 month old premature infant, hemoglobin of 10 gm% is equivalent to only 6.8 gm% in an adult and less than 5.5 gm% in older infants.<sup>[13]</sup> Total replacement of foetal hemoglobin by adult hemoglobin occurs by 3-4 months.

### Renal development

In utero, foetus starts producing urine around 10 to 12 weeks of gestation. By 34 weeks of gestation (weight around 2000 grams) glomerulogenesis is complete. Foetal kidneys

receive about 3-7% of cardiac output and renal blood flow increases gradually after birth. Glomerular filtration rate (GFR) is less in preterm infants than full term infants.<sup>[14]</sup> Renal tubular function begins to develop significantly after 34 weeks of gestation.<sup>[15]</sup>

In premature infants, glomerulotubular imbalance is present which results in Na<sup>+</sup> wastage and hyponatremia. In the first week of life distal fractional reabsorption of Na<sup>+</sup> is 70%. Over the second week of life this increases to 84%. Urine concentrating ability is low at birth and in premature infants. Major cause for the reduced concentration of urine in the neonate is the hypotonicity of the renal medulla.<sup>[16]</sup> Neonates can produce urine with concentration of only 700 mosm/kg during first week of life as against 1000-1400 mosm/kg by adults. Neonates have low threshold for glucose, so mildly increased serum glucose levels (125 gm%) may result in glycosuria and osmotic diuresis. Therefore in neonates fasting for any surgical intervention, it is extremely important to maintain electrolyte and glucose balance by administering appropriate intravenous fluids. The effects of drugs excreted through kidney get prolonged e.g. morphine, pancuronium, antibiotics.

At one month, renal function is about 70-80% of normal adult. Adult values are reached by approximately after one year.

### Liver

At 11 weeks of gestation, formation of liver lobules is complete and bile metabolism starts. By 12 weeks of gestation gluconeogenesis and protein synthesis become established and gall bladder becomes patent. At 22 weeks of gestation bile secretion begins. During foetal life, stored glycogen is much less, hence low birth weight babies have tendency to hypoglycemia.

In low birth weight neonate, oxidation and glucuronidation are very weak; hence drug clearance is extremely slow. Conjugation by amino acids reaches adult values at 6 months of age, while glucuronidation pathways mature by 2-4 years of age. Theophylline is metabolized to caffeine, which is active compound in neonates but inactive metabolite in adults.<sup>[17]</sup> Drug biotransformation of most drugs is decreased in neonates. Their enzyme activities are 50-70% of adult values, but they rapidly mature to adult values by 6 months of age and thereafter continue to be elevated for the first 2 years of life. Later they gradually decrease and reach adult values at puberty. Hence all

anesthetic agents should be meticulously administered in neonates and young children.

**Pancreas**

Morphologically the pancreatic exocrine and endocrine tissues originate as two separate buds which fuse to form single pancreas by the 7<sup>th</sup> week of gestation. The term neonate may show transient functional immaturity despite the relatively mature morphology of pancreas.<sup>[18]</sup> Depressed ability of newborns and infants to digest and absorb lipids and carbohydrates from ingested milk can be attributed to

relative deficiencies of pancreatic functions. The secretion of pancreatic amylase is also not fully developed at birth.

**Abnormal development**

Abnormal development may result from

- Chromosomal anomalies leading to various syndromes
- Incomplete morphogenesis leading to incomplete development of structure
- Inability to attain normal development of organs
- Malformation leading to development of accessory tissues alongside normal tissue organizational defect

**Congenital malformations due to developmental pathology and relative timing (Table 3)**

Malformations	Defect	Foetal age
	<b>Head and neck</b>	
Branchial sinus	Resolution of Branchial cleft	8 Weeks
Cleft Lip	Closure of Lip	36 Days
Cleft Palate	Fusion of maxillary palatal shelves	10 Weeks
	<b>Cardiovascular System</b>	
Transposition of great vessels	Development of bulbus cordis septum	34 Days
Ventricular septal defect	Closure of septum	6 Weeks
Patent ductus arteriosus	Closure of ductus	9-10 months
	<b>Gastrointestinal system</b>	
Tracheo-esophageal fistula and esophageal atresia	Septation of foregut into trachea and foregut	30 Days
Diaphragmatic hernia	Obliteration of vitelline duct and closure of pleuroperitoneal canal	10 Weeks 6 Weeks
Duodenal atresia	Recanalization of duodenum	7-8 Weeks
Malrotation of gut	Rotation of intestinal loop	10 Weeks
Rectal atresia with fistula	Septation of cloaca into rectum and urogenital sinus	6 Weeks
Meckel’s diverticulum	Failure of proximal segment to close, Return of midgut from yolk sac to abdomen	10 Weeks
Omphalocele	Non-return of bowel from extra- embryonic coelem	10 Weeks
Gastroschisis	Occlusion of omphalomesenteric artery and failure of development of lateral folds	Later in fetal life
	<b>Genitourinary system</b>	
Bladder extrophy	Migration of infra-umbilical mesenchyma	30 Days
Bicornuate uterus	Fusion of lower part of mullerian duct	10 Weeks
Hypospadias	Fusion of urethral folds	12 Weeks
Undescended testis	Descent of testicle	7-9 Months
	<b>Central nervous system</b>	
Anencephaly	Closure of anterior neural tube	26 Days

## Conclusion

A clearer understanding of anatomical and physiological development process from foetus to adolescent is extremely valuable to help the anaesthesiologist to steer the optimum course of care during the anaesthetic management of children of all ages. The stage of organ maturation varies with age in each individual child, thus making it essential for the anaesthesiologist to be familiar with each and every age group.

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# Management of household biomedical waste

**Dr. Satish Mishra, Department of Surgery,  
Member, Infection Control Committee, BARC Hospital**

## What is household biomedical waste?

Biomedical waste (BMW) is generated during the diagnosis, treatment or immunization of humans or as part of animal research and has one or all the following properties i.e. contaminated with body fluids, potentially infectious or hazardous (expired/active drugs). This waste is typically generated at healthcare facilities and animal research laboratories.

Household biomedical waste (HBMW) is no different from the BMW generated at a healthcare setup except the quantum and includes the expired/ unused medicines or any waste generated at home that may be soiled with blood or other body fluids. It includes sharps including razor blades and syringe-needles / pens or lancets, absorbent hygiene products (AHP) like adult/baby diapers and soiled sanitary napkins, soiled wound dressings, used barrier contraceptives, pregnancy test kits, colostomy bags, expired medicines, dialysis kits etc.

What are the concerns?

## HBMW is unregulated

A BMW, whether generated at a healthcare facility or a household, is potentially infectious or hazardous. The BMW generated at healthcare facilities is segregated at source in colour coded bins and undergoes a protocol-based treatment by incineration, plasma pyrolysis, shredding, mutilation, sterilization (autoclave/ dry heat) and recycling. In India, BMW in healthcare is regulated by Biomedical Waste (Management and Handling) rules 1998 and Biomedical Waste Management Rules 2016 amended in 2018.<sup>[1,2]</sup> All the healthcare providers are given regular training in waste disposal and the compliance is strictly monitored at various levels right from the local infection control committees to State Pollution Control Board. On the other hand, the HBMW disposal remains unregulated and there are no guidelines for its segregation and disposal in India.

## HBMW is increasing

Studies indicate that BMW in India is growing at an annual



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rate of 7% per annum, but there is a limited data on HBMW.<sup>[3]</sup> Based on a waste audit of 500 households at Hyderabad, Swaminathan et al estimated that HBMW and hazardous waste amounts to nearly 10% of total household waste.<sup>[4]</sup> Further, there are surrogate markers to suggest that HBMW is on increasing trend. There is an increase in life expectancy by almost 10 years in the period 1990 to 2016.<sup>[5]</sup> The burden of communicable diseases, especially diabetes is on the rise, necessitating increase in use of insulin syringe and pens. To reduce burden on hospital beds, home care is being promoted universally and this includes injections, dressings and palliative care needs of terminally ill and bedridden people. Additionally, with increased sanitation awareness, availability, affordability, and strong marketing, consumption of AHP is on exponential rise.<sup>[6]</sup>

## Improper disposal of sharps

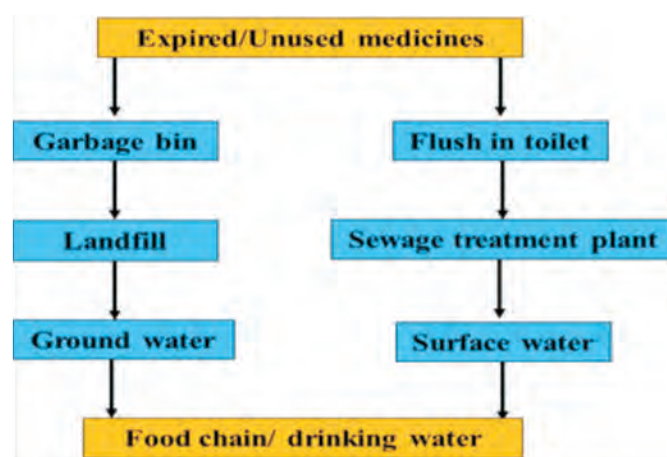
Out of the HBMW, the most important concern is improper disposal of sharps. World Health Organization (WHO) defines sharps as “items that could cause cuts or puncture wounds, including needles, hypodermic needles, scalpel and other blades, knives, infusion sets, saws, broken glass, and nails.”<sup>[7]</sup> The sharps are generated most commonly from the instruments used for self-monitoring of blood glucose (lancet/needles) and self-administration of insulin (syringe needles/pens) by people with diabetes. In an international study, 47% to 67% people with diabetes dispose the sharps in household bins and only less than 10% followed safe disposal in puncture proof box.<sup>[8]</sup> Multicentre

studies from India (New Delhi) and Pakistan report that 80% to 90% people with diabetes discard the sharps directly into their household waste bins.<sup>[9,10]</sup>Worse still, 30% respondents threw sharps in the street.<sup>[9,11]</sup>On an average, a person with diabetes generates 7 syringe needles and 7 lancets per week.<sup>[7]</sup>Due to a careless sharp disposal practice, the domestic waste handlers, sanitary landfill workers, rag pickers, persons in community and even in the household may get serious infections with needlestick injuries. The most common age group vulnerable to needlestick injuries from community are children. In a study reporting needle stick injury in 274 children, 30% injuries occurred in streets, 25% occurred in parks, and overall 65% children picked up the needle out of curiosity.<sup>[12]</sup>The transmission of Blood Borne Virus (BBV) like Hepatitis B virus, Hepatitis C virus and Human Immunodeficiency Virus (HIV) is well established with sharps injuries in healthcare settings. However, the potential for seroconversion in injuries from needles discarded at public places is extremely low since under usual conditions of needle use in the community (small-gauge, low-void-volume syringes) and subsequent environmental exposure (time, heat, drying, humidity), viability of viruses is markedly and rapidly reduced.<sup>[12, 13]</sup><sup>[14]</sup>The most stable virus is HBV which can stay up to 7 to 10 days in stray needles and the most fragile virus is HIV.<sup>[15]</sup>There are few case reports of Hepatitis B and Hepatitis C infection from community acquired needle stick injuries (CANSI), but not even a single case of HIV has been reported till date.<sup>[12-18]</sup>Therefore in CANSI, a post exposure prophylaxis (PEP) against HIV is not recommended but the protocol for Hepatitis B prophylaxis and serological follow-up should be followed.<sup>[15]</sup>Though the risk is small, the psychological impact of CANSI is tremendous and in case of children, parental anxiety is extremely high.<sup>[12-14]</sup>In a study involving children with community acquired needle stick injuries 40% children were subjected to potentially toxic HIV post exposure chemoprophylaxis and of these, majority completed 4 weeks of therapy.<sup>[12]</sup>

#### Improper disposal of unused/expired medicines

Presence of drugs in the water bodies is an emerging environment concern. Most of the pharmaceuticals gain access to environment through human excreta, but improper drug disposal is also an important source of contamination. It is widely reported that most of the expired or unused medicines in households are either

thrown in the garbage bin or flushed down the sewage.<sup>[19]</sup>In a study, analgesics constituted 46% of drugs, followed by pharmaceutical syrups and antibiotics.<sup>[20]</sup>Many of these drugs have stable ingredients that may accumulate in the environment and are difficult to remove in sewage treatment plants.<sup>[21]</sup>The toxic and potentially carcinogenic leachate from landfills, unregulated dump sites and drains can contaminate the surface and ground water resources and return in the food chain through meat, milk, vegetables, fruits and other agricultural produce (Figure 1)



**Figure 1 Method by which discarded drugs reach the food chain**

In a recent study, All India Institute of Medical Sciences (AIIMS) team analysed surface water (river Yamuna) and aquifers collected from 48 places in Delhi and found presence of 28 drugs from different classes, particularly analgesics like diclofenac and ibuprofen, and antibiotics like ofloxacin and fluconazole in Yamuna waters and near dumping areas.<sup>[22]</sup>WHO also reports presence of pharmaceuticals in drinking water.<sup>[23]</sup>Although, the risk to public health from low level exposure to pharmaceuticals in the environment is currently unknown, it could possibly contribute to multi-drug resistance in community and can pose hazard to aquatic life. In a study in 2004, researchers reported a rapid decline of South Asian vultures feeding on animal carcasses and attributed it to acute renal injury due to inadvertent diclofenac (analgesic) poisoning as the drug was in rampant use in livestock.<sup>[24]</sup>This led to ban of diclofenac in India, Pakistan and Nepal for veterinary use.

#### Absorbent hygiene products

AHP include baby diapers, feminine sanitary napkins, and adult incontinence pads. The AHP soaked in menstrual blood, urine and faeces contribute to a significant portion

of HBMW. AHP represent 30% of non-biodegradable waste in sanitary landfills in United States.<sup>[25]</sup> The plastic and polymer constituents of AHP do not disintegrate easily and may remain in landfills for years and are important public health hazard. The infectious and absorbed liquids leach down the landfill, contaminating the environment and water. Further, improperly packed AHP is a matter of dignity and hygiene issues for informal waste collectors and a potential source of infection if due precautions are not taken. The menstrual waste (sanitary pads and tampons) is of special concern as they are potentially most infectious. The menstrual waste disposal practices are deeply influenced by socio-cultural norms and taboos related to menstruation and menstrual blood. At home most women prefer to throw the sanitary pads in garbage bin and outside their home, flush the sanitary pads in the toilets, or litter on the toilet floor due to lack of proper disposal facilities at community or work place toilets.<sup>[26]</sup> The super absorbent polymers (SAP) of disposable sanitary pads absorb fluids, cause the pads to swell and block the sewer lines. In fact, menstrual waste is reported to be a common reason for blocked sewers and can pose challenges for wastewater treatment plants.<sup>[27]</sup>

### **What are international practices for management of HBMW?**

Many developed countries have formulated guidelines for proper disposal of HBMW. The sharps and expired medicines are disposed through already established collection routes like local healthcare setups, pharmacists or mail back services.<sup>[28]</sup> Programmes like syringe exchange programme and free provision of puncture proof container are in place to encourage proper disposal of sharps. The efficacy of these programmes is mixed, depending upon the implementation.<sup>[29]</sup> Similarly there are programs to return the expired and unused medication to the local pharmacies.<sup>[30]</sup> In countries like Australia and the UK the plastic and super absorbent polymers of AHP are recycled into plastic pellets and used to manufacture bins, park benches and building materials.<sup>[31]</sup> Many countries practice incineration of AHP<sup>[26]</sup>

What action is required at various levels?

Management of HBMW needs action at policy level, community level and individual level.

### **Step 1: Recognition of problem, policy decision and formulation of guidelines**

Unlike developed nations where HBMW is regulated and established collection routes exist, India is still lagging in formulating rules for HBMW management. The term “domestic/household biomedical waste” needs to be recognized with a clear definition and guidance should be incorporated in the existing BMW or solid waste management rules for its segregation and proper disposal.<sup>[32]</sup> Ideally HBMW should be segregated at source and collected and managed separately and to inculcate behavioural change among public, both education and legislation are required.

### **Step 2: Awareness creation, community participation, infrastructure & legislation**

Awareness about the danger of mixing HBMW with general waste is generally very low. The best time to create such awareness is when patient is prescribed medication or insulin or recommended self-dressings, or when ladies of menstruating age visit the healthcare providers. In New Delhi, it was found that only 14.1% diabetes patients received education from their healthcare provider regarding proper sharp disposal.<sup>[9]</sup> Often in India, the treating physician either lacks knowledge on HBMW or lacks time for one to one interaction in this regard. Further, unlike west there is no concept of nurse educator in India. The message could still be provided by use of handouts and delegating it to nurses and pharmacists.

Further, awareness needs to be backed by a proper infrastructure for disposal of HBMW. Municipalities are already struggling with solid waste management. Creating another vertical for collection and treatment of HBMW may not be a good idea.<sup>[33]</sup> Rather the existing BMW disposal facilities in healthcare settings may be designated as drop-in collection centres for household sharps and expired medicines. The necessary supplies like puncture proof boxes for sharps and needles may be made available in healthcare facilities either free of cost or at subsidized rates to encourage their use. In one study, 87% patients agreed to dispose sharps in puncture proof boxes but only 34% agreed to pay money to purchase the sharp disposal boxes.<sup>[10]</sup> In New Delhi only 31% agreed and 16% strongly agreed in principle to pay extra for safe disposal of sharps.<sup>[9]</sup>

Behaviour change, however, is not so easy. A study found that those who were educated by physicians were less likely to dispose sharps in the household garbage, but there were still a large proportion of those who received education



(~80%) but still disposes of their sharps in the household garbage.<sup>[10]</sup> Adherence to the safe sharp and drug disposal practices by public and facilitators should be mandated under law.

For safe disposal of menstrual waste, awareness creation programmes at community and institution should be there, backed by infrastructure like provision of dedicated liner bins and incinerators in toilets. Incineration is a good option particularly in workplaces, schools and dormitory settings. Incinerators properly vented and directly connected to the toilet room provide an effective and discrete way of disposing of menstrual absorbents. Ideally incinerators should be of high quality and quickly generate temperatures above 800° C to prevent harmful toxins release in environment.<sup>[34]</sup>

#### **How individuals could segregate and dispose HBMW?**

The solid waste management rules of India recommend that “Every waste generator shall segregate and store the waste generated by them in three separate streams namely bio-degradable, non-biodegradable and domestic hazardous wastes in suitable bins and handover segregated wastes to authorised waste pickers or waste collectors as per the direction or notification by the local authorities from time to time.”<sup>[35]</sup>

#### **Disposal of sharps (shaving razor blades, twin blades, used needles)**

As per National Aids Control Organization (NACO) guidelines:<sup>[36]</sup>

Use a puncture proof box with a lid at the top, dispose the needles till it is filled 2/3 capacity. Recapping the needle, bending/cutting etc should be avoided. Only the needle with hub should be kept in the box and syringe to be separately collected in a thick plastic bag. If your healthcare setup offers drop-in facility, use that to dispose the box.

If puncture proof box collection facility is unavailable, label the puncture proof box hazardous and separately hand it over to the local waste collector or put in municipal waste bin for non-biodegradable (dry) waste.

#### **Disposal of drugs**

No specific Indian guidelines. If healthcare setup permits return of expired medicines, this is best option. Else open wrapper (or bottle) and mix the drug with some absorbent like dirt or soil, separately store it and hand over as

hazardous waste.

#### **Disposal of sanitary waste**

Current solid waste management laws in India recommend wrapping the used sanitary waste (diapers, sanitary pads etc.) securely, in the pouches provided by the manufacturers or brand owners of these products or in a suitable wrapping material as instructed by the local authorities and place the same in the bin meant for dry waste or non- biodegradable waste.<sup>[35]</sup> To address these requirements, manufacturers have started providing plastic wrappers for product disposal.

Alternatively, sanitary waste or barrier contraceptives may be wrapped in double layer of newspaper, a red dot may be made on it for a clear identification of potentially infectious waste and dispose it in non-biodegradable waste. Meanwhile, the Government of India is promoting incineration of menstrual waste in the institutions and techno-feasibility studies are underway.

#### **Disposal of dressings**

There are no guidelines in place. The soiled wound dressings may be doubly wrapped in newspaper, marked with a red dot for identification of infectious waste and put in non-biodegradable (dry waste) bin.

Thus, the above information highlights the importance of proper disposal of HBMW in order to prevent health hazards to sanitary workers, community and to protect the environment from long term effects of improper disposal.

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# Nutrition in critical illness

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## Introduction

Critical illness is often associated with a catabolic stress state and patients demonstrate systemic inflammatory response. Adequate nutritional intervention has shown to attenuate metabolic response to stress, prevent oxidative injury and improve immune response. Nutrition also plays an important role in preventing further metabolic deterioration, promoting tissue repair, maintaining gastrointestinal and pulmonary mucosal barrier.

## Nutritional screening and assessment

Nutritional screening is done to identify patients at high nutritional risk. Firstly, a complete nutritional history should be taken along with examination of muscle mass, body composition, strength, etc. In critically ill patients, family members can give information such as unintentional weight loss during last 3–6 months or recent decrease in nutrient intake. The American Society of Parenteral and Enteral Nutrition (ASPEN) 2016 guidelines recommend using Nutrition Risk Screening-2002 and NUTRIC score for the determination of nutrition risk in critically ill patients. A pragmatic approach should be considered for patients at risk like >48hrs in ICU, undergoing mechanical ventilation, infected, underfed for more than 5 days or presenting with a severe chronic disease.

## Timing

It is recommended that nutritional support should be given to patients who are not expected to resume oral feeding in 7–10 days. Therapy should start within 48 hours in the ICU, preferably after achieving reasonable hemodynamic stability.

## Estimating requirements

The aim is to meet patient energy expenditure, thus decreasing negative energy balance and preventing loss of



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muscle mass. Indirect calorimetry is considered as the gold standard but can be costly and inconvenient. Equations like Harris-Benedict are too time consuming and can over estimate calorie requirement. Weight based equations can be used for calculating energy-protein requirements (11–14 kcal/kg actual body weight/day for BMI 30–50, 22–25 kcal/kg ideal body weight/day for BMI >50). Failing these assessments, patients should receive 25 kcal/kg/day of feed, increasing to target over 2–3 days. Certain subgroups like patients with burns, polytrauma etc have greater nutritional requirements.

Both underfeeding and overfeeding are not desirable. Underfeeding and intolerance are often reported during enteral feeding whereas infectious complications and overfeeding are reported with parenteral feeding. Overfeeding more than metabolic demand is detrimental and can cause re-feeding syndrome with dyselectrolytemia. Best survival is observed with calorie intake of at least 80% of the prescribed target.

## Feeding in hemodynamically unstable patients

During critical illness patients may have reduced peristalsis and mesenteric ischemia especially when they are on high dose vasopressors. In such patients, enteral nutrition (EN) may worsen intestinal ischemia. Once the patient has been

fluid resuscitated and stabilized on declining doses of less than two vasopressors, EN may be started cautiously at low rates with cautious monitoring for signs of intolerance.

### Enteral nutrition

When oral intake is not possible, early (within 48 hrs) EN is the preferred method over parenteral nutrition (PN). Enteral route is more physiologic, maintaining structural-functional integrity of gut and intestinal microbial diversity. EN has limitation in the acute disease phase and gastrointestinal dysfunction, due to its potential lower nutritional adequacy.

Enteral tube feeding can be done with nasogastric feeding using fine tubes, nasojejunal feeding, and percutaneous endoscopic gastrostomy feeding. Wide ranges of nutritional formulae and enteral feed pumps have made EN an effective intervention.

Some patients may not tolerate gastric feeding in case of delayed gastric emptying and poor intestinal motility. Such patients may benefit from postpyloric feeding, if gastric feeding intolerance is not solved by prokinetic agents like intravenous erythromycin or intravenous metoclopramide. Continuous rather than bolus feeding is preferred. EN should not be stopped because of diarrhoea except if no other etiology for diarrhoea is found. EN should be withheld in patients with uncontrolled shock, uncontrolled hypoxemia and acidosis, uncontrolled upper GI bleeding, gastric aspirate more than 500ml/6hrs, bowel ischemia, bowel obstruction, abdominal compartment syndrome and high output fistula.

### Parenteral nutrition

PN should not be started until all strategies to maximise EN tolerance have been attempted. PN can be started after 3-7 days if the patient cannot tolerate EN. EN is the first line strategy in ICU patients with total or supplemental PN where EN is contraindicated, complications develop, energy targets are not met, in acute pancreatitis, GI fistula, short bowel syndrome, etc. Standard formulations are available in preformulated combination bags with an admixture of solutions containing lipids (about 40% of non-

protein calories), carbohydrate (60% of non-protein calories), amino acids, electrolytes, vitamins, minerals and trace elements. The exact composition and infusion rates can be tailored to the patient's needs. It can be delivered via a dedicated central venous catheter or peripherally inserted central catheter or peripheral veins (peripheral parenteral nutrition). The nutritional requirement is better secured with PN but hyperalimentation, hyperglycemia and infectious complications remain the key challenges.

**Carbohydrates:** Glucose is the main carbohydrate in PN with concentrations of 40%, 50% and 70% and can be given upto 5mg/kg/min.

**Protein:** 1.2 – 1.5gm/kg/day in mild to moderate stress and 2.5 gm/kg/day in burns or severe trauma is recommended

**Lipids:** Dose should not exceed 1.5g/kg/day. Olive oil based or soybean oil based lipid emulsions can be used

**Micronutrients:** They modulate the immune and inflammatory response. Many micronutrients are antioxidants. They are often omitted in more than half the ICU patients. Micronutrients can be supplemented in patients on blenderized feeds and those on PN. Immune-modulating nutrients such as  $\omega$ -3 fatty acids, selenium, and antioxidants can be added for patients suffering from trauma, traumatic brain injury and acute respiratory distress syndrome (ARDS).

### Summary

The following chart summarises the approach to nutrition in ICU patient. Early, optimum, and adequate nutrition helps improve patients' overall prognosis and reduces the length of hospital stay. When hemodynamically stable, nutrition should be started as soon as possible (within 48hrs). In unstable patients, the risks of starvation must be weighed against the risks of adverse effects.

Feeding should be increased gradually over 2-3 days to reach the target. Enteral nutrition is the first line strategy. But when not possible parenteral nutrition is a safe alternative if monitored and administered correctly.

ICU NUTRITION PROTOCOL



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## Transient Ischemic Attack (TIA)– a case report

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### Definition

TIA is a sudden, brief episode of neurological dysfunction resulting from a temporary interruption in the blood supply to the brain or the eye, sometimes as a precursor to a stroke.

### Case details

A 52-year-old man with history of hypertension and dyslipidemia developed sudden weakness of the left half of his body with slurring of speech and dizziness while at home during dinner. The episode lasted less than 10 minutes. His neighbors, the first responders, shifted him to the hospital emergency within 30 minutes where he had another similar episode. He was immediately, admitted in the ward where he suffered yet another episode of the same symptoms. A plain MRI brain ruled out an infarction. He had been admitted to the hospital 3 days ago due to sudden temporary weakness of his left upper limb (lasted for a few minutes) for observation for 24 hours. He was regular with his anti- hypertensive medications and had stopped smoking since the last 5 years.

In the hospital for the second time, his haemogram, glucose, homocysteine, lipid, renal and electrolyte profiles including echocardiogram and carotid angiogram were normal. Low molecular weight heparin (LMWH) was started as prophylaxis against embolism and was referred for neurological opinion where a MR angiogram and a diffusion weighted MRI (DWI) was performed. The MR angiogram was normal but the DWI showed a spot of



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hyper-intensity in the right internal capsule region signifying an acute ischemic episode.

Patient was discharged from the hospital on dual antiplatelet agents after a full recovery in 3 days.

### Discussion

A transient ischemic attack (TIA) is like a mini stroke but usually lasts only a few minutes to few hours. Unlike a stroke, it is transient although about 2% to 17% of patients with TIA progress to a complete stroke within 90 days, 50% within the first 48 hours. It can serve as both a warning and an opportunity i.e. a warning of an impending full-blown stroke and an opportunity to take steps to prevent it. Symptoms are weakness, numbness or paralysis of face, arm or leg, typically on one side of the body, slurred or garbled speech or difficulty in understanding others, blindness in one or both eyes or double vision, dizziness or loss of balance or coordination and loss of consciousness. (Fig 1)



Fig 1. Common symptoms of stroke

## ABCD 2 scoring

Inclusions	Criterion	Points
Age	$\geq 60$ years	1
BP	$\geq 139/89$ mm of Hg	1
Clinical features	Speech impairment no weakness	1
	Unilateral weakness	2
Duration of symptoms	10-59 mins	1
	$>60$ mins	2
Diabetes	Yes	1
Total		0-7

Predictions		
Score	2 day risk for stroke	Recurrence within 90 days
0-3	1%	3%
4-5	4%	10%
6-7	8%	18%

11/22

Table 1. TIA to stroke risk scoring ABCD2

• Causes include arterial stenosis due to atherosclerotic plaques and embolism due to a dislodged blood clot from another part of the body, commonly the heart, blocking arterial supply to the brain. Risk factors are classified as

- Non modifiable factors like age, sex, heredity, previous TIAs etc
- Modifiable factors like smoking, sedentary lifestyle, unhealthy diet etc

Contributing risk factors include hypertension, diabetes, dyslipidaemia, overweight, cardiac conditions like valvular heart disease or arrhythmias, carotid artery disease like plaques, stenosis etc. Diagnosing TIA is clinically challenging, as TIAs are sudden in onset, disappear with time and mimics other conditions like seizure or syncope. The clinician depends heavily on history and often, valuable time is lost before coming to a diagnosis.

### Diffusion Weighted MR Imaging (DWI): the game changer

DWI is a special form of MR imaging based on random diffusion of water molecules within a voxel (volume) of tissue. In simplified terms, highly vascular tissues (certain tumours) or those with cellular edema (as happens in acute cerebral ischemia) exhibit lower 'Apparent Diffusion

Coefficients' (ADC) which act as a contrast showing up as a hyperintense area against a normal grey matrix. This technique is particularly useful in detecting TIAs where the ischemia is temporary and the edema disappears with passing time. Early stroke risk is 15% higher in patients showing symptoms of TIA with an area of hyperintensity on DWI. Reported sensitivity ranges from 88-100% and specificity from 86-100%. It should be done preferably within 12 to 48 hours of suspicion of a TIA as it is most potent in detecting the earliest signature of brain ischemia unlike other conventional imaging techniques (CT / MRI brain plain) which only detect established infarction after a full-blown stroke has occurred.

### TIA to stroke: predictive risk scoring

A TIA precedes 2 to 15% of all strokes. About 33% of all patients having a TIA proceed to have a more severe form of stroke within one year. Up to 20% of patients, who have a TIA, die within a year, due to acute embolic episodes involving the brain, heart or kidneys. Hence, it becomes imperative to have a predictive risk scoring system to preempt and prevent a future full-blown stroke. The previously used ABCD (Age, Blood pressure, Clinical features, Diabetes) is no longer in vogue. Most neurological centres now use the modified ABCD2 (Table 1) or the ABCD3 –I



## ABCD 3- I scoring

Inclusions	ABCD 3- I scoring
Age > 60 years	1
BP > 139/89 mm of Hg	1
Speech impairment without weakness	1
Unilateral weakness	2
Duration <59 mins	1
Duration >59mins	2
Diabetes present	1
Dual TIA (second TIA within 7 days)	2
ICA stenosis >49%	2
DW MRI showing hyperintensity	2
Total range	0-13

Predictions		
Score	2 day risk for stroke	Recurrence within 90 days
0-3	Low	2-3%
4-7	Intermediate	6%
8-13	High	>18%

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**Table 2. TIA to stroke risk scoring ABCD3-I**

(Table 2) systems. The second “D” stands for duration of symptoms while the third “D” for dual TIAs with or without the presence of a focal hyperintensity on diffusion weighted MR imaging of the brain signifying ischemia in ABCD3-I. Table 2 TIA to stroke risk scoring ABCD3-I

### Management

Management is determined by the risk score.

- Level 1 (ABCD2 score 1-3)**  
 This category of patients require regular follow up after being prescribed anti-platelet drugs (like aspirin, clopidogrel), statins (like rosuvastatin), angiotensin receptor blocker (like telmisartan).
- Level 2 (ABCD2 score 4-7)**  
 All patients in this category have to be admitted for investigations like carotid colour doppler, MRI brain, carotid arteriography etc.
- Level 3 (ABCD3-I score 7-13)**  
 Patients in this category will require anti

coagulation (warfarin, dabigatran etc). Those having atrial fibrillation will require thrombolytics (like tenecteplase) in case of acute clot embolism. Carotid endarterectomy maybe required in symptomatic carotid artery stenosis while carotid artery stenting maybe considered if endarterectomy is not feasible or is contraindicated.

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# Management of an outbreak of methicillin resistant staphylococcus aureus (MRSA) among neonates in BARC Hospital

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## Introduction

MRSA is a major nosocomial pathogen worldwide responsible for significant morbidity and mortality<sup>[1]</sup>. MRSA is reported regularly in neonates and several outbreaks by it have been reported globally.<sup>[1]</sup> MRSA strains are significant as they develop resistance to common antibiotics like penicillins, cephalosporins, aminoglycosides, macrolides and quinolones. Another important aspect of MRSA is its ability for nosocomial transmission.<sup>[2]</sup> It can be transmitted to neonates through different modes in the hospital setting. One of it is through Health Care Workers (HCW) that are MRSA carriers.<sup>[1,2]</sup> Hospital-acquired MRSA infections in neonates can cause diseases ranging from conjunctivitis, skin and soft tissue infections to blood stream infections and endocarditis.<sup>[2]</sup> We present one such report of MRSA outbreak which occurred in BARC hospital and a multi-disciplinary approach towards its management.

## Material and Methods Setting

The MRSA outbreak occurred in Bhabha Atomic Research Centre (BARC) Hospital among five neonates (three were confirmed on culture and two suspected clinically) within a period of seventeen days. They were delivered in the same institute and shifted to maternity ward of the institute along with their mother after delivery. Case History: Case details are as follows (Table 1)

On examination, eruptions were small, red and filled with pus in first three neonates. The eruptions in other two did not have pus. The pus from first three neonates was sent for Gram stain and aerobic culture. Gram stain showed plenty of pus cells and Gram-positive cocci in clusters. Growth from all three samples was identified as Methicillin Resistant Staphylococcus Aureus (MRSA) by Viek2 compact system. All three neonates were given empirical



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ampicillin-sulbactam intravenously for five days and 2% mupirocin ointment for nasal application twice daily for five days. Standard protocol of isolation and barrier nursing of infected neonates was followed. They responded to treatment and were discharged. Fourth and fifth neonates were given empirical oral amoxicillin-clavulanic acid syrup twice daily for 5 days and 2% mupirocin ointment for application twice daily for five days and were discharged. Mothers of these neonates were screened for MRSA by taking specimens from their nares and axilla. They were found to be negative. Initial suspicion of outbreak was made when pus culture of third neonate also grew MRSA. At this point, in addition to standard precaution of isolation and barrier nursing of infected neonates, strict adherence to hand hygiene by soap, water and alcohol-based sanitisers was implemented by all health care workers. Visitors entry was controlled and alcohol-based disinfectant was kept at the bedside of all patients for use of visitors, care takers and health care workers. Regular surface cleaning and disinfection of the concerned areas was re-emphasised. The Hospital Infection Control Team (ICT) visited the labour room and maternity ward. Records were checked to see for growth of MRSA in patients admitted in that ward in the last thirty days but there were no such cases. Environmental cultures were taken from surfaces of labour room and

Table 1 Case details

Cases	Age/ Gender	Complaints	Details of birth history	NICU stay/birth disorders/risk factors	Culture report
No.1	14 days/ male	Came from home on tenth day after discharge with small red eruptions since two days which started from face and spread to other body parts	Full term, normal delivery with 2.8 kgs birthweight	No/None /oil massage done at home	Growth of MRSA from pus of pustules
No.2	11days/ male	Came from home on seventh day after discharge with small red eruptions all over face, neck and left hand since two days which spread to other body parts	Full term delivery by caesarean section with 3.3kgs birth weight	No / case of Hb E trait/None	Growth of MRSA from pus of pustules
No.3	17days/ male	came from home on thirteenth day after discharge with red eruptions over groin since two days which spread to back and buttocks	Full term delivery by caesarean section with 2.5 kgs birth weight	No/None /oil massage done at home	Growth of MRSA from pus of pustules
No.4	3 days/ male	developed red eruptions over back on day three of birth while in hospital	Full term delivery by cae sarean section with 2.08 kgs birth weight	No/None	Not received sample for culture
No.5	3 days/ male	developed red eruptions in inguinal region on day three of birth while in the hospital which spread to axilla.	Full term normal delivery with 3.16 kgs birthweight	No/None	Not received sample for culture

maternity ward. All health care workers of concerned wards were screened for MRSA carriage by collecting specimens from nares and axilla. Six HCWs were found to be MRSA carriers. The antibiotic susceptibility pattern of isolate from one of the neonates was similar to that of some of the HCWs who were found to be MRSA carriers (Table 2). The HCWs were recommended decolonisation therapy which included a five-day course of 2% mupirocin nasal ointment application twice a day and daily chlorhexidine bath. Forty-eight hours after the decolonisation therapy, three nasal specimens were collected at weekly intervals and were negative for MRSA. The outbreak came to an end after taking all these collective measures and no further cases have been reported since.

### Discussion

Neonates can acquire *Staphylococcus aureus* through various means like birth canal, breastfeeding, contact with people and surrounding environment.<sup>[3]</sup> First three neonates were discharged and came from home with lesions and two of these also gave history of oil massage to the body. Hence it appeared that these neonates might have acquired infection from community. But prevalence studies have found that most patients carrying MRSA in community had recent hospital exposure.<sup>[4]</sup> Due to the transmission and evolution of MRSA, there is recent emergence of Community Acquired MRSA (CA-MRSA) outbreak in health-care settings.<sup>[3]</sup> Rosenthal A et al found that an outbreak of CA-MRSA was reported among healthy newborns and maternity patients in a hospital.<sup>[5]</sup> According to

**Table 2. Antibiotic susceptibility of MRSA isolates of cases and HCWs**

Antibiotic	Case 1	Case 2	Case 3	HCW 1	HCW 2	HCW 3	HCW 4	HCW 5	HCW 6
MLSBI (inducible clindamycin resistance)	Negative	Negative	Positive	Positive	Positive	Positive	Positive	Negative	Negative
Vancomycin	S	S	S	S	S	S	S	S	S
Teicoplanin	S	S	S	S	S	S	S	S	S
Linezolid	S	S	S	S	S	S	S	S	S
Erythromycin	R	S	R	R	R	R	R	R	R
Clindamycin	S	S	R	R	R	R	R	R	R
Levofloxacin	R	R	R	R	R	R	R	R	R
Ciprofloxacin	S	R	R	S	R	R	R	R	R
Gentamicin	S	R	R	S	S	S	R	S	R
Trimethoprim/ sulfamethoxazole	S	R	S	S	S	R	R	S	S

other authors, outbreaks in hospitals can be caused by both CA-MRSA as well as Hospital Acquired-MRSA (HA-MRSA) clones.<sup>[6]</sup> As these three neonates were discharged from the hospital recently, the infection could have been acquired from hospital at the time of discharge which presented later or they could be community acquired and presented as CA-MRSA outbreak in hospital. Immediate control measures like contact precautions, hand hygiene and environmental cleaning were implemented to prevent occurrence of further cases as these are

the current strategies in preventing MRSA transmission.<sup>[7]</sup> After these three cases, two more clinically suspected cases of MRSA infection occurred in neonates in the same ward while they were still in the hospital. They developed similar but milder eruptions as compared to previous cases. Hence their sample was not received for culture. But in light of a possible outbreak and keeping in mind the possibility of aggravation of lesions, treatment was started in these neonates at this point. As cases continued to occur even after the third case, surveillance cultures of environment and HCWs were done to find out the source.<sup>[5,6,7]</sup> Mothers of these neonates and HCWs of the concerned wards were screened using nasal and axillary swabs as these sites were found to have 57% sensitivity of detection as compared to a single site.<sup>[3,7-9]</sup> Six HCWs were found to be MRSA carriers. Due to close contact with HCWs there is enhanced prevalence of MRSA carriage in health care settings as compared to community. So, hospitalised neonates have a higher MRSA carriage in health care settings as compared to community.<sup>[3]</sup> Various authors have observed role of HCWs in nosocomial transmission of MRSA.<sup>[1,2,7]</sup> Antibiotic susceptibility pattern of one of the isolates matched with that of some of the HCWs. This probably indicates the acquisition of MRSA strain by that neonate at the time of delivery. But the antibiotic susceptibility pattern of other two MRSA isolates from other two neonates were different. So, there could be more than one strain involved resulting in outbreak as multiple strains circulating during a non-outbreak setting have been found.<sup>[7]</sup> Also, presence of different strains in HCWs which did not reflect in all neonates indicates additional bacterial reservoirs.<sup>[7]</sup> Decolonisation of HCWs with mupirocin was done as per recommendations.<sup>[10]</sup> After taking all these measures together, further cases did not occur. Hence, we assume a combination of MRSA source which were through

colonised HCWs along with some other source resulting in this outbreak. Transmission may have occurred through insufficient adherence to hand hygiene or other preventive measures. The transmission was interrupted when all control and preventive measures were taken together.

### Conclusion

It was hypothesized that more than one strain could be responsible for this outbreak which was epidemiologically linked to a certain extent, to the colonised HCWs. But other sources could also be involved. The key to managing neonatal MRSA infections and averting such outbreaks always lies in basic prevention measures which include hand hygiene, use of Personal Protective Equipment (PPE), environmental cleaning and disinfection, cleaning and sterilisation of medical equipments, contact precautions, barrier nursing and cohorting.<sup>[11]</sup>

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# Medications in management of behavioral and psychological symptoms of dementia

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## Introduction

At least 50 million individuals are currently suffering from dementia globally. WHO estimates that by 2025, 75% of the 1.2 billion people aged more than 60 years in developing countries are likely to be affected. Nearly one third of CHSS beneficiaries are from the geriatric age group. This is far more than the average geriatric population (in proportion) of the developed countries like Japan, Europe, UK and US, while the Indian national average stands at a mere 9%. The presentations in early, middle and later part of dementias are different and their management becomes more and more challenging with 2.3 times increase in mortality in those with dementia due to presence of challenging behaviors. These behavioral and psychological symptoms of dementia (BPSD) are a cause of significant concern to the patient as well as the caregiver. This increases burden for the family unit and thereby worsens the outcome.

## Behavioral and psychological symptoms of dementia

Behavioural changes, paranoid delusions, hallucinations and long periods of screaming were the symptoms described by Alzheimer in 1907 in his original case description of the disease. Though they are not included in the classification systems as a primary feature, research shows that the lifetime risk of these disturbances is nearly 100%. By definition, these are behaviours that put the patient and others at risk of harm. Common complaints include hitting at others, yelling/cursing, irritability, wandering, disrobing, hoarding/stealing and anxiety. Some of these such as disinhibited sexual behavior may be very distressing for the family & is one of the main reasons for referral.

## Assessment of the symptoms

- Prior to starting medications, management must include a thorough interview from both the patient and the caregiver. It is necessary to speak to the patient as it improves rapport and provides an understanding of the



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situation. It must be kept in mind that the accompanying relative may not be the primary care giver; which in many cases may be the elderly spouse. In such cases, the details may be inadequate since information must be obtained from the care-giver who spends most of the time with the patient. BPSD increases the care-giver burden and is known to increase risk of interpersonal conflicts, abuse and behavioral issues. Hence information regarding future course of the dementia should be imparted to the family. The interview should include the following details.

- The antecedent-behavior-consequence (ABC) pattern of the challenging behavior. Information regarding triggers and exacerbating factors, temporal pattern and subsequent behavior can help in preventing further episodes.
- Medical problems: any identifiable medical illness that contributes or masquerades as a behavioral disturbance. These can be recent illnesses such as fever, head injury, falls, pain, gastrointestinal problem, genitourinary problems. Inadequately treated seizure disorder or new onset epilepsy in the old may also be a cause.
- Social reasons: Loss of life-partner/close friends can be a trigger. Maladaptive patterns of communication between the patient and the care givers lead to conflicts and arguments.

- Environmental changes: Lack of a schedule, loss of a regular hobby, changes in their living space or new carers can lead to behavioral problems due to difficulty in adjusting. These can be as simple as new furniture, shift of their room or installation of a new TV.
- Exploration of psychiatric symptoms after ruling out all of the above. History of prior psychiatric illness must be enquired into, including any worsening of symptoms.

### Pharmacological management

Usage of drugs for behavioural management is common in dementia. However, current guidelines recommend initial usage of non-pharmacological methods. Structured activity, scheduled lifestyle and adequate social support are most effective. Prior to prescribing medications, details of drugs patient is already on, their interactions or recent change in medications must be sought to rule them out as cause for symptoms. Use of medication does not help in all forms of behavioural disturbance and risk benefit ratio should be considered for every intervention. Following is a summary for use of pharmacological means to treat BPSD in dementia.

### Benzodiazepines sedatives

Benzodiazepines are GABA agonists that improve the duration of sleep and decrease the latency of sleep onset. These are extremely popular for use in clinical practice. They are effective over a short term, since long term use of benzodiazepine agents are associated with dependency and multiple falls. Special care must be taken to avoid use of high potency short acting drugs such as alprazolam. Synergistic action with other medications may increase risk of side-effects and drug interactions. Newer agents such as melatonin may be safer and equally effective as it acts physiologically through the circadian sleep cycle. However, detailed review of melatonin is not available at this point.

**Recommendation:** These agents are to be used only in acute crisis and should not be used routinely. They should not be used for more than 4 weeks. Regular or long term daily use does not translate into reduction of problem behaviors.

### Cholinesterase inhibitors

Memory impairment in dementia is treated by use of cholinesterase inhibitors namely donepezil, rivastigmine and galantamine. These agents increase the level of acetylcholine in the brain by inhibiting acetyl-

cholinesterase. Other agents such as memantine work on NMDA system. Common side-effects include bradycardia and gastrointestinal disturbances.

Though they are effective in improving cognitive function, use of medications that improve the cognitive functions has not translated to better control of BPSD. It is necessary to understand that cognitive and behavioral symptoms are independent domains. Only in specific forms of dementia such as Lewy body dementia, use of rivastigmine has shown to be effective in some studies.

**Recommendation:** Improvement in cognition may help some dementia patients to function better although these agents do not directly reduce BPSD.

### Dopamine antagonists/ anti-psychotics

Dopamine antagonists or anti-psychotics are one of the most commonly used agents in management of behavioral problems across all age groups. First generation or typical antipsychotics include haloperidol, trifluoperazine, fluphenzine etc. and these act solely as dopamine blockers. They are known to cause extrapyramidal reactions (EPR) like tremors, rigidity, dystonia and tardive dyskinesia. The newer agents or second generation/atypical antipsychotics include olanzapine, risperidone, quetiapine and these act on both serotonin and dopamine antagonists. The risk of EPR is lesser with these agents however they cause weight gain, hypercholesterolemia and increased risk of diabetes mellitus.

**Recommendation:** They are effective in controlling behavioral problems and have to be used for rapid tranquilization. Caution is advised with these agents due to risk of mortality associated with them.

### Analgesics

Constant pain in the elderly can lead to irritability and agitation. As many as 84% of elderly have some form of pain. Anger and agitation is the presenting feature in those with severe debilitation and inability to communicate pain. These are usually from arthritic pains i.e. knee or shoulder joint involvement. Persons with dementia have greater propensity to be affected by pain and undiagnosed illnesses compared to those without cognitive impairment. While it may be surprising, use of simple analgesics is advocated as initial therapy. Care regarding gastrointestinal effects must be kept in mind when using these agents. Additionally, many of these patients are already on aspirin or may have



renal insufficiency.

Recommendation: Trial of non-opioid analgesics may benefit in all elderly, even in those who are not presenting with complaint of pain.

### Summary

Early identification and management of BPSD is the main goal due to significant morbidity and caregiver burden associated with it. Involvement of family to identify triggers and evaluation based behavioural and environmental interventions are recommended as first-line treatment, followed by judicious addition of medications. Analgesics, cognitive enhancers and atypical antipsychotics are beneficial in improving the quality of life.

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## Vaginal hygiene

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Vaginal hygiene is extremely important for every woman's health. Keeping the vulva clean in the correct way can make a significant difference to the incidence of vaginal infections. The most important aspect of vaginal hygiene is maintaining its pH. A normal vaginal pH is slightly acidic and when this changes, women start to experience symptoms of infections which might include irritation, itchiness and pain. Vaginal hygiene can be maintained by observing the following points

### Washing

Maintaining a clean vagina requires regular and gentle bathing on the outside of the vagina. Water is the best cleanser and there is no need for commercially available vaginal cleansers.

- Vulval area should be washed with warm water daily, even if a shower is skipped. Rinsing with warm water removes unwanted bacteria; and the area should be pat dry.
- Vaginal douching should be avoided as it can strip the vagina of vital bacteria and disrupt the pH, causing infections and irritation. Even if there is vaginal odor, douching will only cover up the problem or possibly make it worse but not fix it.
- After using the toilet, wiping should be always from front to back, not in the opposite direction. Use of scented soaps should be avoided as these can irritate the area and may cover up gynecological issues that might be causing odor.
- The hair at the pubic region exists to protect it. However, trimming with scissors may be done if required. Shaving this area can cause irritation, cuts and nicks which may introduce bacteria. Hair removal cream can be harsh on this skin causing irritation or reactions.
- Vaginal discharge that is clear, white/light yellow and without odor is normal.

### Sexual intercourse and vaginal hygiene

Sexual intercourse is a healthy activity and should not be



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considered unhygienic. The following points help avoid infections after coitus.

- During coitus, bacteria can sometimes get introduced into the urethra. Urination afterwards helps to flush them out and prevents urinary tract infection
- After coitus the vulva should be cleaned with warm water and pat dry.
- Condoms should be changed when switching among vaginal, anal and oral intercourse to avoid spreading bacteria.
- Sex toys should not be shared with the partner.
- **Clothing**

The key to good vaginal hygiene is to make sure the external pubic area remains dry as moisture can promote the growth of bacteria.

- Inner wear fabric must preferably be cotton and should be changed twice a day if there is extra discharge to avoid prolonged dampness.
- Tight-fitting pants that restrict circulation of air in the vaginal area should be avoided.
- White or light colored inner wear is preferable as dark textile dyes may cause allergies.
- New inner wear should be washed before wearing. They should be rinsed thoroughly after washing and use of excess detergent or fabric conditioners should be avoided.
- Wearing thongs while exercising should be avoided as

the constant movement can introduce anal bacteria into the vagina resulting in infections.

#### **General vaginal hygiene**

- Tampons, pads and liners should be changed at least 3-4 times a day. Scented versions of these products should be avoided. Vulval area should be washed regularly during period.
- For vaginal infections, including yogurt in the diet can be helpful as it contains lactobacillus acidophilus which helps to create the acidic environment the vagina requires.

However, direct application of yogurt into vagina can exacerbate infections.

- Practices of inserting any home remedies into the vagina for treating vaginal infections should be strictly avoided.

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## Data visualization

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Visualization is the process of representing data visually. It is useful to communicate complex ideas quickly, clearly and in a simple 'data story' manner, to understand their significance. Visualization also helps to take an appropriate action.

Use of pictures as well as graphics for understanding data has been used since centuries. The great developer of 'Exploratory Data Analysis', John Tukey, 1977, has stated that "The greatest value of a picture is when it forces us to notice what we never expected to see."

It is often assumed that data visualization is primarily about graphic design although other components demand equal attention. As stated in Finagle's Laws of (Public Health) Information,

The information you have is not the information you want,

The information you want is not the information you need,

The information you need is not easy to obtain,

The information you obtain is not worth the costs you pay for it

The principles of visualization are based on the science of perception and cognition in which visual perception (i.e., seeing) is handled by the extremely fast and efficient visual cortex of the brain while cognition (i.e., thinking) is handled primarily by the relatively much slower and less efficient cerebral cortex of the brain.

Traditional analysis and presentation methods require conscious thinking for understanding the data. It would be impossible for any single person to go through all data thoroughly and see distinct patterns and make interpretations. The human brain can process visual information more quickly than written or verbal information. As stated by the 'World Economic Forum', the world produces 2.5 quintillion bytes of data every day, and 90% of all data has been created in the last two years. By looking over this vast amount of information and data available, it is challenging to tell a compelling story out of it in just a text form. Our short-term memory can only remember very few



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pieces of information at a time. However, visualization can leverage visual perception to help the brains interpret information even before the 'thinking brain' engages its short-term memory. Data visualization, through charts, maps, and illustrations, allows us to see and explore data, and ultimately use them to make appropriate decisions. Global health analysts, managers, and policymakers worldwide are using data visualization to make informed decisions

Four key steps are required to build an effective data visualization (Fig 1)

- Identify the audience and context  
Who are the participants? What is the literacy of the audience, their comfort with technology and graph formats, level of technical expertise, job function and context? What precisely the audience wants to know?
- Find the story in data  
Review the data to formulate the data story. Check if there are any identifiable patterns, trends, surprises, relationship, success, or failures present.
- Build visualization  
Choose the right chart for data. Various chart/graph types are available like a bar chart, pie chart, bubble graphs, area graphs, and scatterplots. Visualization should be readable and easy to see. The graphic should be easy to understand and should be framed in such a way that it highlights

the story well.

- Disseminate, share, and use

Data visualization products must be actively disseminated to the intended audiences to improve

awareness and use. Many visualizations begin with a printed report but can be shared in many other ways like user-friendly print materials, on websites, through social media, and during presentations.

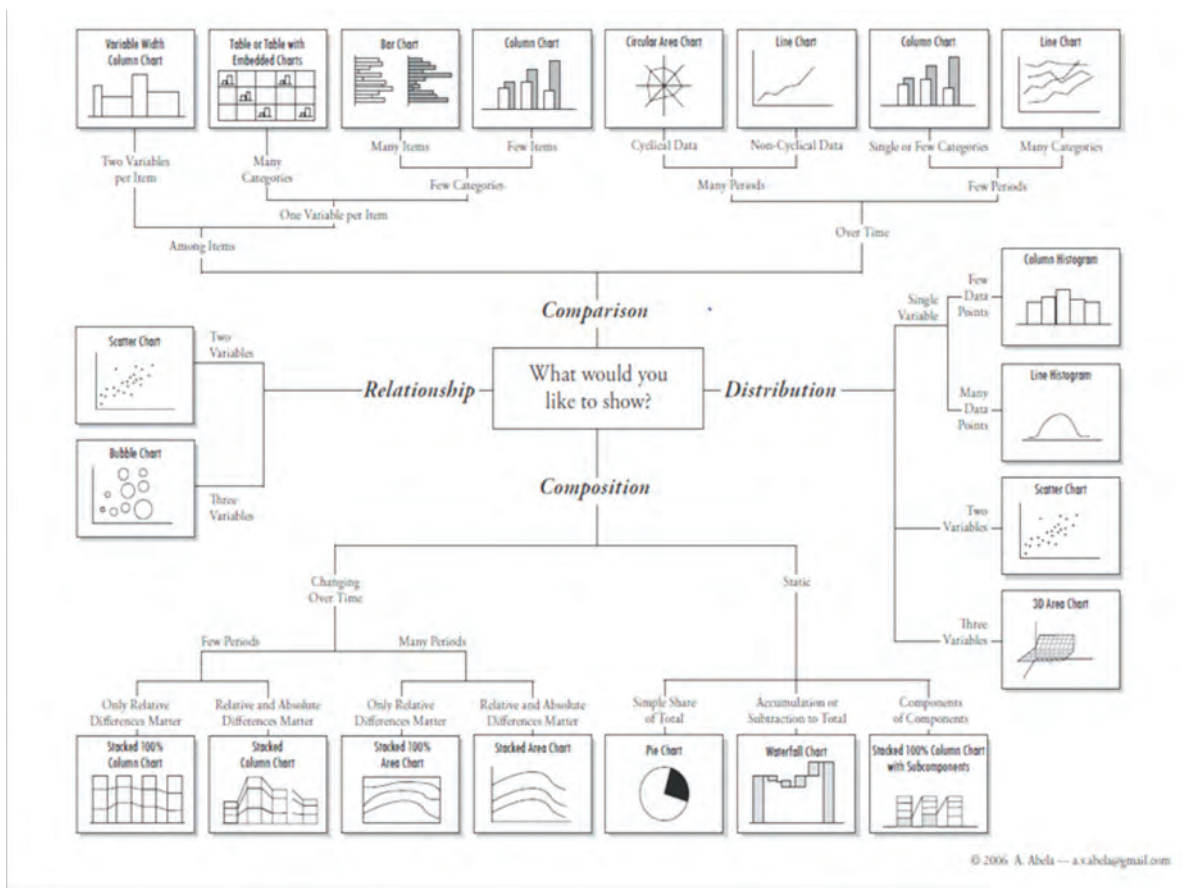


Fig. 1. Effective data visualization

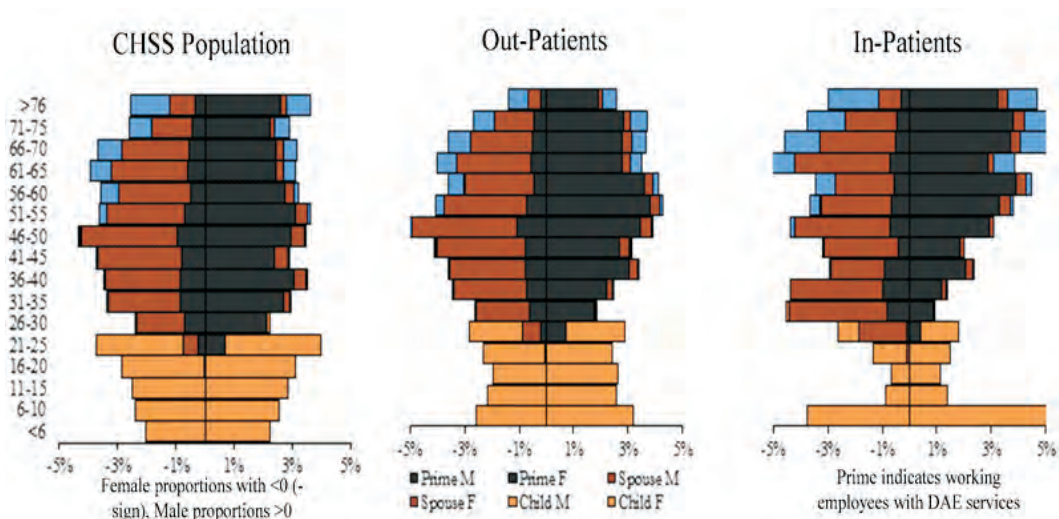


Fig. 2. Population Pyramid: CHSS Beneficiaries, Outpatient Visits, Inpatients Visits

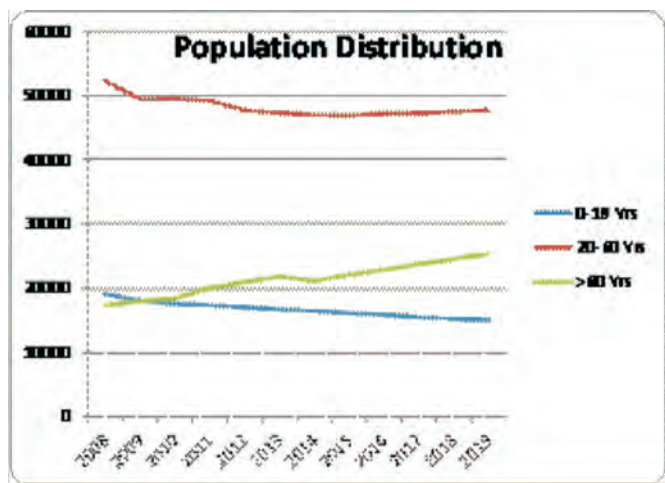


Fig. 3A. Before appropriate visualization

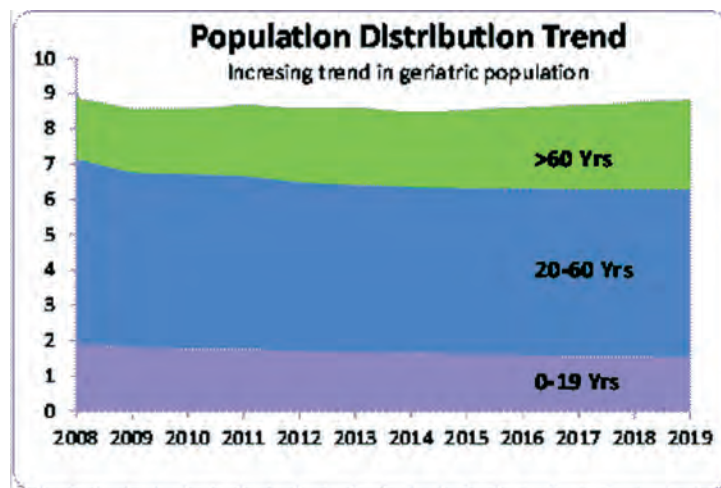


Fig. 3B. After appropriate visualization

**Case study1**

Based on above discussion, we have made an attempt to elaborate data story of CHSS beneficiaries and pattern of their demographics proportion while availing outpatient and inpatient care at BARC Hospital. (Fig 2)

**Case study 2:**

Representation of CHSS population trend over 12 years (Fig 3A, 3B).

Thus, after choosing the right visualization for a story, it is possible to make the graphic simple and easy to understand while telling the readers the exact story which presenter wants them to remember.

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## A tale of two cities...or worlds; musings of palliative care team

**Dr. Harry Ralte, MOIC, Kharghar Dispensary,**

**Dr. Nandini Vallath, Visiting consultant,**

**Palliative care team, BARC Hospital**

We were into our fifth, or was it the sixth month, after the start of home visits for patients deemed to be in need of palliative care. These visits happen on Wednesdays, and cover an area approximately 6 Km around Anushaktinagar. They are 'scheduled', with the need and frequency decided by the palliative team after careful clinical evaluation of the patient, and are not 'emergency' services.

Let us now delve into one such visit.

The first home was that of Shri. Jagannathan (name changed), a man afflicted with advanced bladder cancer that had infiltrated the skin of his genitals as well as the pubic area leaving a fungating growth in these areas, requiring daily dressings as well as pain management. He lay in his small chawl tenement in Trombay, cared for by his two sons, daughter and daughters in law. The elder son does the dressings with metronidazole jelly, applying crushed tablets of the same medicine which decreases the foul odour of such cancerous skin lesions. The daughter in law serves him tea. She offers us some, but we politely decline. The 7-year-old grandson peeps at us from behind the 'stairs' that lead to the upper portion of the small room. Our team had previously demonstrated and taught the caregivers (his son and daughter) the techniques of dressing his wounds, changing the pain-relieving fentanyl patch and administering medications.

The official vehicle then takes our team to a prosperous society in Deonar area where we visit Smt. Geeta (name changed), a bed bound elderly lady who does not have cancer, but a neurological condition that has affected her basic bodily functions, not her mind. She smiles at us, and her forgetful spouse, always besides her, rises from his easy chair to greet us. The two employed caretakers look at us, the look implying caution, not warmth. Theirs is a big house, with a TV on the wall opposite where Smt. Geeta lies in bed, day after day. With their permission, we video graph the cleaning of her urinary catheter, the method of correctly



**Dr. Harry Ralte**

turning her in bed as well as the methods of giving gentle physiotherapy for her joint contractures. These clips were shared with the patient's daughter, a doctor herself, for ready reference as also for the caregivers, who may change with time.

The care provided by our team was customised to the individual patient's needs. Shri. Jagannathan had expressed a wish to travel to his hometown down south, for an important religious ritual to commemorate his late wife's death anniversary. We provided clinical advice, medication, taught the family members how to provide care and were in constant touch with them; and he did travel. When he returned, there was a glow of contentment on his face, despite his cachexia having progressed. In Smt. Geeta's case, the children had communicated that the caregivers might be changed over time, which was why we, after permission from the family, had to record the care methods so that in case the caretaker changed, the videos would help the new staff.

These two different settings of providing home palliative care also revealed our team's flexible approach in providing palliative care. Additionally, we provided contact details of other teams like Tata Hospital, PalCare India, Romila Palcare etc for individuals requiring palliative care but residing in far off suburbs which preclude our team

travelling there.

As we waved the old couple and their watchful caregivers goodbye, the contrast of the two houses we had visited were in all our thoughts. Firstly, the size of the houses each of the affected person lay in, along with obvious materialist differences; secondly and oddly, both individuals seemed happy to the extent that their respective medical conditions allowed them. In their own personal way, both Shri.Jaganathan and Smt.Geeta, had a look of acceptance in their eyes. We talked about the two worlds as we returned to the hospital to our OPD in room 2, surgical department.

Shri.Jaganathan passed away a week later, in the hospital,

surrounded by his family. Our visit to Smt.Geeta's house continues as per schedule...

Palliative care, started in 2017 at BARC hospital, has had some effect in decreasing unnecessary admissions/casualty visits, futile interventions and fruitless man hours of ICU staff who would otherwise have had a terminal patient on ventilator. Dying at home or in the ward, surrounded by loved ones, with as much comfort as is possible, is a dignified and probably superior alternative to passing away alone in a sterile ICU.

“There is an end to cure, but there is no end to care...”



## Overview of annual day 2020

**Dr. Snehal Nadkarni, Head, Department of Ophthalmology &  
Convenor, Annual Day 2020, BARC Hospital**

Medical Division celebrated its 44<sup>th</sup> Annual Day in January 2020. The scientific programme held on 14<sup>th</sup> January 2020 consisted of two informative talks given by eminent speakers. After the inaugural session, the first talk was given by Shri Prashant Umrani, Assistant Commissioner (Food), Food and Drug Administration (FDA) on 'How safe is your food?' dealing with the safety aspects of food which are essential for the general public. In view of variety of food available on sale in restaurants, hotels, roadside eateries, online apps and ready to eat meals etc, this was a very relevant albeit vast topic. Shri Umrani covered it well with anecdotal references to situations faced during his career as food inspector of FDA. The second talk on "Managing emotions in daily life" was by Dr Manoj Bhatawdekar,



**Dr. Snehal Nadkarni**

consultant psychiatrist. Dr Bhatawdekar talked not only about anger as an emotion which is causing a lot of damage in interpersonal relationships at home, schools or workplace but also about methods to be used for anger control.



**Chief guest Shri Kamachi Mudali, Chairman and Chief Executive ,  
Heavy water board, with other dignitaries.**



**Mr. Achyutanand Palei, Pharmacist, BARC hospital welcoming Shri. Prashant Umrani, Assistant Commissioner (Food), FDA.**



**Staff Nurse Mariamma Renji, BARC hospital welcoming Dr. Manoj Bhatawdekar, consultant psychiatrist.**

As part of scientific programme this year, the employees of medical division recorded short video clips containing health and social messages. 15 clips were envisaged, directed and acted in, by groups formed by the employees. The topics of the videos were varied from health care messages regarding

avoiding alcohol, tobacco, early cancer detection, care of special child, social messages like pre marriage counselling about blood group matching and cardiopulmonary resuscitation to name a few. These were shown during the scientific programme between talks and will be shown at various sites within BARC, at dispensaries and the hospital over the coming months as part of community outreach programme. A diet exhibition aptly titled “Modular kitchen to metabolic kitchen” was organised under the guidance of Dr (Smt) Anjali Kulkarni, Head Medical Division on 16<sup>th</sup> January 2020 open to all DAE employees and residents of Anushaktinagar. The exhibition showcased food pyramid, various medically approved diets in the form of charts, cooked food and raw materials. The participants were employees of the medical division who were present on site to explain and answer any questions. The diets on display included healthy diet, diet for weight loss, salt restricted diet, diet for diabetics and many more with around 25 display counters. The exhibition received an overwhelming response from the beneficiaries of CHSS and the DAE employees. The medical division intends to hold more of such exhibitions for the benefit of people.

Team Medical Division with director, BARC at the diet exhibition



Shri. P. Govardhan, Controller, BARC at the inauguration of 'Diet Exhibition' with Dr (Smt) Anjali Kulkarni, Head Medical Division, BARC hospital and other dignitaries.



**CHSS beneficiaries and visitors from different parts of the city took delight in the diet exhibition**



**Dr (Smt) Anjali Kulkarni, Head Medical Division, BARC hospital with the organising team of 'Diet Exhibition'**



The cultural committee performing 'Ganesh stuti' as a part of 'Carvaan 2020'



Team Medical Division at the 'walkathon'

Medical division also celebrated cultural day 'Carvaan 2020' on 15<sup>th</sup> January which saw 145 participants from the

hospital and dispensaries showcasing their unique talents.



**Yoga session in progress at the hospital lawns**

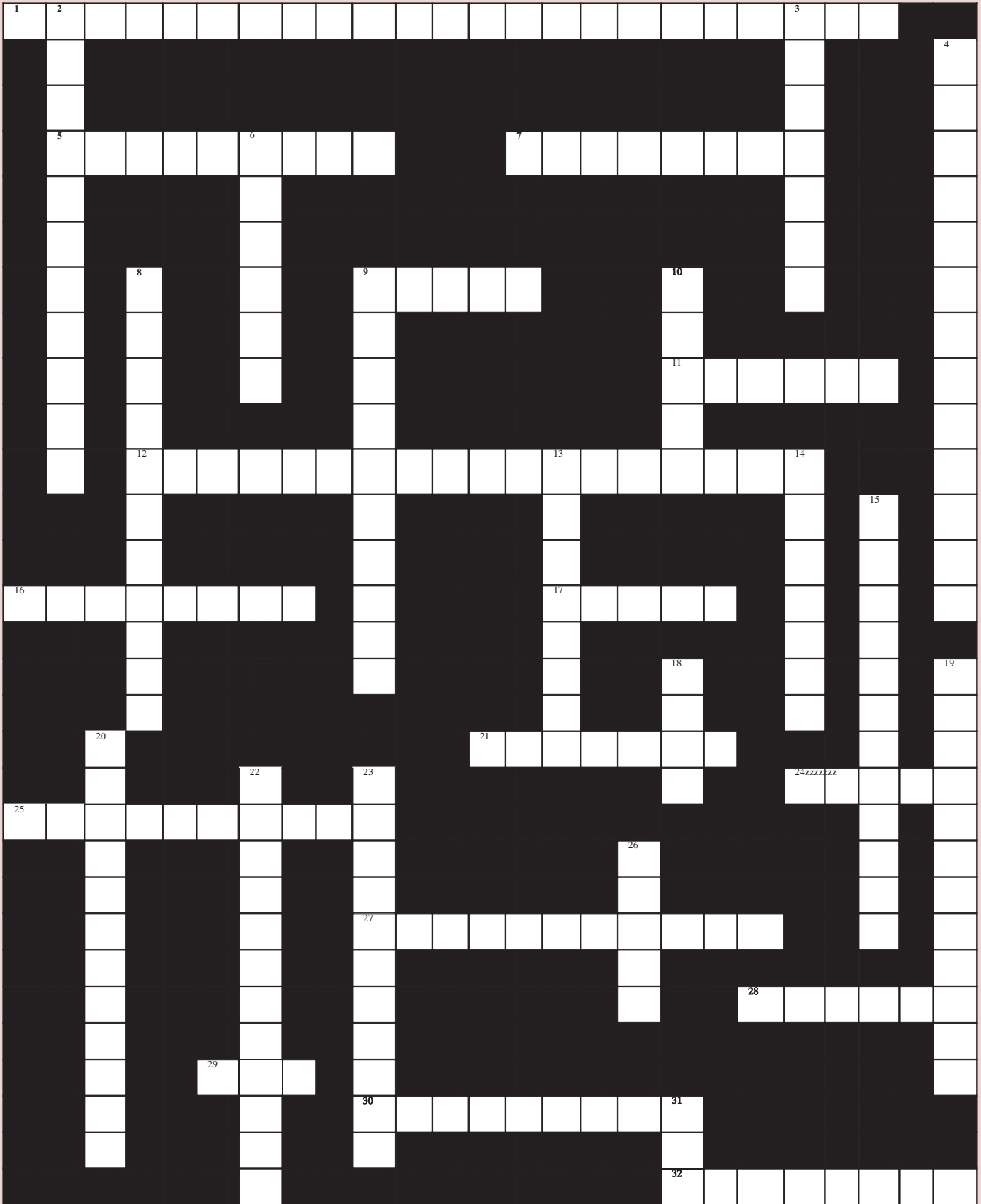
**Outreach program of medical division at Anushaktinagar-  
COLS by Anaesthesia team**



On 17<sup>th</sup> January 2020, “Walkathon” a group sport activity for the community was organised which was followed by yoga instruction course on the hospital lawns in the early morning hours, again, as a part of community outreach programme. The dictum being, good health is the result of good food habits and daily exercise. In continuation with the community outreach programme, Head Medical

Division along with the department of anaesthesia organised a lecture cum demonstration on Compression Only Life Support (COLS) for the residents of Malaygiri building, Anushaktinagar. The medical division looks forward to conducting more such informative programs for education and awareness of the community, in the near future.

# CROSSWORD



## CROSSWORD CLUES

### ACROSS

1. Temporary heart condition induced by stress(9,14)
5. An RNA virus that may cause HFMDisease(9)
7. Excessive inward curvature of spine(8)
9. Transparent, plasma like fluid(5)
11. Neural or vascular network(6)
12. Produce and release hormones of glucose metabolism (6,2,10)
16. Organ slips out of place(8)
17. Maneuver to treat vertigo(5)
21. Lockjaw(7)
24. Syndrome of excess ADH (5,acronym)
25. Rumbblings of the gut(10)
27. Abnormal protein deposits in tissue(11)
28. Shortsighted(6)
29. Electroencephalogram (3,acronym)
30. Sound of blood flow to measure BP(9)
32. Trepanation(4,4)

### DOWN

2. Retrograde root canal treatment(11)
3. State of being twisted(7)
4. Supine with head inclined down(11)
6. Antiglobulin test (6)
8. Lateral epicondylitis(6,5)
9. Low WBC(10)
10. Zoonotic virus that can cause respiratory illness and encephalitis(5)
13. Fracture distal radius and dislocation of radio-ulna joint(9)
14. Blindspot(7)
15. Basis of sulpha drugs(12)
18. Endobronchial ultrasound(4,acronym)
19. Antifungal drug (12)
20. Tingling numbness(12)
22. Surgical removal of uterus(12)
23. Diagnostic maneuver for vertigo(3,8)
26. Statistical test for analysis of variance (5,acronym)
31. Fiberoptic bronchoscope (3,acronym)

*\*Please email your answers to [pulse@barc.gov.in](mailto:pulse@barc.gov.in). Names and photographs of the first five entries with correct answers will be published in the next issue of 'Pulse'\**



## Answers to Crossword, Pulse Vol.20, August 2019.

### ACROSS

1. Rotator Cuff.
2. Varicose Vein.
3. Oesophagus.
4. Gall bladder.
5. Keratitis.
6. EMG.
7. Aphthous Ulcer.
8. Pons.
9. INR.
10. Serum.
11. Hamstrings.
12. Omphalocele.
13. Appendectomy.
14. Lactate.
15. Placenta Previa.
16. Tympanum.
17. Cervix.
18. PAP
19. SwineFlu
20. Hypospadiasis.
21. Oedema.
22. MRI
23. Incus.
24. Trigone
25. Glucose.
26. Nephron.

### DOWN

1. Rifampicin
2. Vagus.
3. Coronary.
4. Foramen Magnum.
5. Ketamine.
6. Anemia.
7. Rabies.
8. Hysteroscopy.
9. Quadriceps.
10. Clavicle.
11. Epiglottis.
12. Epidural.
13. Parkinsonism.
14. Virus.
15. Scapula
16. WPW.
17. Circumcision.
18. Diabetes.
19. Adrenaline.
20. Hypertension.
21. Iris.
22. Ureter.

### First five correct entries of Crossword , Vol. 20, August 2019



Dr. Nalini Bhat



Staff nurse Pratima Rodrigues



Dr. Vaishali Jadhav



Dr. Dinesh Babu Vadrnapu



Dr. Gayatri Savani

## ACADEMIC ACHIEVEMENTS



Dr. Devika Desai, PGRMO, Dept of Gynaecology & Obstetrics, BARC Hospital, received the 'Dr.N.A.Purandare Award' at 48th annual conference of MOGS, Feb 2020, at Hotel Trident, Mumbai.



Dr. Divya Gupta, Dept of Ophthalmology, BARC Hospital, obtained her Fellowship of the Royal College Of Surgeons (FRCS), UK.



Dr. Pritee Bhirud, Dept of Anaesthesiology, BARC Hospital, was invited as faculty for chairing a panel discussion on 'Intensive care management of head injuries' at national conference ISACON November 2019, Bengaluru.

## Candidates passing DNB exam in June 2019.

### *Congratulations!!*



**Dr. Rashmi Shinde**  
Dept of Anaesthesia



**Dr. Devika Desai**  
Dept of Gynaecology & Obstetrics



**Dr. Raksha Gowda**  
Dept of Gynaecology & Obstetrics

### **Paper presentations**

- 1) Effect of intravenous dexmedetomidine infusion Vs intravenous dexmedetomidine with low dose ketamine infusion on sedation in otological surgeries under MAC' authored by Dr. Pritee Bhirud , Dr. Jalpa Kate, Dr. Pratibha Toal and Dr. Dipali Gote was presented by Dr. Pritee Bhirud, Dept of Anaesthesiology, BARC Hospital, at national conference, ISACON November 2019, Bengaluru.
- 2) Confirmation of endotracheal tube placement in trachea- USG vs EtCO2 with auscultation-an observational study' authored by Dr. Sanjog Mekewar, Dr. Pritee Bhirud, Dr. Shrividya Chellam and Dr. Pratibha Toal was presented by Dr. Sanjog Mekewar, Senior resident, Dept of Anaesthesiology, BARC Hospital at national conference, ISACON November 2019, Bengaluru.
- 3) Dr Gayatri Savani, Dept of Gynaecology & Obstetrics, BARC Hospital, presented a poster on 'Fetal Ovarian Cyst' at 48<sup>th</sup> MOGS annual conference on 8th February 2020 in Mumbai.

### **Publications**

Bhirud PH, Chellam S, Mote MN, Toal PV. Effects of intravenous dexmedetomidine on spinal anesthesia and sedation – Acomparison of two different maintenance infusions. J Anaesthesiol Clin Pharmacol 2020; 36:78-82.

## Extracurricular achievements



Dr. Urmila Peshoton of OYC Dispensary, participated in Goa river marathon run (21km) and stood 4<sup>th</sup> in open category, held on 17<sup>th</sup> November 2019. She stood 3<sup>rd</sup> in Tridhatu Navi Mumbai marathon (21.1 km), held on 16<sup>th</sup> February 2019. She also participated in Tata Mumbai Marathon (42.2km) on 19<sup>th</sup> January 2020 and finished in 4 hours and 13 minutes.



Dr. Savita Mishra of Mandala Dispensary, won Mumbai city skipping championship 17+ category (2 gold medals in speed and endurance) held on 18<sup>th</sup> September 2019 and also won two medals at Maharashtra State championship 17+ category (silver in endurance and bronze in speed) held on 22<sup>nd</sup> September 2019

## Extracurricular achievements



Dr. Julli Bajaj, Dept of Dentistry, Trombay Dispensary, won consolation prize in the safety slogan contest conducted as part of 'National Safety Day Programme 2020', organised by Industrial Hygiene and Safety Section, BARC.

Shri Mangesh Kadam, Technician G, Dept of Dentistry, BARC Hospital participated in a play 'Khatron ke khiladi' at central complex auditorium, BARC, on 16<sup>th</sup> April 2019, as part of fire service week.



Staff nurse Smt Savi Nayak, BARC Hospital, participated in a play 'Khatron ke khiladi' at central complex auditorium, BARC, on 16<sup>th</sup> April 2019, as part of fire service week.

## Extracurricular achievements

Smt Swati Phanse, Staff nurse, BARC Hospital, won the 2<sup>nd</sup> prize in poem competition organised by the Indian academy of paediatrics at JJ Hospital, Mumbai on 25<sup>th</sup> July 2019 as part of ORS day celebrations.



Smt Reema Gaichor, Staff nurse, BARC Hospital, won the 2<sup>nd</sup> prize in poster competition at KEM Hospital, on 26<sup>th</sup> July 2019 and the 3<sup>rd</sup> prize in poem competition at JJ Hospital, Mumbai on 25<sup>th</sup> July 2019, both organised by the Indian academy of paediatrics as part of ORS day celebrations.



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**Computer Design, Graphics & Layout by**  
**Khan Shahid J.A.**

**Sunil Angrakh**  
SIRD, BARC, Trombay, Mumbai - 400 085.

**Published by**  
Scientific Information Resource Division  
Bhabha Atomic Research Centre, Trombay, Mumbai - 400 085.