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# Editorial Board

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PRAXIS UNDERGRADUATE MEDICAL RESEARCH JOURNAL

# Hyposkillia- A Large Chink in The Armor

*Gp Capt TVSVGK Tilak*[1]

*"First the patient, second the patient, third the patient, fourth the patient, fifth the patient, and then maybe comes science. We first do everything for the patient."*

Bela Schick (1877 – 1967)
Hungarian Pediatrician and Bacteriologist

The current state of professionalism of doctors has been under the scanner for a multitude of reasons. The awareness of the clientele, the ready access to information, affordability of treatment, the appropriate use of soft skills has made the profession, more demanding. The number of students joining medical schools has been increasing, however, the clientele satisfaction continues to be a matter of debate. [1,2] One of the reasons is a malady lurking in the open- the lack of adequate clinical skills- a disorder truly named "Hyposkillia'. The term essentially means inability to render good patient care due to ill-equipped state of skills.

The Hyposkilliacs lack the following- the art of basing the probable diagnosis by history and physical examination, inability to assess critically the information received and form a sound plan of management, poor communication and clinical decision making or reasoning. They are in a hurry to treat the report than treat the patient. As a result, they fail to understand the natural history of an illness.[3]

They do, however, gain skills in multiple other fields - how to order an investigation, but fail to know when to order a test; read the report but fail to interpret it in the clinical scenario; and order more tests if the initial reports are not worthy of treatment. Eventually, they acquire a 'laboratory-oriented' approach rather than 'patient-centred' approach.

Somewhere, the training needs to be blamed for this disorder. There is an apparent lack of pride in self, lack of devotion to hard work, lack of accountability and inability to pursue excellence. This has resulted in mediocrity as a norm rather than an exception.

The teachers of current day are also to be blamed for not insisting on laying emphasis on history and physical examination. The dependence on high-end tests and imaging based on the initial complaint, rather than guided investigations based on strong pre-test probability is a potent factor for the lack of development of skills in the student.

This dependence on test results to form opinions and plan management has led to a change in the doctor-patient relationship. The doctor-patient bond established instituting the initial rapport-listening to the history, examining the patient to get the clinical clues etc lays the foundation of trust between the patient and the doctor. The inability to establish this trust and the high-dependence on the tests to form an opinion leads to a weakened bond between the patient and the doctor. The doctor eventually ends up treating the disease, but not the patient.

Modern medical technology has greatly enhanced our ability to diagnose and treat disease, but, it has also promoted mental laziness among many physicians. Wonted reliance on sophisticated medical gadgetry for diagnosis precludes physicians from using the most sophisticated, complex machine they'll ever and always have—the brain.

Is there a way out of this woe? How do we empower our new generation doctors with this under practiced skill?

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There are surely a few ways. At the outset is the change in medical curriculum for the Indian Medical Graduate to a 'Competency-Based' learning and assessment. This initiative by the medical council of India [MCI] to change the UG curriculum is indeed a humble beginning. The change has been made to ensure that learning medicine will include all necessary domains-Cognitive, Skill-based and Affective. The formal introduction of AETCOM [Attitude, Ethics and Communication] modules in undergraduate [UG] teaching will underscore the importance of soft skills in patient management.

There is a need for the teachers to be role models and impart learning emphasizing the importance of good history taking, pertinent clinical examination, the power of thinking and putting together the clinical story and base the need for tests on sound clinical reasoning.

The next challenge lies in making the clinical skills teaching longitudinal- throughout the medical career starting from undergraduate to post graduate residency training. It is not just teaching the skills in the classroom or showing the skills in the clinical side-room or laboratory. Incorporating the Peyton's 4-step approach to skill enhancement will empower the student with the right way of learning and practicing a skill.[4]

The modification of the curriculum to ensure 'Deep Learning' by the student rather than 'Surface approach' will prepare students to grasp the skill-based knowledge longer. (Table 1)

Modern technology is not flawless and its undiscerning use will not only spiral health care cost but also alter the doctor-patient bonding and lead to lack of trust in the profession. The function of the teacher is to educate and not placate the student. Medicine has to be based on commitment, compassion and candour, keeping the patient in the prime view and use of appropriate skills to render quality healthcare to humanity.

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**Table 1.** Contrasting 'Deep learning' approach and 'Surface learning' approach

| Students with a deep-learning approach | Students with a surface-learning approach |
|---|---|
| ▪ Intend to understand and actively seek meaning to satisfy curiosity<br>▪ Understand the relationship between facts or concepts<br>▪ Relate new ideas to their previous knowledge and personal experiences<br>▪ Can analyse a professional situation and focus on the critical aspects<br>▪ Question and are able to explain topics by reconstructing knowledge<br>▪ Enjoy and are interested in their work<br>▪ Are prepared to spend more time in independent study than those with a surface approach<br>▪ Are motivated by an interest in the subject and/or recognition of relevance to vocation<br>▪ Retain facts some weeks later | ▪ Memorize facts for assessments without attempting to understand meaning<br>▪ Accumulate unrelated facts and treat related parts separately<br>▪ Reproduce essentials as accurately as possible<br>▪ Show no evidence of reflection on purpose or strategy<br>▪ Find an answer to a problem without grasping the underlying issues or principles illustrated by the problem<br>▪ Meet demands of task with minimum of effort<br>▪ Are motivated by a desire to complete task or fear for failure |

Open Access Images in Medicine

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# Approach to Diagnosis of Raynaud's Disease

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## Introduction

Raynaud's Disease or Raynaud's phenomenon is an exaggerated vasospastic response to cold temperature characterized by transient, episodic changes in skin colour of digits. [1,2]

## Primary and Secondary Raynaud's

Primary Raynaud's phenomenon is common in females more than males, who present at any earlier age, mostly in the 2nd or 3rd decade of life. Secondary Raynaud's is associated with an underlying condition, such as lupus or scleroderma, and has an age of onset typically in the 4th decade of life.[3] The criteria of clinical diagnosis of Primary Raynaud's was first proposed by Allen and Brown in 1932 [4] ; has now been modified to include laboratory measurements and nailfold capillary microscopy, eliminating the earlier requirement of a 2 year follow up. [5]

**The current diagnostic criteria are as follows:**

1. Symmetric episodic attacks

2. No evidence of peripheral vascular disease

3. No tissue gangrene, digital pitting or tissue injury

4. Negative nailfold capillary examination

5. Negative antinuclear antibody and normal erythrocyte sedimentation rate

**Features suggestive of Secondary Raynaud's** [6]

1. Age of onset > 40

2. Male gender

3. Tissue loss or ulceration

4. Asymmetric symptoms

5. Abnormal laboratory parameters suggestive of underlying vascular or autonomic disease

6. Raynaud's phenomenon associated with ischemic signs or symptoms proximal to finger (in the upper limb) or proximal to toes (in the lower limb)

## Clinical Manifestations

Raynaud's phenomenon most commonly affects the hands and presents as episodes of sudden onset cold fingers associated with sharply demarcated colour changes of skin initially to white (pallor), then to blue (cyanotic).[7] A typical attack of Raynaud's begins in a single finger and spreads to other digits symmetrically involving both hands. The index, middle and ring fingers are most often involved, sparing the thumb.[8] An attack usually terminates in 15 to 20 minutes with erythema of reperfusion. Cutaneous vasoconstriction may also affect other areas such as skin of ears, nose, face, knee and nipple. Colour change is pathognomonic of Raynaud's phenomenon, however not all patients might present with the phasic colour change during all episodes. The symptoms of Raynaud's associated with low blood flow include numbness or paraesthesia. During an episode of Raynaud's, patients may exhibit livedo reticularis, by mottling or reticular pattern of skin of arms and legs with regular unbroken circles which completely reverses with rewarming.

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## Diagnosis

Clinical diagnosis is based on patient history of characteristic symptoms of Raynaud's phenomenon or by directly witnessing an attack during physical examination.

A 3-step approach has been proposed for the diagnosis of Raynaud's phenomenon as follows: [9]

Step 1: Ask screening Question

Are your fingers unusually sensitive to cold?

↓ Yes, proceed to step 2

Step 2: Assess color changes

Occurence of biphasic color changes during the vasospastic episodes (white and blue)

↓ Yes, proceed to step 3

Step 3: Calculate disease score

a) Episodes are triggered by things other than cold (i.e. emotional stressors)

b) Episodes involve both hands, even if the involvement is asynchronous and/or asymmetric

c) Episodes are accompanied by numbness and/or paresthesias

d) Observed color changes are often characterized by a well-demarcated border between affected and un-affected skin.

e) Patient provided photograph(s) strongly support a diagnosis of RP.

f) Episodes sometimes occur at other body sites (e.g. nose, ears, feet, and areolas).

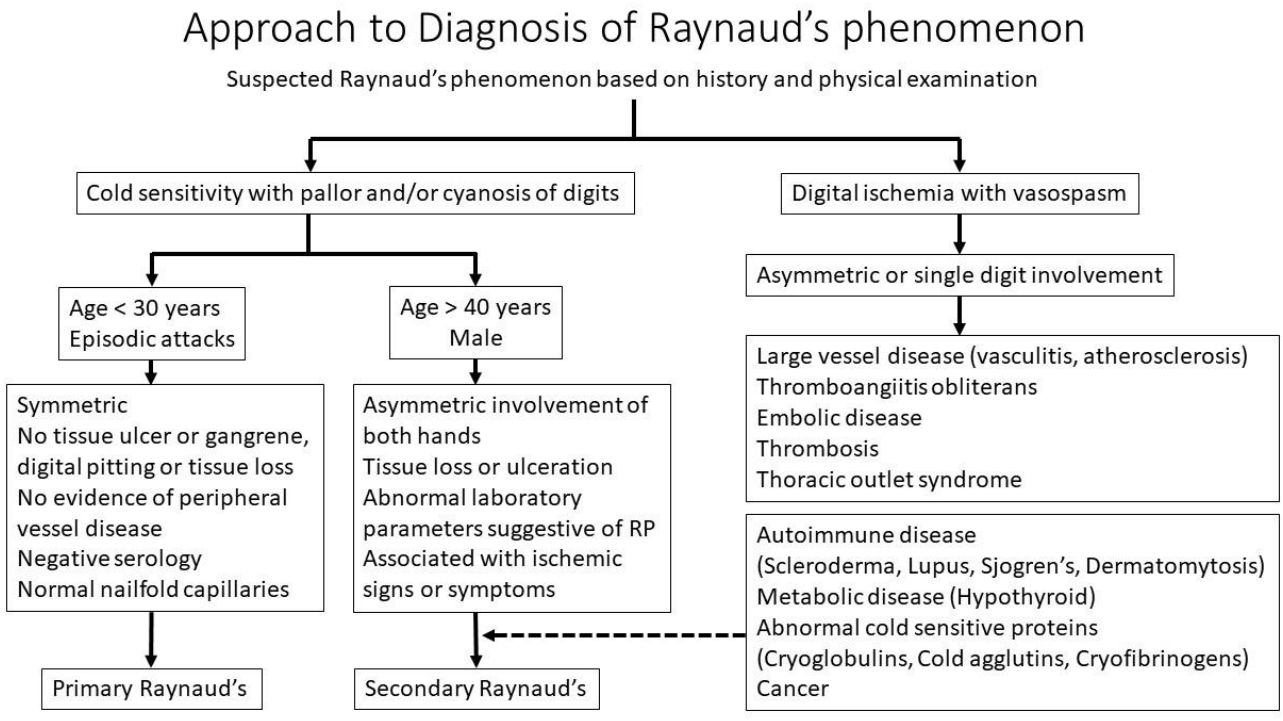
g) Occurence of triphasic color changes during the vasospastic episodes (white, blue, red)

If 3 or more criteria met from Step 3 (a - g), then the patient has RP

In addition, diagnostic tools may be used to assess the vasospastic response, such as nailfold capillaroscopy, thermal imaging and Laser Doppler imaging.

## Differential Diagnosis

- Cold sensitivity
- External compression of blood vessel e.g. sleeping with arm under body
- Peripheral neuropathy
- Complex regional pain syndrome
- Occlusive vascular disease (emboli, thrombosis, vasculitis, atherosclerosis)
- Acrocyanosis
- Buerger's disease
- Polycythemia vera



After Exposure to Cold

2 minutes after Exposure

5 minutes after Exposure

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Open Access Original Research

PRAXIS UNDERGRADUATE MEDICAL RESEARCH JOURNAL

# Assessment of Taboos Regarding Menstruation in Adolescent Rural Girls

*Sabarnee Banerjee*[1]

## Abstract

**Introduction:** Menstruation is a physiological phenomenon that imparts a woman the power of procreation. But various taboos regarding menstruation, especially in India, have made this "normal" process an abnormal one. The present study aims to assess the prevalence of taboos regarding menstruation in rural adolescent girls.

**Methodology:** This is an observational, descriptive, cross-sectional study which was conducted in a school setting and included a total 146 girls who had already experienced menarche. The study tool included a semi- structured, self-administered questionnaire.

**Results:** 41.8% of the study population had no knowledge regarding physiological basis of menstruation. It was found that mother and friends were the two most important sources of information regarding menstruation. Many of them deferred themselves from entering temples or taking part in an auspicious event during menstruation because of the perception of being impure during the time of their periods. Many blindly followed the customs being under the influence of other female members of the family, especially the mother. Only 58.2% of the study population thought menstruation is important for life. For many, their knowledge about menstruation was incomplete. 75.3% of the study population thought that the ancient customs were important and should be followed and they, in the future, would instruct their daughters to follow those customs.

**Conclusion:** The taboos regarding menstruation are an age-old problem and widely prevalent even today, hampering the physical and mental health of adolescent girls. Education and counselling of both girls and their mothers is the key to solving this problem.

**Keywords: Menstruation, Taboos, Social customs, Adolescent health**

## Introduction

Menstruation is the visible manifestation of cyclic physiologic uterine bleeding due to shedding of endometrium.[1] It is a natural process occurs in girls beginning usually between the age of 11-14 years and imparts a woman the power of procreation. But in many parts of the world, including India, myths and taboos about menstruation are so prevalent, they those have made this 'Natural' process a very 'Unnatural'. Menstruating women are labelled as "Impure and evil" [2] by the society and have to go through a lot of physical, mental and social compromise during what is known as "Those days of month".

The origin of this myth dates back to the Vedic times and is often been linked to Indra's slaying of Vritras. For, it has been declared in the Veda that guilt, of killing a brahmana, appears every month as menstrual flow as women had taken upon themselves a part of Indra's guilt2. According to hindu myth, women are prohibited from participating in normal life events during menstruation.

**Current taboos and practices in India:**

1. Not entering the prayer room
2. Not entering the kitchen (menstruating women are considered unhygienic and unclean and hence the food they prepare or handle can get contaminated. According to another study [3] participating women also reported

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that during menstruation the body emits some specific smell or ray, which turns preserved food bad)

3. Restricted from offering prayers and touching holy books
4. Cultural norms and religious taboos on menstruation are often compounded by traditional associations with evil spirits, shame and embarrassment surrounding sexual reproduction
5. In some cultures, women bury their cloths used during menstruation to prevent them being used by evil spirits.
6. Many adolescent girls believe that doing exercise/physical activity during menses could aggravate dysmenorrhea. Exercise has been shown to help relieve the pain and bloating sometimes associated with menstruation in addition to making the woman feel much happier by releasing serotonin.
7. It is believed that if a girl or women touches a cow while she is on her period, that the cow will become infertile – leading girls to associate their own bodies with curse and impurity.

With this in background, the present study was planned to assess the prevalence of taboos regarding menstruation in rural adolescent girls.

## Methodology

The present study was an observational, descriptive, cross-sectional study conducted over a period of 1 month at at a school in West Bengal. A multistage sampling technique was adopted. 23 districts of West Bengal, Purba Medinipur district was randomly selected and of the 25 developmental blocks of the district, Sutahata block was randomly chosen. The study population was of 146 adolescent girls selected from a randomly chosen school from among the 5 girls' schools in that block. A pre-designed, pre-tested, self-administered, semi-structured questionnaire was used as the study tool. The variables included age, class, social class, age of menarche, information about menstruation and source of such information, reaction after menarche, practices during menstruation, comfort level while discussing about menstruation, customs followed during menstruation, the necessity of such customs, and the reasons behind it, perception of importance of menstruation, perception of importance of menstruation. Girls studying in 6th, 7th and 8th standard who have experienced menarche were included in the study. Girls who had not yet attained menarche were excluded from the study. Consent was taken before administration of the questionnaire. Statistical analysis involved descriptive analysis. MS Excel was used for data entry and statistical analysis.

## Results

It was observed that 50% of the study population was 13 years old and 40% belonged to lower middle socioeconomic class. Out of the study population, 41.8% girls had no knowledge regarding the physiological basis of menstruation and 69.2% girls had no knowledge about menstruation before menarche and were scared during menarche. A large number of girls, their mothers were the primary source of information regarding menstruation, followed by friends.

**Table 1**: Knowledge and Source of Knowledge About Menstruation

| **(n=146)** | |
|---|---|
| **Knowledge** | **Number (%)** |
| Physiological process | 85 [58.2%] |
| Curse of God | 0 [0%] |
| No Idea | 61 [41.8%] |
| **Knowledge about menstruation before Menarche** | |
| Yes | 45 [30.8%] |
| No | 101 [69.2%] |
| **Source of Information about Menstruation*** | |
| Mother | 125 [85.6%] |
| Friends | 44 [30.1%] |
| Relatives | 6 [4.1%] |
| Tv/Newspaper/Magazine | 4 [2.7%] |
| Others | 1 [0.6%] |
| *multiple response table | |

98.6% girls did not prefer to discuss about menstruation with others and 30.8% felt ashamed of it. Most importantly 12.3% of the study population regretted for being female. The most common reaction to menstruation, as reported by nearly 65% of the girls were that they were scared of it. (Table 2)

Most girls did not enter temple or take part in an auspicious event during menstruation and some thought they were impure during that period. The social customs and taboos also forced a large percentage of girls to separate themselves from the family, skip school and restrict movement during their menses. (Table 2)

**Table 2**: Reaction and Practices during Menstruation

| (n=146) | |
|---|---|
| **Reactions: *** | **Number (%)** |
| Scared | 94 [64.4%] |
| Impure | 6 [4.1%] |
| Regret | 18 [12.3%] |
| Normal | 43 [29.4%] |
| **Discuss about menstruation with everyone** | |
| Yes | 2 [1.4%] |
| No | 144 [98.6%] |
| **Feel Ashamed of Menstruation** | |
| Yes | 45 [30.8%] |
| No | 101 [69.2%] |
| **Various Customs Followed*** | |
| Does not enter temple | 144 [98.6%] |
| Does not enter kitchen | 3 [2%] |
| Does not touch children | 4 [2.7%] |
| Does not touch domestic animals | 13 [8.9%] |
| Does not take part in auspicious events | 90 [61.6%] |
| Others | 10 [6.8%] |
| **Source of Direction to Follow the Customs*** | |
| Elder Sister | 9 [6.1%] |
| Mother | 138 [94.5%] |
| Other elderly ladies | 17[11.6%] |
| **Creating Distance from Family During Menstruation** | |
| Yes | 15 [10.3%] |
| No | 131 [89.7%] |
| **Skip School During Menstruation** | |
| Yes | 31 [21.2%] |
| No | 115 [78.8%] |
| **Restriction of Movement** | |
| Yes | 54 [36.9%] |
| No | 92 [63.1%] |

*multiple response table

Only 58.2% of the study population thought menstruation is important for life. Moreover, nearly 30% of girls had no knowledge about the importance of menstruation. Further, 75.3% of the study population thought that the ancient customs and taboos were important and should be followed and they in the future would instruct their daughters to follow those customs. (Table 3)

**Table 3:** Perception of Importance of Menstruation and Taboos

| (n=146) | |
|---|---|
| **Importance of Menstruation** | **Number (%)** |
| Yes | 85 [58.2%] |
| No | 19 [13%] |
| Does not know | 42 [28.7%] |
| **Importance of Taboos** | |
| Yes | 110 [75.3%] |
| No | 36 [24.7%] |
| **Will Impose the Restrictions on Their Daughters** | |
| Yes | 110 [75.3%] |
| No | 36 [24.7%] |

## Discussion

As is also evident from past evidence, menstruation is not free of taboos.[2] Public discussion on menstruation is considered shameful.[4] These taboos were being followed irrespective of socioeconomic status.[3] Through the present study it is evident that female family members, especially mothers, imposed various restrictions on the menstruating adolescent girl and most of them were unable to justify the reason behind following those customs as has been reported in other studies as well.[2] These traditional practices and taboos are rooted deep in the society and women are their flag bearers. Moreover, adolescent girls are either receiving no information regarding the physiologic basis and importance of menstruation or are receiving misleading information, about the ideal practices and hygiene associated with menstruation. This is hampering the education, mental health and normal life of an adolescent girl, compelling them to consider “menstruation” as nothing but “monthly headache” with no purpose or importance in their lives.

This is one of the few studies conducted in this region which addresses the issue of customs and taboos related to menstruation. However, the limitations of the study include its cross-sectional nature, involvement of only one school and lacks generalization of results. Since the information was obtained from a self-administered questionnaire, information bias cannot be ruled out.

## Conclusion

The issue under consideration is a very sensitive one even today and hence it should be requiring a well strategized approach to tackle it. Proper education and counselling of both mothers and daughters are important in order to get rid of the unnecessary age-old customs and to promote menstrual health and hygiene among girls belonging to all strata of the society.

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Open Access Original Research

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# A Study on Platelet Indices in Type II Diabetes Mellitus

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## Abstract

**Introduction:** Type II Diabetes Mellitus (DM) is a part of metabolic syndrome. Inadequate glycemic control, protein glycation and oxidative stress can adversely influence platelet morphology and endothelial function contributing to diabetic angiopathy. This study aims to evaluate and compare platelet indices in type 2 diabetes mellitus (DM) and non–diabetics and to determine the correlation of total platelet count (PLT), mean platelet volume (MPV), platelet crit (PCT), platelet-large cell ratio (P-LCR) and platelet distribution width (PDW) with glycosylated hemoglobin (HbA1c), fasting blood glucose (FBS), postprandial blood sugar (PPBS), body mass index (BMI) and duration of DM.

**Methodology:** The study is an analytical cross-sectional design with study population comprising 60 patients, each with type 2 DM and non – diabetic control group. Diagnosis of DM using the American diabetes association criteria of 2010 and the cut off value of HbA1c was >6.5. Hematological parameters measured using automatic analyzer Sysmex XS 1000i.

**Results:** Platelet indices PLT, MPV and PCT were significantly higher in diabetics compared to non-diabetics. There was a statistically significant correlation between MPV and PPBS. No significant correlation was observed between MPV and HbA1c, FBS, BMI. Similarly, the correlation between PDW and HbA1c, FBS, PPBS, BMI was statistically insignificant. MPV or PDW was not significantly associated with duration of DM. No statistically significant differences were observed between platelet indices and occurrence of vascular complications.

**Conclusion:** Platelet indices are a simple, easily available and cost-effective tool which can aid in the early detection of diabetes, but have a little role to play in detection of complications.

**Keywords:** Diabetes mellitus, platelet indices, platelet count, mean platelet volume.

## Introduction

Diabetes mellitus (DM) is a global health problem and is fast gaining the status of a potential epidemic in India. [1,2] Type 2 DM is a part of metabolic syndrome which comprises of hyperglycemia, hypertension, dyslipidemia, impaired fibrinolysis and increased procoagulation factors. Chronic hyperglycemia results in microvascular (retinopathy, neuropathy, nephropathy) and macrovascular complications (coronary artery disease, peripheral arterial disease and stroke).[3]

The measurement of blood glucose and other markers of hyperglycemia provide some insight into the presence of the disease, however they do not predict the presence and progression of various vascular complications.[4] Metabolic derangements like inadequate glycemic control, protein glycation and oxidative stress in DM can adversely influence platelet morphology and vascular endothelial function contributing to the pathogenesis of diabetic angiopathy.[5] Several studies have shown that increased platelet sensitivity is a direct consequence in diabetes with platelets being larger , more reactive, more aggregable. The platelets are also able to release more prothrombotic factors from their granules which leads to the formation of a platelet gradient, increased platelet turnover rate and reduction in survival of platelets.[6]

Platelet indices i.e. platelet count (PLT), platelet crit (PCT), mean platelet volume (MPV), platelet distribution width

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(PDW), platelet-large cell ratio (P-LCR) are markers of platelet function and activation which can be quantified by clinical hematology analyzers.

In the Indian set up, literature has shown utility of some platelet indices (MPV); however, the association of glycemic status and the vascular complications with other markers like PDW and PCT has not been explored. This study aimed to prove that variations in platelet indices exist between type 2 diabetic patients and non-diabetic controls.

## Methodology

This was a case control study involving 60 Type 2 diabetics and 60 non diabetic healthy controls, undertaken at a tertiary teaching- hospital in Mangalore, Dakshina Kannada district of Karnataka. Baseline data was collected by means of a questionnaire which included the subject's age, gender, demographic information, duration of diabetes, medications, last fasting blood sugar, family history of diabetes and other relevant information. Body mass index was calculated by using Quetlet's Index, i.e., weight in kilograms / square of the height in meters. The diabetic group included individuals with both vascular complications and without complications. Exclusion criteria for the diabetic arm included anaemia (males with haemoglobin (Hb) less than 12 gm/dl and females with Hb less than 11 gm/dl), idiopathic thrombocytopenic purpura, cyanotic congenital heart disease, coronary artery disease, suspected or confirmed cases of malignancies, history of anti-thrombotic or anti platelet medication and history of gestational diabetes. Similar exclusion criteria were used both in cases and controls, such that the only difference between the two groups remained the presence or absence of Type 2 DM.

Blood samples were collected in dipotassium EDTA tubes and analyzed within one hour for Hemoglobin (Hb), total WBC count, platelet count, mean platelet volume, platelet distribution width and plateletcrit using automatic analyzer Sysmex 1000i. Fasting blood glucose was measured by glucose oxidase method using automatic analyzer Johnson & Johnson Vitros 5600 and and HBAc1 by automated ion-exchange high performance liquid chromatography using Biorad D10 respectively.

The data was analysed by Statistical Package for the Social Sciences (SPSS) version 23 for Windows using unpaired T test and Pearson's correlation test. Data was expressed as mean ± standard deviation. P value of <0.05 was considered as statistically significant.

## Results

The study comprised of 60 diabetic patients, out of which 39 were males and 21 were females. Out of the 60 non- diabetic controls, 40 were males and 20 were females. The male to female ratio of diabetics was 1.8:1 and that of non-diabetics was 2:1. The mean age of the diabetic population was 55.26±10.76 years with a minimum age of 35 and a maximum age of 82 years; whereas that of non-diabetic population was 52.30±13.27 years. The mean duration of diabetes was 8.80±7.46 years.

Out of the 60 diabetics, 29 had complications such as peripheral neuropathy, autonomic neuropathy, diabetic foot, diabetic retinopathy, diabetic nephropathy, coronary artery disease, peripheral vascular disease and 31 did not have any of these complications. The mean haemoglobin level among the diabetics was 11.45±1.85 gm/dl and that of the controls was 13.49±1.35 gm/dl. The Hb level in diabetics was lower and the difference was statistically significant.

The values of mean BMI, FBS, PPBS, glycosylated haemoglobin, platelet count, platelet crit, platelet volume, PDW and P-LCR in diabetics and non-diabetics are depicted in table 1.

**Table 1**: Comparison of mean, standard deviation & P values of BMI, FBS, PPBS, HbA1c, platelet count and indices between type II diabetic and the nondiabetic controls.

| Parameters | Type II diabetics | Non- diabetics | P value |
|---|---|---|---|
| **BMI** | 23.96±4.62 | 23.03±3.09 | 0.199 |
| **FBS** | 170.70±79.65 | 88.70±10.0 | <0.001 |
| **PPBS** | 229.68±98.27 | 117.21±20.85 | <0.001 |
| **HbA1c** | 9.41±2.90 % | 5.24±0.42 % | <0.001 |
| **PLT** | 287.45±108.63 | 247.93±73.50 | 0.021 |
| **PCT** | 0.292±0.12 | 0.256±0.63 | 0.046 |
| **MPV** | 10.29±0.96 | 9.90±0.89 | 0.024 |
| **PDW** | 11.61±2.06 | 11.53±1.79 | 0.814 |
| **P – LCR** | 26.32±7.60 | 26.87±8.22 | 0.702 |

The platelet count (PLT), mean platelet volume (MPV) and platelet crit (PCT) were significantly higher in diabetics compared to non-diabetics. Platelet distribution width (PDW) and platelet-large cell ratio (P-LCR) showed no statistically significant differences between the two study groups. PPBS had a significant correlation with MPV.

No significant association was observed between MPV and HBA1C, FBS, BMI and similarly between PDW and HBA1C, FBS, BMI. The association of MPV or PDW with the duration of diabetes was also statistically insignificant.

The diabetic group was divided into two subgroups based on the presence of vascular complications. However, our study did not find any statistically significant difference in comparison of MPV and PDW between diabetic subjects with and without complication

## Discussion

In our study we found a significantly higher platelet count in Type II diabetics compared to non- diabetic controls which. Similar results have been reported in studies such as those by Zuberi et al, Kodiatte et al, Jabeen et al and Akinsegun et al. [7, 8, 9, 10] In contrary, certain studies have also shown a lower platelet count in diabetics. [6, 11]

Evidence suggests that platelet volumes and counts are inversely correlated, and the total platelet mass (platelet count *MPV) remains stable. However, in pathological conditions physiological feedback between platelet count, morphometric indexes and immature platelet fraction is lost, which also augments the risk of thrombotic events. [12]

Mean platelet volume (MPV) is a measure of the average size of platelets circulating in the blood. Larger platelets contain more granules and mitochondria; synthesize more thromboxane A2 which is a biomarker of platelet activation. In the case of diabetes mellitus, increased endothelial damage is seen, which reduces the survival of platelets and increases turnover of younger platelets. [13,14] Our results showed MPV to be significantly higher in T2DM compared to non-T2DM; this difference represents the heterogeneity in platelet morphology, including the presence of larger reticulated platelets.

Platelet distribution width (PDW) is another morphometric index reflecting the size distribution of the peripheral platelet population. Recent evidence suggests the role of PDW in association with the risk of cardiovascular disorders, however data on PDW in association with diabetes mellitus is largely lacking.[15] In a study, Yilmaz et al described a significantly higher PDW among diabetics, PDW also being the largest independent risk factor for diabetes among other platelet indices. [17,18] Further, it has been shown that the combined rise of MPV and PDW might indicate a higher fraction of immature platelets in peripheral blood. [5, 7, 8, 11, 16] In our study, PDW did not significantly vary between the diabetic and non- diabetic group.

In our study, we found a statistically significant correlation of MPV with PPBS. There is a wide range of evidence on the association between MPV and the indicators of glycaemic control. While several studies have found a highly significant association of MPV with FBS, PPBS and HbA1C levels, few studies such as those by Yenigun et al and Hekimsoy et al found a non-existing association. [9,14,19,20]

Studies by Yenigun et al, Hekimsoy et al and Kodaitte et al found no significant association between platelet indices and the duration of diabetes. In our study MPV and PDW did not significantly correlate with the duration of diabetes. In the contrary, studies by Ulutas et al and Navya et al have found a positive correlation between MPV and duration of diabetes. [6,8,16,19] This association needs to be further explored.

The prevalence of diabetic microvascular complications are greater in people with poor glycaemic control, longer duration of diabetes, and those with elevated blood pressure and obesity.21 It has been hypothesized that platelets may also play a role in the pathogenesis of diabetic vasculopathies, vascular damage may be due to more reactive platelets and the rate of damage may be independent of diabetic control.[8,22] In our study, no significant association was found between platelet indices and the incidence of vascular complications in diabetic patients.

Mean P-LCR values in our study showed no significant differences between diabetic patients than non-diabetic controls. There is limited information on the clinical importance of P-LCR, because this is a relatively new parameter and is generated by only a few machines, the Sysmex analyser being one. Very few studies have measured PCT in diabetics and the correlation between a higher PCT and diabetic status is equivocal. [9,23]

The limitations of our study include small size of study population, not considering the effect of anti-diabetic medicines as a potential confounding factor. Further, we did not examine peripheral smears to quantify megakaryocytes.

## Conclusion

This study revealed significant differences in platelet indices including platelet count, mean platelet volume and platelet crit between the diabetic and non-diabetic groups. Although platelet indices can be a simple and cost-effective tool for the early diagnosis of type 2 diabetes mellitus, they have a little role to play in diagnosing vascular complications of diabetes.

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PRAXIS UNDERGRADUATE MEDICAL RESEARCH JOURNAL

# Therapeutic role of *Phyllanthus amarus* on pilocarpine induced status epilepticus in experimental animals

*Sushma HP[1], Roopa P Nayak[2]*

## Abstract

**Introduction:** Status epilepticus (SE) is a life-threatening emergency in humans which if not treated can lead to permanent brain damage and even death. Benzodiazepines are the first line drugs in SE. However, in some cases, the therapeutic efficacy of Benzodiazepines is lost and second-line (Phenytoin and Fosphenytoin) or third-line (Propofol or Phenobarbital) drugs may have to be administered. But even these drugs are not always successful and side effects are very common. *Phyllanthus amarus (phyllanthus niruri)*, a herbaceous plant has been shown to possess antiviral, anticancer, anticonvulsant and diuretic properties. It has also been employed for nervous debility, epilepsy and dropsy.

In the above context, the present research has been undertaken to study the therapeutic role of *Phyllanthus amarus* ethanolic extract (PAEE) on pilocarpine induced status epilepticus in Swiss albino mice.

**Methodology:** Swiss albino mice with an average weight of 25 g were divided into three groups that received Scopolamine+ Pilocarpine (Group 1), Scopolamine + Pilocarpine+ PAEE (Group 2) and Scopolamine+ Pilocarpine+ Diazepam (Group3). There were 6 mice in each group, 3 males and 3 females. The plant extract was given for 10 days at the dose of 100mg/kg body weight. On the 10th day 1 hour after giving the test dose, Scopolamine was administered at the dose of 1 mg/kg body weight i.p followed by Pilocarpine 300mg/kg body weight i.p 30 minutes later. Outcomes in the form of status epilepticus (SE) and the mortality of the animals were recorded.

**Results:** All the animals administered with *Phyllanthus amarus* reached the state of status epilepticus compared to the diazepam group. Also, it was noted that all the animals died in the plant treated group. It was observed that the test drug PAEE does not possess any protective against action on pilocarpine induced status epilepticus.

**Conclusion:** *Phyllanthus amarus* does not have anticonvulsant activity on pilocarpine induced status epilepticus.

**Keywords:** Phyllanthus amarus, Status epilepticus, Swiss albino mice

## Introduction

Approximately 1% of the people worldwide suffer from epilepsy. It involves all the age groups and both sexes. Etiological factors contributing are stroke, oxidative stress and dysfunction among many others. [1,2] It is characterized by localized outburst of electrical activities commonly in cortical and sub-cortical regions of cerebral hemisphere resulting in cell death and permanent brain damage.[3] Epilepsy encompasses a variety of chronic neurological disorders characterized by repeated unprovoked seizures resulting from momentary impairment of brain function due abnormal neuronal excitability and synchronization. [4]

Epilepsy is a life-threatening emergency in humans which if not treated can lead to permanent brain damage and death. [5] Benzodiazepines are the first line drugs in SE. They potentiate the inhibitory responses mediated by GABA-A receptors. Lorazepam and diazepam are two first line anti-epileptic drugs which are given intravenously. Midazolam is given intramuscularly for prehospital cessation.[6]

The therapeutic efficacy of Benzodiazepines is lost in some cases and the administration of second-line (Phenytoin and

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Fosphenytoin) and third-line (Propofol or Phenobarbital) drugs might be required. But even these drugs might not always be successful. [7]

The cases which are resistant to all the above-mentioned drug therapies is called as refractory status epilepticus (SE). It is seen in up to 40% of the SE patients and is managed by coma induction using anesthetics such as propofol or Phenobarbital but often result in a poor prognosis. [8-11] Therefore there is a growing demand for newer anticonvulsant drugs, especially for patients of refractory status epilepticus.

Herbal drugs, which have been proven to show clinical efficacy with much fewer side effects and being more cost effective, have been used for the treatment of many neurologic conditions. In Indian traditional medicine system, several plants belonging to the family of Euphorbiaceae have been used for the treatment of epilepsy. [12] But the clinical efficacy of these drugs in treating epilepsy had been largely unexplored.

*Phyllanthus amarus* (*phyllanthus niruri*) commonly called as "Stonebreaker" is a herbaceous plant of Euphorbiaceae family and has been shown to have antiviral, anticancer, antitumor, antioxidant, anti-inflammatory, analgesic, anticonvulsant and diuretic properties. It has been employed for nervous debility, epilepsy and dropsy. [13,14]

It was shown by a study on Streptozotocin (STZ) induced diabetic male Wistar rats that methanolic extract of *Phyllanthus amarus* possessed antioxidant property at a dose of 125 and 250 mg/kg body weight. Significant reduction in the levels of thiobarbituric acid reactive substances and increased levels of reduced glutathione were observed, along with increased activity of superoxide dismutase and catalase by employing the methanolic extract in various tissues such as liver, kidney, heart and brain of the diabetic rats. [15]

Hence with this in mind, our research aimed to study the therapeutic role of *Phyllanthus amarus* on Pilocarpine induced status epilepticus in experimental animals.

## Methodology

### Drugs and Chemicals

Absolute alcohol, Scopolamine, Pilocarpine, Diazepam

### Instruments

Soxhlet apparatus and Rota vapour apparatus to prepare the plant extract.

### Animals

Six months old healthy Swiss albino mice with an average weight of 25 g were selected for the study. They were maintained under standard housing conditions in the animal house of the institution.

### Plant materials

*Phyllanthus amarus* plants were collected. The plants were authenticated at the Biological Sciences Department, St. Agnes College, Mangalore. They were properly washed in tap water and then rinsed in sterile distilled water and left to shade dry for several weeks. The leaves of the plants were reduced to powdered form using an electric blender. The powder was stored in air-tight containers till use.

### Preparation of plant extract

*Phyllanthus amarus* ethanolic extract (PAEE): A weighed quantity (500 g) of the coarse powder was taken and extracted with ethanol (90%) in a Soxhlet apparatus. The extract was concentrated on a water bath at a temperature not exceeding 60°C (yield 20% w/w). The ethanolic extract was suspended in distilled water.

### Assessment of anticonvulsant activity of *Phyllanthus amarus* ethanolic extract

### Pilocarpine induced status epilepticus

For ten days, the plant extract was given orally at the dose of 100 mg/kg body weight. On the 10th day the test samples were given 1 hour prior to the induction of convulsion. Half an hour prior to the administration of the pilocarpine, scopolamine was administered at the dose of 1 mg/kg body weight i.p to minimize peripheral side effects of pilocarpine. After 30 minutes, Pilocarpine 300mg/kg body weight i.p was administered to the mice. The parameters like Status epilepticus (SE) and the mortality of the animals were observed.

As shown in Table 1, the animals were sorted into three groups.

**Table 1**: Groups of Swiss albino mice

| Group | Drug |
|---|---|
| I | Scopolamine + Pilocarpine |
| II | Scopolamine + Pilocarpine+ PAEE |
| III | Scopolamine + Pilocarpine + Diazepam |

N= 6 in each group [3 males and 3 females]

*Scopolamine: 1 mg/kg body weight i.p ; Pilocarpine: 300mg/kg body weight i.p*

*PAEE: 100mg/kg body weight orally; Diazepam: 10mg/kg body weight orally* [16]

## Results

All the animals administered with *Phyllanthus amarus* reached the state of status epilepticus compared to the diazepam group. Also, it was noted that all the animals died in the plant treated group whereas the diazepam group showed no mortality. (Table 2)

**Table 2**: Effect of plant extracts on Pilocarpine induced seizures

| Group | No of animal reaching status epilepticus | Mortality |
|---|---|---|
| S+P | 6 | 6 |
| PAEE +S+ P | 6 | 6 |
| Diazepam +S+P | 2 | 0 |

*Scopolamine 1mg/kg, Pilocarpine 300mg/kg, Diazepam 10mg/kg*

## Discussion

As shown in a preclinical on Streptozotocin (STZ) induced diabetic male Wistar rats, the methanolic extract of *Phyllanthus amarus* possessed antioxidant property at a dose of 125 and 250 mg/kg body weight. Significant reduction in the levels of thiobarbituric acid reactive substances and increased levels of reduced glutathione, along with the activities of superoxide dismutase and catalase was observed by employing the methanolic extract in various tissues such as liver, kidney, heart and brain of the diabetic rats [15].

This antioxidant property of *Phyllanthus amarus* was the basis of our study.

From our result, it is seen that all the animals administered with *Phyllanthus amarus* reached the state of status epilepticus compared to the Diazepam group. Also, it was noted that all the animals died in the plant treated group. It is very clear that, the test drug *Phyllanthus amarus* ethanolic extract does not possess any protective action on Pilocarpine induced status epilepticus.

## Conclusion

Phytoconstituents of the indigenous medicinal plant, *Phyllanthus amarus* do not have a potential to prevent status epilepticus.

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PRAXIS UNDERGRADUATE MEDICAL RESEARCH JOURNAL

# Wound care by cellular therapy

*Priyal Shrivastava[1], Dr.Sandeep Shrivastava[2]*

## Abstract

**Introduction** Wound is a huge health care problem that consumes massive resources. The management is a complex process requiring intense management with drugs, local dressings and multiple surgical reconstruction. Clinical managements of wounds with regenerative medicine products can change the current trends. There are 3 regenerative medicine products - Stem cell, Mesenchymal Cells and Platelet Rich Plasma. PRP has the widest range of clinical applications. The present study was undertaken to assess wound healing with autologous PRP therapy.

**Methodology** This is a prospective Interventional Study involving 150 consecutive wound cases. The study made use of the Sandeep's Technique for Assisted Regeneration of Skin (STARS) therapy which was developed at the JNMC, in the Centre for Autologous Platelet Biotechnological Intervention (CAPBI). It is a mono- therapy based on autologous Platelet Rich Plasma (PRP). Wounds were followed up and observed for wound healing particularly status of floor, edge and discharges after every PRP infiltration. Microbial culture sensitivity test was also done.

**Results** This pilot study included 150 wounds (infective, diabetic, bedsores, compound fractures etc).
Results showed complete healing of wound in all the cases including infection control. Regeneration of grossly dead/ dying tissues was also observed.

**Conclusion** PRP triggers wound repair by releasing locally acting growth factors via α-granules degranulation. Growth factors trigger cell division, suppress cytokine release, limit inflammation, interact with macrophages to improve tissue healing and regeneration and promote new capillary growth. PRP has demonstrated antimicrobial activity. PRP led STARS therapy is safe, predictable, accessible and can be performed by any trained health care provider.

**Keywords:** Regenerative medicine, Wound care, Platelet rich plasma

## Introduction

People tend to get injured and develop wounds. These wounds lead to damages that involve tissue losses. Wounds range from acute wounds to more compound fractures that leave bones and tendons exposed. Wounds may also be post-operative scars or dehisces, infected compound fractures; conditions like active cellulitis, necrosis as well as chronic non healing wounds like pressure sores, bed sores or tropical ulcers.

Current wound management solutions include drugs like antibiotics and analgesics, along with dressings of such wounds with local antimicrobial or chemicals. Device assisted interventions like vacuum assisted or surgical debridement and reconstructions are other options. All these interventions are associated with significant side effects, surgical risks. They require great technical expertise and bear a huge financial burden. In addition, the current management of wounds faces challenges such as loss of skin and/or tissue, risk of infections and possibility of non-healing or delayed healing. Death, necrosis, gangrene remain most dreaded complications. Co-morbidities like diabetes or old age further complicate the management.

Recent advances in biotechnology have translated into the

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creation of regenerative medicine technologies which are imperative to address the current health care needs. [1] There are 3 regenerative medicine techniques with promising clinical applications. These are Stem cell, Mesenchymal Cells and Platelet Rich Plasma (PRP).

PRP, an autologous plasma fraction of peripheral blood, is the regenerative medicine intervention that is currently being used clinically for a wide range of conditions. [1] PRP is a 3-10 times concentrate of platelets in plasma. PRP is a good choice as amongst the available regenerative products owing to its ease of preparation, easy accessibility and most importantly the safety by virtue of it being an autologous plasma fraction of peripheral blood.

PRP has an excellent regenerative property. It triggers wound repair by releasing locally acting growth factors via α-granules degranulation. These include platelet-derived growth factor, transforming growth factor-β, interleukin-1, platelet-derived angiogenesis factor, vascular endothelial growth factor, epidermal growth factor, platelet-derived endothelial growth factor, epithelial cell growth factor, insulin-like growth factor etc. They aid by triggering cell division and suppressing cytokine release and limit inflammation, interacting with macrophages to improve tissue healing and regeneration, promote new capillary growth. [12] PRP has also demonstrated antimicrobial activity against Escherichia coli, Staphylococcus aureus, including MRSA (Methicillin Resistant Staphylococcus aureus) [13]

The present study was undertaken to assess wound healing with autologous PRP therapy.

## Materials and Methodology

This is a prospective Interventional Study in which 150 consecutive wounds presenting to the Department of Orthopaedics and Centre for Autologous Platelet Biotechnological Interventions were included. The inclusion and exclusion criteria were as follows, Patients having Haemoglobin of at least 10gm% and Platelet count more than 100000/ul were included in the study. Patients having clotting disorders or any haemato-oncological disorders or with oncological wounds were excluded from the study.

PRP preparation was done with the autologous low volume venous blood. A blood volume of 20 ml was taken and double spin method was used. About 2-4 ml of PRP was extracted from every sitting and infiltrated around the margins of the wound as per the Sandeep's Technique for Assisted Regeneration of Skin (STARS) protocol.[7] Wounds were inspected at every sitting and tracing of wound area was taken over a tracing paper and with the help of graph the size was determined. Also, a clinical photograph of each wound was taken weekly till the end of the treatment. A culture sensitivity test was performed for each infected wound and followed up with weekly culture sensitivity test. The observations were recorded in terms of wound healing particularly status of floor, edge and discharges after every PRP infiltration. The wounds were kept covered with moist saline dressings.

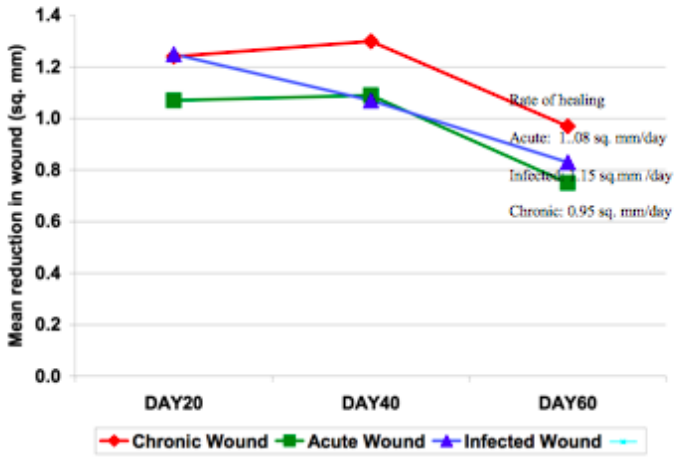
## Results

The mean age of the patients was 39.8 years with a range of 4-75 years.

The mean requirement of the sessions were 10.3 sessions on average. A complete wound healing was observed within 20 days in 30 (20%) of the total wounds, while it took 40 days for 70 (46.6%) of the total wounds and 60 days for the remaining 50 (33.33%) wounds to heal completely. A 50% reduction in size of wounds was observed within 20 days in 99 (66%) wounds and within 40 days in the remaining 51 (34%) wounds. It was observed that the rate of healing for acute wounds was 1.08sq.mm/day, for infected wounds it was found to be 1.15 sq.mm/day while the rate was 0.95sq.mm/day for chronic wounds.

**Table 1**: Characteristics of the wounds used in this study

| Type of wound | Number | % |
|---|---|---|
| Acute | 118 | 78.66 |
| Chronic | 32 | 21.33 |
| Clean | 103 | 68.66 |
| Dirty | 47 | 31.33 |
| Non-Infected | 91 | 60.66 |
| Infected | 59 | 39.33 |
| **Etiology** | | |
| Post Thrombotic | 114 | 76 |
| Diabetic | 22 | 14.66 |
| Bed Sores | 10 | 6.66 |
| Others | 4 | 2.66 |
| **Site** | | |
| Upper Limb | 12 | 8 |
| Lower Limb | 99 | 66 |
| Hand | 6 | 4 |
| Foot | 30 | 20 |
| Back | 3 | 2 |




**Graph 1**: Rate of reduction in size of wound per sq.mm/day

**On Histopathological Examination**

1. Phagocytic Infiltration within 48n hours

2. Defect filling with neo-angiotic tissue within 10 days

3. Collagen led healing in 21 days





## Discussion

The cellular therapy led by platelet rich plasma (PRP) is a key regenerative product. [1] PRP is increasingly being used as a new alternative approach in various fields of medicine (i.e. dentistry, traumatology, cosmetic surgery, ophthalmology, and dermatology).[14] Platelet-rich concentrate is an autologous concentration of platelets and growth factors .[2] The secretory proteins contained in the α-granules of platelets include platelet-derived growth factor (PDGF-AA, BB, and AB isomers), transforming growth factor-β (TGF-β), platelet factor 4 (PF4), interleukin-1 (IL-1), platelet-derived angiogenesis factor (PDAF), vascular endothelial growth factor (VEGF), epidermal growth factor (EGF), platelet-derived endothelial growth factor (PDEGF), epithelial cell growth factor (ECGF), insulin like growth factor (IGF), osteocalcin (Oc), osteonectin (On), fibrinogen (Ff), vitronectin (Vn), fibronectin (Fn) and thrombospondin-1 (TSP-1) (15,16,17,19). All these factors trigger biological effects including directed cell migration (i.e. chemotaxis), angiogenesis, cell proliferation and differentiation, which are key elements in the process of tissue repair and regeneration. [14]

Initially there is control of infection and suppression of unhealthy tissue, further there is formation of granulation tissue, followed by epithelisation from margins progressing towards centre of wound and eventually maturation into near normal skin. These stages mimic the natural healing process. [10]

The PRP therapies involve minimal manipulation, and in general, regulatory requirements are easy to comply. [18]

"STARS" therapy with autologous PRP as biotechnological intervention for wound management is safe as its uses autologous venous blood; is easily reproducible; can be widely accessed and is effective; leading to complete healing.[7]

## Conclusion

The PRP led STARS therapy is safe, predictable, accessible and can be performed by any trained health care provider, at all levels of health care including field and primary centres. It obviates the need for surgery, debridement of dead and necrotizing tissue; antibiotics; high dose of painkillers and intense local dressing.

Regeneration as a tool for healing can be a very powerful option with a potential to be the mainstay treatment for wounds, adding newer dimensions to wound management beyond the current concepts of Surgical Reconstructions and Medicinal management.

The future has arrived for Wound Management with Regenerative Medicine.

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PRAXIS UNDERGRADUATE MEDICAL RESEARCH JOURNAL

# Changing rhythm of life- modern epidemic of mobile phone misuse

*Advay Mehta[1], GR Lingeshwaran[2]*

## Abstract

**Introduction:** The near-epidemic and extensive use and dependence on mobile phone usage by all strata of modern society has had effects on sleep patterns, social interactions and work outputs. The study aims to examine the relationship between mobile phone usage and sleep patterns among medical students.

**Methodology:** A cross sectional survey was conducted involving 294 UG MBBS students aged between 17 and 25 years who were questioned on their sleep patterns and mobile phone usage. This was assessed by a self-administered, Pittsburgh Sleep Quality Index (PSQI) questionnaire. In addition, they were also interviewed with a semi-structured questionnaire on the pattern of their daily mobile phone usage.

**Results:** Mean age of students (SD) was 20.74 years (± 1.72). All the students owned a smartphone and mainly used it for communication, social networking, gaming, reading, watching movies and taking photographs and videos. 42.85 % of students used their phone for up to 60 minutes before sleeping and 45.23% used it for up to 30 minutes before sleeping. Night time usage of mobile phones was significantly ($p<0.05$) associated with increased difficulty in waking up, wake- time tiredness, decreased concentration, sleep latency and tendency to miss or be late to classes. Further, greater hours of mobile phone usage correlated to higher PQSI scores, meaning poor sleep quality. These problems were more prevalent in students living in hostels compared to those students living with their families.

**Conclusion:** Use of mobile phones before bedtime negatively impacts sleep, psychological health and academic performance of students. Avoidance or restriction of late night mobile phone use should be encouraged.

**Keywords: Sleep, Mobile phone epidemic**

## Introduction

Mobile phones have now become an indispensable part of our daily lives. Originally developed as a business tool, they are now being used by every strata of society. This device incorporates features of a telephone, television, computer, camera, alarm clock, music player and calculator into an all-in-one pocket-sized device. When originally introduced, they were expensive, bulky and impractical. As technology advanced, they have become simpler, more affordable and widely used. With easy internet availability, mobile phones now have multipurpose uses. According to the International Telecommunications Unions, India currently has the second highest number of internet users in the world. Teenagers and young adults, being inherently tech savvy, have graciously accepted mobiles as a part of life. This is a generation shaped by smartphones and by the parallel rise of social media.

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However, the highly portable and pervasive nature of digital devices with their small screens and blue –light emission affects daily routines, sleep and rest patterns and diurnal rhythms. [6]

Excessive screen time, especially at night disrupts the natural circadian rhythm of the body leading to reduced sleep quality, increased sleep latency, difficulty in waking up, wake time tiredness, decreased energy and productivity, difficulty in concentration, reduced academic output and increased skipping of classes. [3,7,15,16]

Anything that gives excitement has the potential to cause addiction. Addiction to mobiles leads to inappropriate usage and causes mental, physical and emotional stress.

Our study was undertaken to examine the effects of late-night mobile phone usage and its perceived effects on sleep length and quality in undergraduate medical students.

**Table 1: Relationship between Night time usage of mobile phones and sleep related problems**

| Problems faced by students the next day | Duration of Mobile Phone use before going to sleep Total number of students =294 (%) | | | | | |
|---|---|---|---|---|---|---|
| | 60 minutes n=126 (42.85) | 30 minutes n=133 (45.23) | Less than 15 minutes n=27 (9.18) | No use within 60 minutes n=8 (2.72) | χ2 | P value |
| Difficulty in waking up (n=220) | 107(84.9) | 98(73.6) | 14(51.8) | 1(12.5) | 30.97 | <0.00001 |
| Wake time tiredness (n=239) | 110(87.3) | 112(84.2) | 16(59.2) | 1(12.5) | 37.25 | <0.00001 |
| Decreased energy and productivity (n=175) | 86(68.2) | 78(58.6) | 10(37) | 1(12.5) | 17.03 | 0.00069 |
| Inability to concentrate in class/on studies (n=260) | 119(94.4) | 121(90.9) | 18(66.6) | 2(25) | 49.27 | <0.00001 |
| Disturbed appetite (n=43) | 23(18.2) | 18(13.5) | 1(3.7) | 1(12.5) | 4.06 | 0.25466 |
| Skipping/being late to class (n=202) | 97(76.9) | 90(67.6) | 14(51.8) | 1(12.5) | 19.40 | 0.00022 |
| Negative mood or behavioural changes (n=70) | 35(27.7) | 31(23.3) | 3(11.1) | 1(12.5) | 4.07 | 0.25334 |
| None (n=36) | 10(7.9) | 12(9) | 9(33.3) | 5(62.5) | 33.43 | <0.00001 |

## Methodology

294 Undergraduate MBBS students aged between 17 and 25 years were recruited as a part of a cross sectional survey and were questioned on their sleep patterns and mobile phone usage. This was assessed by a questionnaire on their demographic characteristics and pattern of mobile phone usage. Demographic details included age, gender, year of study and residence (hostel or family). Pattern of mobile phone usage included questions on smartphone ownership, duration of total daily phone use, duration of phone use 1 hour before sleeping, where the phone is kept while sleeping and purpose of phone use.

They were asked about perceived effects faced in wake-hours due to reduced quality of sleep, decrease in concentration ability, being late to or skipping classes, decreased appetite or any mood changes.

In addition they were also interviewed by a self-administered, Pittsburgh Sleep Quality Index (PSQI) questionnaire used to measure quality and patterns of sleep. It is used to grade sleep in the last one month from poor to good using 7 components. These components are subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication and daytime dysfunction. Each component is given a score and a sum of the 7 component scores gives a global PSQI score. A global score of 5 or greater indicates poor sleep quality. Data was collected after obtaining informed consent and confidentiality was maintained.

Statistical analysis included descriptive statistics and chi square testing to find correlations between mobile phone usage and sleep characteristics. Statistical significance was taken as $p<0.05$.

## Results

The study consisted of 294 undergraduate medical students, out of which 42.17% were males and 57.82% were females. The mean age of the students was 20.74 ± 1.72 years. The median value of daily mobile use was 4.5 hours. 182 (61.9%) students lived in the hostel and 112 (38.09%) lived with their families. 238 (80.95%) students kept their mobile phone next to their pillow while sleeping. Mobile phones were most commonly used by students for social media, followed by accessing internet and making calls.

Mobile phone use at night (60 minutes prior to sleeping) was significantly associated ($p<0.05$) with difficulty in waking up the next day, wake time tiredness, decreased energy and productivity the next day, inability to concentrate on studies and increased incidence of skipping or being late to classes. (Table 1)

The PQSI score is significantly correlated with the duration of hours of mobile phone usage. An increase in total daily hours of mobile usage was associated with higher PSQI scores, which implies poor sleep quality.

**Table 2: Relation between PSQI score and total daily hours of mobile phone use**

| Global PSQI score | Total Daily hours of mobile phone use | | χ2 | P value |
|---|---|---|---|---|
| | < 4.5 hours | > 4.5 hours | | |
| <4 (good) | 71 | 33 | 22.2931 | <0.01 |
| >5 (poor) | 75 | 115 | | |

A significant association was also observed between the type of place of residence of the students, i.e., hostel or with family and the duration of mobile phone usage. Poorer sleep quality and higher total daily mobile phone usage was observed in students living in hostel compared to those living with their parents. (Table 3)

**Table 3: Relation between place of residence and total daily mobile phone usage**

| Place of residence | Total Daily hours of mobile phone use | | χ2 | P value |
|---|---|---|---|---|
| | < 4.5 hours | > 4.5 hours | | |
| Hostel (182) | 55 (30.21%) | 127 (69.78%) | 4.865 | <0.05 |
| Family (112) | 48 (42.85%) | 64 (57.14%) | | |

## Discussion

A mobile phone is a device which is an inherent part of every college student's life. In our study, we observed that every medical student owned a smartphone and its use was extensive among both genders. [1]

The main purpose of using mobile phones was communication (calling and messaging), social media use, internet, watching movies and videos, listening to music and camera functions. [2]

Students were always expected to be reachable by their friends and family at all hours, hence always had their phone with them, which may be a reason for extensive use of phones. Even while sleeping, majority of students kept their phone next to their pillow indicating habitual mobile use even before sleeping at night.

We observed that large majority of students used their phones before going to sleep. In our study, night time mobile phone use was shown to be significantly associated with difficulty in waking up the next day, wake time tiredness, decreased energy and productivity, inability to concentrate on studies and increased incidence of skipping or being late to classes. Our results were consistent with a similar study conducted by Gupta et al. [3] Studies have also shown that poor sleep quality leads to lower cognitive scores.[4] Use of mobiles late at night is more harmful than daytime use [5], because light from the screen gets more concentrated due to absence of ambient environmental light which would otherwise have the effect.

Mobile phones hamper sleep because of cognitive stimulation, emission of electromagnetic radiation, and the effect of blue light from the screens. [6,17] Due to cognitive stimulation, there is increased release of cortisol in the body, which confuses the body's internal clock. [17]

Blue light emitted from screens also affects our circadian rhythm by altering the synthesis pattern of melatonin, which is essential for good sleep and reduces the sleep latency period. These are interpreted by higher PSQI scores, indicating poor sleep quality. [6,7]

With the entry of new telecom services offering high speed 4G internet services at low prices, the internet usage and total daily mobile phone usage has also increased in the student population. We observed that an increase in total daily hours of mobile usage was associated with higher PSQI scores, and this was significantly associated with poor sleep quality. [8,3] Poor sleep hygiene is also be an associated factor in reduced sleep quality as shown by this study. [9] Students living in hostels were observed to have poorer sleep quality and higher total daily mobile phone usage when compared to those living with their parents. This may be due to lack of adult supervision and influence by peers. However this was in contradiction to a study done in Malaysia where 75.6% of study population was between 21 and 25 years of age[10].

The smartphone addiction magnitude in India ranges from 39% to 44%.[11] Overuse and addiction to mobile phones use can also lead to insomnia, social anxiety, stress and depression among students. [12,13] Excessive mobile phone use has also been linked to promotion of sedentary behaviour and obesity. [14] Mobile phone addiction can also lead to sensation of phantom ringing of phones called ringxiety, which was faced by 34.5 % students in a study done by Subba et al. [15]

The limitations of the study we conducted are its cross-sectional nature, self-reporting of data and the inclusion of only a small section of the student population, that is only medical students. Including students from other fields can give deeper insights into this issue.

## Conclusion

Mobile phone addiction is a problem plaguing college students and is significantly associated with reduced sleep quality. It can be corrected by limiting the daily screen time, switching off or restricting use of mobile phones for at least an hour before sleeping, switching to 'night mode' on the mobile phone and reducing constant refreshing of social media applications, following a strict sleep schedule and good sleep hygiene.

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Open Access Original Research

PRAXIS UNDERGRADUATE MEDICAL RESEARCH JOURNAL

# A Cross-sectional study to assess the Usage and Unmet needs of Assistive Technology and its Implications among the disabled persons in Hubli - Dharwad

*Anusha Hegde[1], Vinayak Akki[2], Spoorty Savalagi[3], Dr. Kantesh S[4], Dr. Sunil Gokhale, Dr. S R Itagimath, Dr. Sushma H R*

## Abstract

Assistive Technology (AT) concerns the practical tools that can support functional needs of people who experience difficulties linked to disability or ageing. Our study aims to assess prevalence of usage and unmet needs of AT and to study the implications of using assistive technology. A cross-sectional study was conducted among the disabled persons of Hubli-Dharwad district for a period of one month, June 5,2018 to July 8,2018. The sample size was calculated to be 223, which was collected from 8 disability centers using simple random sampling method. Data was collected using standard questionnaire from National Disability Survey (NDS), 2006 conducted in Ireland with necessary modifications. Our study conducted in Hubli-Dharwad, revealed highest prevalence of Intellectual and Learning disability (33.2%). Top most used AT were Magnifiers large print or Braille reading materials and unmet need was highest for Speech and language therapy and most of them had no difficulty participating in Social activities and use of public transport. From our study, we conclude that across each disability group there are substantial number of people who still require additional AT and a further group who have received no AT yet at all. AT used and required by people with a physical and/or sensory disability is diverse.

**Keywords:**

## Introduction

Disability is defined by UN Convention on the Rights of Persons with Disabilities as
"*Persons with disabilities include those who have long-term physical, mental, intellectual, or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others*". [1]

The World Health Survey gives the prevalence of adults with very significant difficulties in functioning at 2.2%. Based on 2010 population estimates – 6.9 billion with 5.04 billion 15 years and over and 1.86 billion under 15 years – and 2004 disability prevalence estimates (World Health Survey and Global Burden of Disease) there were around 785 (15.6%) to 975 (19.4%) million persons 15 years and older living with disability. Of these, around 110 (2.2%) to 190 (3.8%) million experienced significant difficulties in functioning. Including children, over a billion people (or about 15% of the world's population) were estimated to be living with disability.[2] Per Census 2011 of India, the prevalence of persons with disability was found to be 2.21%.[3]

For individuals with disabilities, modern technological advancements and low-tech and high-tech breakthroughs have not only changed but have revolutionized the way disabled children and adults learn and live. 'Assistive Technologies' (AT) are practical tools that can support functional needs of people who experience difficulties linked to disability or ageing. The International Standards Organization (ISO) [4] defines ('Assistive Products') as: *"Any product (including devices, equipment, instruments and software), especially produced or generally available, used by or for persons with disability: for participation; to protect, support, train, measure or substitute for body*

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*functions/structures and activities; or to prevent impairments, activity limitations or participation restrictions*"

AT supports children to access and enjoy their rights; do things they value; and bridges disparities between children with and without disabilities.

"Assistive technology usage and unmet need amongst People with Disabilities in Ireland" presents an analysis of the data on the Assistive Technologies providing a detailed profile of levels and patterns of usage and unmet need for various types of AT among people with disabilities in Ireland. The results show that assistive technologies have an important place amongst the range of aids and supports for people with disabilities. They are used by large numbers of people with disability, but similar or large numbers have unmet need for many of the ATs. [6] Assistive device is quite common among persons with underlying difficulty with respect to activities considered in the study. Between 16% and 39% use AT alone to accommodate their difficulty and those who use AT are consistently less likely to state that they need any assistance or hands on help. [5]

First, disability is a vital issue and poses challenges to the state of development. Disabled are the most vulnerable group and have higher incidence of poverty, ill health, illiteracy and unemployment. In addition, they suffer from societal prejudices, discrimination with respect to health care, employment and other public facilities. Though prevalence of disability is higher in developing countries and increasing over time, there are limited number of studies that addressed the dimensions and structure of disability in India. Evidences also suggest that there is increase in various form of disability in India. Second, in India, there are a few studies that addressed the usage of assistive technology and the needs of the disabled population.[8] Our study aims to assess the on Usage and Unmet needs of Assistive technology for disabled and their implications in the form of getting help and social participation.

## Materials and Methodology

A cross-sectional study was conducted among the disabled persons of Hubli-Dharwad. Our study setting included Disability centers of Hubli-Dharwad. There are totally 22 of disability centers and institutions in Hubli-Dharwad district, out of which 7 centers were selected by simple random technique. The duration of our study was one month. As per Census 2011 of India, the proportion of disabled population was 2.21%.[3]

Considering the prevalence of disabled population as 2.21%. with 95% confidence interval, 2% permissible error and 10% non-response rate, the sample size was calculated as 22.3

Permission was taken from the Department of Community medicine, KIMS, Hubli and the Head of the Institutions that were included in this study. Also, consent was taken from person with permanent disability included in this study. We used the standard questionnaire of National Disability Survey (NDS) of Ireland, 2006 and carried out a pilot study and accordingly modified the questionnaire to the needs of the population we interviewed. Each person who took part in the study was interviewed for around 10 minutes. The data collected were entered in Microsoft excel sheet and analyzed using IBM SPSS version 21software. Categorical variables were expressed in frequency and percentages. The test of proportion i.e., Z-test was applied wherever necessary and 'p' value less than 0.05 was considered as statistically significant.

## Results

The data analysis revealed that among 223 participants we interviewed, 70.4% belonged to the age group birth to 17 years; 26.5% belonged to age group 18 to 59 years and 3.1% of the participants were above 60 years; and 63.2% were male and 36.8% were female. (Table 1)

**Table 1**: Demographic data

| Age | Percentage |
|---|---|
| Birth to 17 years | 70.4 |
| 18 years to 59 years | 26.5 |
| 60 years and above | 3.1 |
| Total | 100 |

In our study population, 39.5% received special education; 4% were not eligible; 2.2%were illiterate; 19.7% received primary education; 11.2% received middle school education; 10.8% received high school education; 4.9% received Intermediate education 6.7% completed graduation and 0.9% did profession or honors. Among our study group 34.1 % belonged to upper middle class; 27.8% belonged to lower class; 19.7% belonged to upper class and 72.6% received state benefits. (Table 2)

**Table 2**: Education

| **Education** | **Percentage** |
|---|---|
| Not eligible | 4.0 |
| Illiterate | 2.2 |
| Primary school | 19.7 |
| Middle school | 11.2 |
| High school | 10.8 |
| Intermediate or post high school diploma | 4.9 |
| Graduate or post graduate | 6.7 |
| Profession or honors | 0.9 |
| Special education | 39.5 |
| Total | 100 |

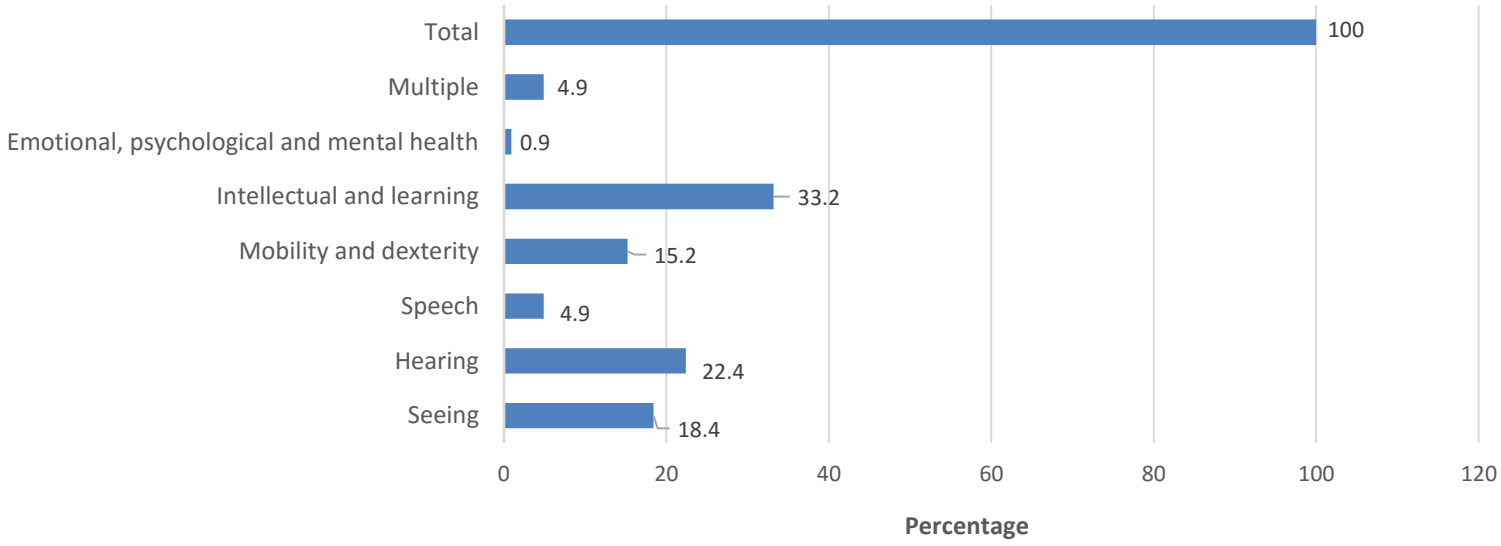
**Table 3**: Usage and unmet needs of assistive technology

| Assistive Technology | Usage | | Unmet need | | Z | p |
|---|---|---|---|---|---|---|
| | Frequency | Percentage | Frequency | Percentage | | |
| **Seeing difficulty** | | | | | | |
| Magnifiers, large print or Braille reading materials | 37 | 78.72 | 4 | 40 | 2.58 | p<0.05 |
| Audible or tactile devices, such as talking scales, clocks, tapes or Dictaphones | 4 | 8.51 | 37 | 86.04 | 16.27 | p<0.0001 |
| Recording equipment or portable note-takers | 4 | 8.51 | 34 | 79.07 | 12.74 | p<0.0001 |
| A computer with large print, Braille | 7 | 14.89 | 36 | 90 | 18.97 | p<0.0001 |
| A screen reader | 5 | 10.64 | 35 | 83.33 | 14.48 | p<0.0001 |
| A scanner | 3 | 6.4 | 35 | 79.55 | 13.08 | p<0.0001 |
| A guidance cane | 9 | 19.15 | 27 | 71.05 | 9.65 | p<0.001 |
| A guide dog | 1 | 2.13 | 2 | 4.35 | 1.44 | p>0.05 |
| Mobility or rehabilitative worker | 3 | 6.38 | 3 | 6.82 | 1.79 | p>0.05 |
| Community resource worker | 3 | 6.38 | 3 | 6.82 | 1.79 | p>0.05 |
| **Hearing difficulty** | | | | | | |
| Hearing aid(s) without 'T-switch | 12 | 19.04 | 10 | 19.60 | 3.52 | p<0.01 |
| Hearing aid(s) with 'T-switch' | 37 | 58.73 | 10 | 38.46 | 4.03 | p<0.01 |
| Cochlear implants | 1 | 1.58 | 10 | 16.13 | 3.45 | p<0.01 |
| Phone related devices, e.g. phone 'coupler', flashers, and minicom. | 0 | 0 | 3 | 4.77 | 1.77 | p>0.05 |
| A mobile phone for texting | 5 | 7.93 | 1 | 1.72 | 1.00 | p>0.05 |
| A fax machine | 0 | 0 | 1 | 1.59 | 1.00 | p>0.05 |
| Speed text | 0 | 0 | 2 | 3.17 | 1.43 | p>0.05 |
| A computer to communicate, e.g. email or chat service | 1 | 1.58 | 21 | 33.87 | 5.63 | p<0.001 |
| Sub-titles on TV | 5 | 7.93 | 2 | 3.45 | 1.43 | p>0.05 |
| Sign language, e.g. ISL | 35 | 55.55 | 12 | 42.86 | 4.58 | p<0.01 |
| Lip read or speech read | 46 | 73.01 | 3 | 17.65 | 1.90 | p>0.05 |
| **Speech difficulty** | | | | | | |
| Voice amplifier | 1 | 0.84 | 25 | 21.19 | 5.63 | p<0.001 |
| Computer or keyboard | 6 | 5.04 | 54 | 47.79 | 10.17 | p<0.0001 |
| Communications board | 18 | 15.12 | 53 | 52.48 | 10.56 | p<0.0001 |
| Speech and language therapy | 89 | 74.78 | 28 | 93.33 | 20.48 | p<0.0001 |
| Sign language, e.g. ISL | 45 | 37.81 | 36 | 48.65 | 8.37 | p<0.001 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Interpreter | 2 | 1.68 | 16 | 13.68 | 4.3 | p<0.01 |
| **Mobility and dexterity** | | | | | | |
| Walking aids, e.g. orthopedic footwear, walking stick or frame, rollator | 10 | 21.27 | 15 | 39.47 | 4.977 | p<0.01 |
| A manual or electric wheelchair or a scooter | 8 | 17.02 | 11 | 28.2 | 3.91 | p<0.01 |
| Portable ramps | 2 | 4.25 | 15 | 33.33 | 4.74 | p<0.01 |
| Assistive device, e.g. braces or supportive devices, reach extenders or grasping tools | 1 | 2.12 | 6 | 13.04 | 2.62 | p<0.05 |
| **Intellectual and Learning difficulty** | | | | | | |
| Occupational therapy | 30 | 38.96 | 11 | 23.40 | 3.78 | p<0.01 |
| Speech and language therapy | 68 | 45.45 | 21 | 50 | 6.48 | p<0.001 |
| Psychology service | 16 | 20.77 | 17 | 34 | 5.60 | p<0.001 |
| Physiotherapy, instructor or educator | 21 | 27.27 | 20 | 35.17 | 5.51 | p<0.001 |
| Screen reading software, learning support software | 11 | 14.28 | 47 | 71.21 | 12.77 | p<0.0001 |
| General products and technology for education not adapted or specifically designed, e.g. talking books, computer hardware or software | 11 | 14.28 | 48 | 72.72 | 13.26 | p<0.0001 |

Among our study group 33.2% had intellectual and learning as main disability followed by hearing (22.4%); seeing (18.4%); mobility and dexterity (15.2%); speech (4.9%); and multiple disability (4.9%); very few had emotional, psychological and mental health (0.9%) as main disability. (Graph 1)

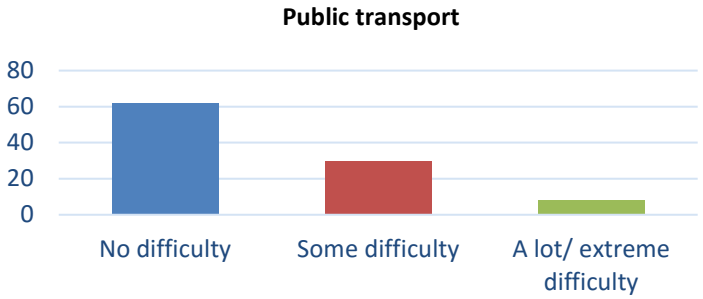
Table 3 shows usage of various ATs among different disability groups. The AT ranges from magnifiers and braille for to the wheel chairs, ramps and talking books. Among the wide range of assistive technologies considered in our study, highest usage was reported for Magnifiers, large print and braille reading materials. Unmet need for the assistive technologies varies greatly with utmost unmet need being for Speech and language therapy. Analyzing the unmet need within each




**Graph 1**: Prevalence of disability

disability group, among people with visual impairment, computer with large print, Braille etc. (90%), for persons with hearing impairment a computer to communicate (33.87%), speech and language therapy (93.33%) among those with speech difficulty, Physiotherapy (61.29%) among people with difficulty in mobility and dexterity and General products and technology for education among Intellectually impaired individuals respectively were found to have highest unmet needs.

Among our study group 90.6% did not use specialized transport, 26% did not use public bus, 39.5% did not use private transport. Among those who used public transport, 61.8% faced no difficulty while 6.3% faced a lot of difficulty. (Graph 2)




**Graph 2:** Level of difficulty among those who use public transport

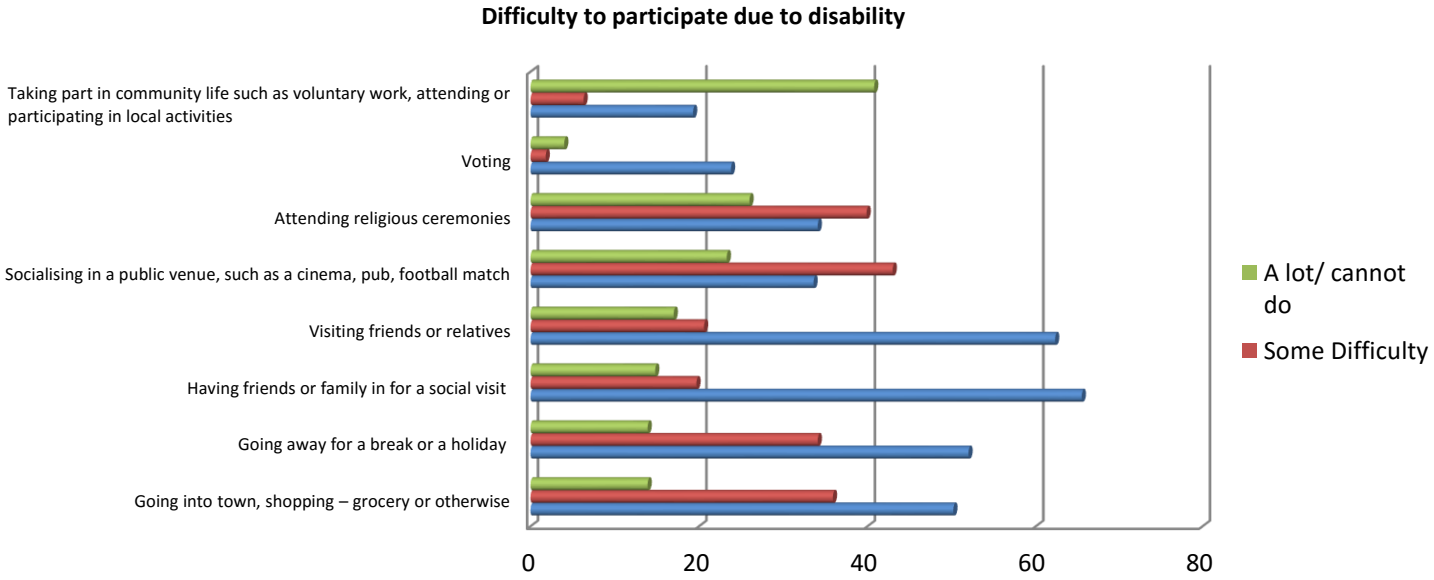
Considering social participation, 50.2 % faced no difficulty in going to town for grocery, shopping etc. whereas 35.9% faced some difficulty and 13.9% couldn't do at all. Majority (65.5%) had no difficulty in having friends for a social visit and 62.3%of the participants had no difficulty in visiting friends. 43.0% participants had some difficulty in socializing in public venue such as cinema. 39.9% participants had some difficulty in participating in religious ceremonies. 43.08% participants had no difficulty in taking part in community life. (Graph 3)

## Discussion

Facilitating the ability to the persons with disabilities to live and work in the community is a central goal for policymakers and public health practitioners. Although it is difficult to measure optimal care arrangements for persons with disabilities, the results presented here further increase our understanding independently of the relative effectiveness of ATs and provide insights into the conceptualization and measurement of unmet need. [8]

Our study revealed that 70.4% of them belonged to the age group of 0 to 17 years, like the Census 2011. [3] Intellectual and learning was found to be the main disability (33.2%) affecting majority of the persons in our study group whereas the analysis of the NDS, 2006 revealed major disability to be mobility and dexterity (56%). [7]

The most commonly used AT by persons with visual impairment, were Magnifiers large print or Braille reading materials (78.72%). For other impairments, such as hearing-Lip read or speech read (73%); mobility and dexterity-Physiotherapy (34.04%) and Intellectual and Learning-Speech and language therapy (45.45%); were reported maximum usage. In NDS, 2006, Magnifiers, large print or Braille reading materials was the most commonly used AT by people with seeing disabilities, with almost one-in-three (31.8%) reporting using these and hearing aids by persons with hearing disabilities.[8] Among the various ATs used




**Graph 3:** Social Participation

amidst different disability groups, highest unmet need was for Speech and Language therapy which was comparable to the results of NDS, Ireland of 2006. [8]

A significant difference has been observed in between what respondents perceive as unmet needs and actual usage of ATs. The unmet need for audible or tactile devices was found to be quite high, 86.04% while the usage being only 8.51%. Similarly, for various other ATs like computer with large print, braille; screen reader, scanner, guide cane, guide dog among persons with visual impairment. In other groups this difference is considerably less. High percentages of unmet demand flag that AT provision systems may be less effectively reaching. The ATs also vary in technology characteristics; some are relatively low-tech and low cost, others are relatively high-tech and high cost, these factors might be responsible for the considerable difference between the usage and unmet needs.

Majority (65.5%) had no difficulty in social participation and 93.3% of them received help from family or others to carry out their routine activities, similar to the NDS,2006. [8]

Our study identifies a number of factors that appear to increase the likelihood of having unmet demand for AT. These help to identify groups that may be underserved by AT delivery systems at present and may warrant more attention. We have used cross-sectional data and thus were unable to directly examine the order in which each type of assistance was adopted. A second limitation in this study is that we were unable to distinguish among specific types of devices or between simple and complex technologies, though other research has shown these distinctions to be important.

## Conclusion

There is a correlation between AT status, restrictions and barriers in participation in everyday living and activities. Across each disability group there are substantial number of people who still require additional AT and a further group who have received no AT yet at all. Access to information (e.g. about entitlements, services, or nature of the condition) was a major barrier to participation and was significant. Too often, AT has been a missing link in the chain of prerequisites that enable children with disabilities to lead an enjoyable life and exercise their rights rather than being deprived of them. AT products that are available in India are unaffordable as these have been primarily developed in the western world where affordability is not a criterion. These devices are almost non-existent in India and steps need to be taken to make affordable AT medical devices in India. There has been increasing recognition of the importance and benefits of social inclusion and the full participation of people with disability. AT as a space is underserved in India.

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PRAXIS UNDERGRADUATE MEDICAL RESEARCH JOURNAL

# Assessment of Maternal awareness on danger signs in neonates and infants

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## Abstract

**Introduction:** Integrated management of neonatal and childhood illnesses (IMNCI) lays emphasis on maternal awareness of danger signs in neonates and infants for reduction of infant mortality rate (IMR).

**Methodology:** 300 mothers with children under 1 year of age were given a questionnaire encompassing questions on various neonatal and infant danger signs

**Results:** Majority of the mothers who participated had adequate knowledge on danger signs in their infants and neonates. However, there was a gap in perceiving entities such as bulging fontanelles, umbilical discharge and cold peripheries as important danger signs.

**Conclusions:** For a greater impact in reducing IMR, information on danger signs in infants should be disseminated through mass media initiatives. This will enable timely management of those unfortunate babies who land up 'paying' for the missed danger signs.

**Keywords:** Danger signs, Infant mortality, IMNCI

## Introduction

According to recently released Sample Registration System (SRS) bulletin, India has registered a significant decline in infant mortality rate (IMR) over last one decade and it was 34 per 1000 live births in 2016 [1]. The neonatal mortality rate (NMR) declined from 52 per 1000 live births in 1990 to 28 per 1000 live births in 2013, however, the rate of decline has been slow [2]. Among neonatal deaths, the rate of decline in early neonatal mortality rate (ENMR) is much lower than that of late (LNMR).

Integrated management of neonatal and childhood illnesses (IMNCI) developed by WHO and expanded by India combines improved management of common childhood illnesses and promotion of health by including counseling of caretaker on feeding and immunization. Counseling of mothers regarding warning signs is an integral part of IMNCI; as the major cause of delay in health care access remains poor knowledge of mothers in disease recognition. The data regarding level of knowledge about warning signs in Indian mothers is scanty. A study done by Dongre et al in Wardha revealed that maternal knowledge about various danger signs ranged from 9% to 40% [3]. A similar study done by Nigatu et al in Ethiopia showed that the proportion of mothers who had knowledge of 3 or more neonatal danger signs was only 18.2% [4]. This study aimed to assess the level of maternal knowledge about danger signs in neonates and infants and the factors that have a bearing on their level of this knowledge.

## Materials and Methodology

A questionnaire based cross sectional observational study was conducted at various venues in a tertiary care teaching hospital, which included the Pediatric OPD, Obstetrics Ward and Day Care Centre. The study was conducted over a period

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of 3 months, from August to October 2018. All mothers with an offspring less than 1 year of age (neonates and infants) during the study period were enrolled. Assuming that 25% of our mothers were unaware of common danger signs, with 95% confidence interval, a sample size of 289 was required. However, a total of 300 mothers were included in the study.

After obtaining informed consent, 300 mothers were interviewed using a validated questionnaire during their OPD visits. The questionnaire covered information about socio-demographic profile of mother, open-ended questions on knowledge of mothers regarding various neonatal and infant danger signs [5]. Mothers were initially encouraged to voice their concerns and knowledge on danger signs, subsequently were offered open- ended questions and at the end were primed on the specific danger signs. Additional data regarding parity, previous admissions of their children and breast feeding were also sought as these were likely to have a bearing on their knowledge about the danger signs. Study questionnaire is attached separately. Danger signs, as specified in the IMNCI were used during this study.

Mothers who were aware of 10 or less danger signs (less than two thirds of the danger signs used in the study) were categorized as having inadequate knowledge and mothers who were aware of more than 10 danger signs (more than two thirds of the danger signs used in the study) were categorized as having adequate knowledge for the purpose of this study.

After administering the questionnaire, each mother was taught to recognize particular danger signs. The data was tabulated in an Excel sheet and proportion of mothers, aware or unaware of the danger signs was derived by analysis using Excel software. Bar diagrams and pie charts were prepared using excel software. Statistical significance was calculated by comparison of proportions and ANOVA was used where there were more than two groups. Statistical package Medcalc 9.3.0.0. was used for the data analysis. A p value of less than 0.05 was considered as significant.

## Results

The mean age of the mothers was 25.84+-4.29 years. Most of them were educated but less than 10% were working. The demographics of the participants of the study is given in table 1.

Table 2 shows the Association between Education status & adequate knowledge of danger signs There was no statistically significant association between educational status of the mother and knowledge about the danger signs.

**Table1: Demographic characteristics**

| | | |
|---|---|---|
| 1 | Mean age of respondents | 25.84 ± 4.29 yrs. |
| 2 | Educated | 290(97%)` |
| 3 | Working status | 29(10%) |
| 4 | Mean age at marriage | 20.8 yrs |
| 5 | Mean birth weight of the babies | 2.9 ± 0.58 kg |
| 6 | LBW | 52(17%) |

**Table 2: Association between Education status & adequate knowledge of danger signs**

| Education | Adequate Knowledge | | Total |
|---|---|---|---|
| | Absent | Present | |
| Illiterate | 3 (30%) | 7 (70%) | 10 |
| Primary & Secondary | 41 (39.8%) | 62 (60.2%) | 103 |
| 10+2 | 16 (23.2%) | 53 (76.8%) | 69 |
| Graduate & Post graduate | 31 (26.3%) | 87 (73.7%) | 118 |
| Total | 91 | 209 | 300 |

p= 0.73

Table 3 gives the association between working status and adequate knowledge of danger signs. A statistically significant association was found, wherein Higher Proportion of working mothers were aware of the danger signs.

**Table 3: Association between working status and adequate knowledge of danger signs**

| Working status | Adequate knowledge | | Total |
|---|---|---|---|
| | Absent | Present | |
| Home-maker | 87 (32.1%) | 184 (67.9%) | 271 |
| Working | 4 (13.8%) | 25 (86.2%) | 29 |

Association between age of the mother & adequate knowledge of danger signs is given in table 4. Overall, there is a statistically significant association between the age of mother and whether or not the mother has adequate knowledge about danger signs. For mother's under the age of 21, the proportion of mother's who were aware of danger signs was roughly the same as those who did not have adequate knowledge about danger signs. However, in mother's over the age of 22, the proportion of mother's who had adequate knowledge on danger signs was more than 1.5 times the proportion of mother's who lacked adequate knowledge. Furthermore, mothers with babies of 2nd / 3rd birth order had higher knowledge on danger signs as compared to mothers with baby of 1st birth order (data not shown)

**Table 4: Association between age of the mother & adequate knowledge of danger signs**

| Age | Adequate knowledge | | Total |
|---|---|---|---|
| | Absent | Present | |
| <21 yrs | 21 (48.8%) | 22 (51.2%) | 43 |
| ≥21 yrs | 70 (27.3%) | 187 (72.7%) | 257 |
| Total | 91 | 209 | 300 |

p= 0.04

All mothers knew that fever was a danger sign. Proportion of mothers who responded on various danger signs are depicted in the Figure 1. However, less than 50% of the mothers identified bulging fontanelle and umbilical discharge as danger signs.

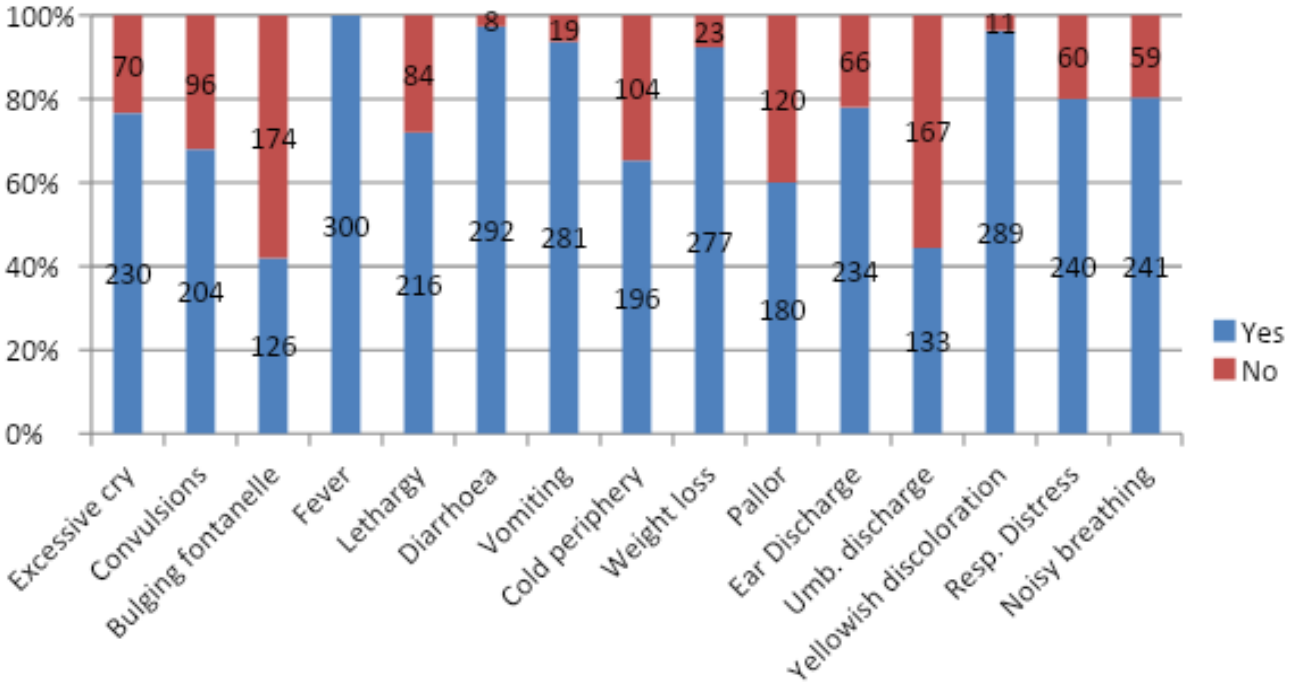


**Figure 1: Proportion of mothers who were aware of danger signs (n=300)**

## Discussion

Training of mother's and making them competent enough in recognizing danger signs in their babies so that they are able to seek help in time, is an important aspect of maternal and child health and this was the focus of the present study.

Various differences in the knowledge regarding danger signs in children have been described in this study.

It was observed that majority (62%) of the mothers had studied up to senior school certificate examination (10 + 2). Only 10% of the subjects were working. Ninety percent were home makers. This highlights the importance of making efforts to reach every home for dissemination of topics of public health importance. Twenty-three (8%) mothers in the study group were married before the age of 18 years. Though the number is not very large, the data shows importance of educating the parents on hazards of early, teen age marriage with its impact on newborn outcome.

Fifty-two babies (17%) in the current series were low birth weight babies. As the LBW babies have more propensity to be afflicted by morbidities, mothers of these babies are the most appropriate targets for education on baby care and danger signs.

All the mothers (100%) were aware of fever as a danger sign. Majority were also aware of excessive cry, diarrhea, vomiting, jaundice, respiratory distress and weight loss as danger signs. Awareness level ranged from 41% (bulging fontanelle) to 100% (fever). Majority of the mothers were unaware of signs like umbilical discharge, cold periphery and a bulging fontanelle as danger signs. this study shows that there is a definite gap in their knowledge. Efforts should be made to ensure that all prospective mothers are educated on danger signs, their implications and what to do on seeing such a sign in their babies.

Adequacy of the knowledge on danger signs for this study was defined as mothers being aware of more than or equal to 10 danger signs out of 15. It was encouraging to note that significant proportion of mothers were aware of many danger signs. The awareness level was not significantly different between women of differing educational status. However, a greater proportion of graduate and postgraduate mothers were aware and were able to decipher the implication better. Out of 10 illiterate mothers, 7 had adequate knowledge as defined in the study, however, the number is too small to conclude that educational status has no bearing on awareness. It might be possible that maternal instinct of sensing some danger in the baby is a natural phenomenon and every mother can perceive the danger irrespective of the educational status.

The proportion of mothers having adequate knowledge about danger signs was found to be higher among working mothers compared to home makers(p=0.04). This could be attributed to learning from peers and exposure to health educational initiatives and messages in their work environments. More efforts should be directed to reach the mothers at home who may have restricted access to health information and educational initiatives.

When the cut off age of 21 years was applied to the mothers who participated, the adequacy of knowledge on danger signs was more in those mothers who were more than 21 years of age. This may be related to the experience built up over a time and self learning during the previous pregnancy and baby care. It is natural that each medical visit offers some information to the mothers and over a period of time it translates into better awareness.

After completion of each questionnaire, mothers were counselled about the danger signs and they were asked to react appropriately on seeing such signs in their baby. They were also given an opportunity to ask any questions to clarify their doubts. Participation by mothers was very proactive and there was a great window of opportunity to educate these mothers during the conduct of this study. It was also an opportunity for a young researcher to step into the affective domain of medical practice by interacting and communicating with so many mothers.

The strength of the study is a reasonable sample size of 300 and an opportunity that was available for the researcher to interact with and educate the needy mothers. The limitations of the study lie in its cross sectional nature and involvement of only one center. Larger studies with more robust survey questionnaire targeting specific subsets of mother-baby dyad is recommended.

## Conclusion

Though majority of mothers had adequate knowledge on danger signs in their infants and neonates, there exists a gap in perceiving entities like bulging fontanelle, umbilical discharge and cold periphery as significant danger signs. Future efforts should be directed at targeting a suitable cohort of mothers to educate them and so that they are able to identify these signs as well. Despite having awareness of a particular sign as an indicator of danger to baby, large void exists in the perception of mothers regarding the rationale on labelling such observations as danger signs. When the rationale is not clear, mothers may resort to traditional or home remedy delaying required emergency care. Efforts should be made to explain the basis of all the danger signs in the babies and message should be driven home during each encounter with mother-baby dyad to educate mothers. For the long term effect and wider reach, information on danger signs should be disseminated through mass media to enable timely management of those unfortunate babies who land up 'paying' for the missed danger signs.

**Conflict of Interest**: None

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PRAXIS UNDERGRADUATE MEDICAL RESEARCH JOURNAL

# Thomas Willis

*Gp Capt TVSVGK Tilak*[1]

Thomas Willis was a renowned physician who made breakthrough studies in the anatomy of human body in particular the brain. He even served as a physician to the royal family during the reign of Charles I of England.

He was born on January 27, 1621 in the Great Bedwyn village of the Wiltshire County in England. His father worked as a stewardess for the baronetcy of the Willys of Fen Ditton. His family had to face lot of opposition during the Civil War in Britain and their family lost a lot of ancestral property, which were annexed by the Parliament.

He studied at the 'Christ Church' college affiliated to the 'Oxford University' and completed his bachelor's degree in arts 1639 and then obtained a master's degree three years later. He then went on to study medicine and received a bachelor's degree in medicine after successfully completing the course in 1646.

Thomas started his medical practice in the market town of Abingdon and in the year 1656 he penned his first work on medicine, titled 'De Fermentatione'. It was followed by another significant composition 'De Febribus' that was published three years later. It was during this time that natural philosopher Robert Hooke assisted him. He was appointed as the 'Sedleian Professor of Natural Philosophy', at the 'Mathematical Institute' of 'Oxford University', in 1600, a position he would hold for the rest of his life. He became a member of the newly-founded 'Royal Society of London' the following year.

In 1663, he penned another book 'Diatribae duae medico-philosophicae – quarum prior agit de fermentatione'. The following year one of his major works on anatomy of human brain 'Cerebri anatome' was published. The diagrams for the book were provided by Christopher Wren and the book contained many significant observations made by Willis. In 1666, he established practice in the Westminster city of London starting.

As a physician he used to combine his knowledge of human anatomy with the general remedial measures for treating his patients. His pioneering works in relation to neurophysiology were highly elaborate in comparison to prior studies undertaken. He even studied the cause and effect of various convulsive disorders like epilepsy and his findings heralded a new era in psychiatric treatment.

This pioneering scientist then embarked on studying the physiology of the nervous system, in particular the brain, and the cause of various illnesses that plague the human mind. He studied diseases like epilepsy and successfully attributed their cause thus paving the way for modern day psychiatry. His findings in this regard were presented in a scientific paper titled 'De Anima Brutorum', in 1672.

Furthering his study of human brain, he successfully established the number of cranial nerves emerging from the brain. Studying neurophysiology he provided accurate descriptions of the mesolobe, corpora striata and optic thalami. Thomas also studied the cerebellum,

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deciphering its anatomy; in addition he also described the functions of carotids and basilar artery.

In 1674, he penned the findings of his research on metabolic diseases, especially diabetes mellitus, which were later included in the scientific paper 'Pharmaceutice rationalis'. It was Thomas who proposed the name 'mellitus' and the disease is also known as the 'Willis's disease'.

Willis' most important contribution, in the field of medicine, were his works on the anatomy of human mind and his discovery of the 'Circle of Willis', which is a connection between arteries that are responsible for supplying blood to the brain. He provided detailed and precise description of the structure and function of various important sections of the brain such as the cranial nerves and cerebellum. His observations were quite pronounced in comparison to the works of his predecessors.

Concentrating on metabolic diseases, he conducted an extensive study of diabetes mellitus; it was he who named the disease as mellitus. His expertise on anatomy of human brain is reflected in the paper he published on the 'Circle of Willis', which describes the flow of blood in the brain. The pioneering scientist continued to work till his last days and was highly regarded among his peers.

Willis' first marriage was to clergyman Samuel Fell's daughter Mary and the couple had nine children of whom one died in infancy. Upon Mary's demise, Thomas entered the wedlock with Elizabeth Calley in 1672.

He breathed his last on November 11, 1675 in London.

PRAXIS UNDERGRADUATE MEDICAL RESEARCH JOURNAL

# The Utopia - A Healthcare Ecosystem

*Med/Cdt Drishti Sen*[1]

## Introduction

Have you ever had the misfortune of being admitted to a hospital? While it is a relief to be under constant medical supervision in the beginning, towards the end of the stay, as you recover, you have to be truly 'patient'.

Since most of those admitted to our hospitals are military personnel it is desirable that they get in their highest SHAPE the soonest possible.

While we deliver the best medical care to our patients, some contribution from their side will do no harm.

Just like ventures in various other fields, the hospital wards can undergo metamorphosis. Instead of being exclusively dependent on the hospital staff for care and wellbeing, patients in wards can get involved in participative recuperation, with assistance of other in-patients. Those who are more capable, better able and mobile, can take care of patients who are not so fortunate.

Patients can help maintain a garden right outside the ward, the manure for which can be produced from the organic kitchen waste generated in the hospital galley and water for irrigation drawn up using equipment used in patient physiotherapy. Doctors can discuss their cases during ward rounds, over a stroll through the garden, returning to the patient when necessary. The patients can also be encouraged to practice 'Yoga' and occasionally be joined by doctors and nursing staff. This will reinforce their belief in the hospital ecosystem.

In the wards, patients and relatives can pedal exercycles while talking on the phone, watching TV or reading newspaper. The bicycle mechanism can be coupled to beds of immobile patients so as to act as an agitator- constantly changing the pressure points to prevent bed sores. In the bargain, they may end up conversing, discussing news and sharing mutual experiences. On similar lines, pulling handle bars as exercise, can be coupled with highly placed ventilators, circulating fresh air with each swing like the erstwhile punkahs. Duty doctors, who spent most of their time in the wards, may also benefit from the same to remain physically fit.

While being admitted in the Hospital Ward, the relatives of patients can gift Greeting Cards made by children of the Paediatric Ward as part of their evening activity. And pregnant women and their relatives can have workshops on making dresses for their newborns and learn about infant care. All these activities will give the patients and relatives, a sense of collective accomplishment and community bonhomie. Finding themselves to be an integral part of the healthcare system may in turn improve compliance and trust. [1]

## But Why go through all this trouble?

Each one's personal time is precious and there is no reason why we can't utilise the existing infrastructure (with minor ergonomic changes and modifications) to encourage the good habit of self-care and physical well-being among doctors, paramedics and inpatients alike, so that the activities of one person could lead to the betterment of another.

Since no observation has meaning unless it can be translated into tangible and actionable points, I would like to propose a achievable starting point…

A fair number of chronically admitted patients are immobile. And stand a risk of developing the dreaded pressure sores.

Some of the proven ways to prevent and manage pressure sores are-

[1] *Armed Forces Medical College, Pune*

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1. Nutrition and hydration
2. Pressure redistributing devices
3. Debridement
4. Dressings
5. Systemic antibiotics

Since one of them is to keep redistributing pressure so as to facilitate blood flow, a variety of devices may be used to achieve the same.

## Proposed Model

One of the models possible...is through implementation of a pedal operated bicycle mechanism coupled to a Hospital Bed through a set of up-and-down movable rods containing rubber coated wooden bud like projections. These can create alternate pressure points with each rotation, thus improving blood circulation and thereby preventing Decubitus Ulcers (Bed Sores).

A foam mattress of suitable thickness has to be used so as to enable transmission of the pressure changes.

The need for pedaling to keep the agitators in motion though may seem primitive at first but it ties in another effective and documented way of reducing pressure ulcers- increased awareness and changing staff attitudes.

## Conclusion

In the end, I would like to conclude by emphasising that having such an integrated environment in hospital wards, though difficult to implement initially, will promote better health-care in bed-ridden and mobile patients as well as medical workers including doctors. It will also boost the morale of recovering patients and give them a sense of purpose and accomplishment that they could partake and assist in other patient's healing and recovery process.

It is also prudent to make optimum use of our available resources. And India's greatest resource is its manpower. Every little contribution will definitely add to our strength.

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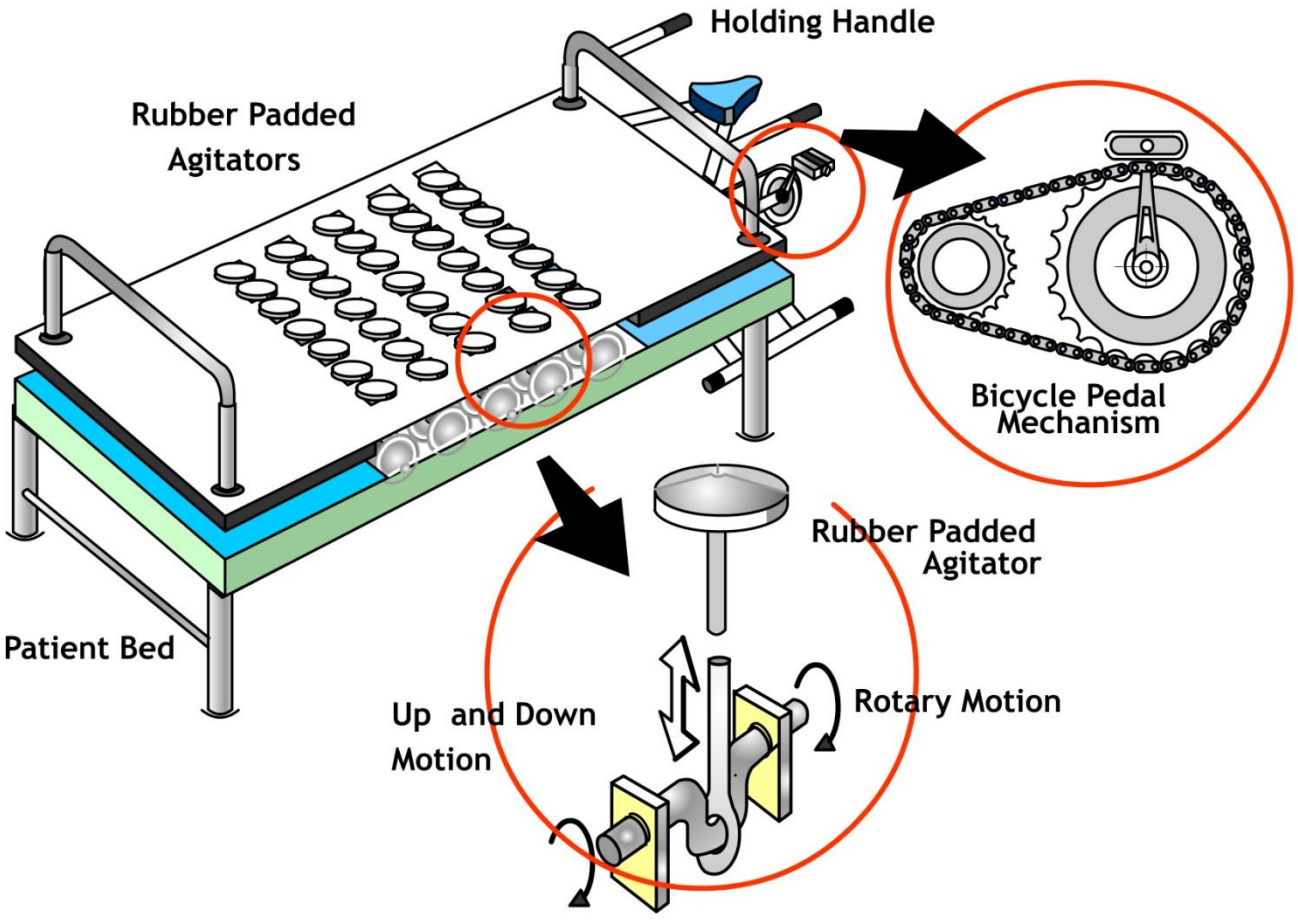


*Reference - Image drawn by Capt Sudeep Sen, NM*