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ISLAMIC BANKING IN INDIAN SCENARIO- A THEORETICAL ANALYSIS

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ABSTRACT

Islamic Banking refers to a system of banking consistent with the principles of Islamic Laws or Shariat which prohibits the payment or acceptance of interest or riba for the lending or acceptance of money. The advocates of Islamic banking have been trying their best to propagate this concept over the years, yet there is no full-fledged Islamic bank currently working in India. Islamic banking is a distant dream in the world of Conventional interest based Indian banking. RBI and other legal institutions of India are not issuing license to banks to work as per the principles of Islamic banking due to several reasons. In order to set up Islamic banks in India, a lot of amendments need to be carried out in the prevalent legal set up. The main objective of this paper is to study the relevance of Islamic banking for the economic and social development of developing countries like India and finally conclusion has been provided whether Islamic banking is worthwhile to be persuaded in India or not. It has been concluded that Islamic banking has good prospects in India, given the diverse Indian canvas and holds good for India from a development point of view.

KEYWORDS

Islamic bank, Shariat and India

Introduction

Islamic banking refers to a system of banking or banking activity that is consistent with the principles of Islamic law (Sharia) and its practical application through the development of Islamic economics. Islamic banking has the same purpose as conventional banking except that it operates in accordance with the rules of Shar'ah, known as Fiqh al-Muamalat (Islamic rules on transactions). Sharia prohibits the payment or acceptance of interest fees for the lending and accepting of money respectively, (Riba, usury) for specific terms, as well as investing in businesses that provide goods or services considered contrary to its principles (Haraam, forbidden). Islamic banks are seen to involve themselves as financial intermediaries and investment oriented institutions in bringing about wellbeing of the community, society and the economy in the light of Shar'ah.

The advocates of Islamic banking have been trying their best to propagate this concept over the years, yet there is no full-fledged Islamic bank currently working in India. The main focus of this paper is to study the relevance of Islamic banking for the socioeconomic development of developing countries like India by analyzing its merits and demerits and finally conclusion has been provided whether Islamic banking is worthwhile to be persuaded in India or not. As per the census, India has the second largest Muslim population in the world Muslim population will also be able to improve their socio economic conditions and this system must be helpful in eradicating poverty among Muslims and will certainly help in their overall uplift. Around 80% of the Indian Muslims are willing to lend or borrow from Islamic Finance Institutions. Muslim owned businesses have achieved a sizeable proportion. The demand for Islamic Banking Products is visibly huge.

Principles of an Islamic Bank:

- The absence of interest-based (riba) transactions.
- The avoidance of economic activities involving oppression (zulm)
- The introduction of an Islamic tax, zakat;
- The discouragement of the production of goods and services which contradict the Islamic value (haram)
- Any predetermined payment over and above the actual amount of principal is prohibited.
- The lender must share in the profits or losses arising out of the enterprise for which the money was lent.

- Making money from money is not Islamically acceptable
- Gharar (Uncertainty, Risk or Speculation) is also prohibited.
- Investments should only support practices or products that are not forbidden -or even discouraged- by Islam

Advantages of Islamic Banking

- Islamic banking is becoming very popular among international investors. It is not a closed system. It has no regional, ethnic or class affiliations.
- In Islam banking, only one kind of loan and that is qard-el-hassan (literally good loan) whereby the lender does not charge any interest or additional amount over the money lent.
- Islamic banking is more efficient in that it allocates investable funds on the basis of the expected value of projects rather than on the criterion of the creditworthiness of those who own the projects, which is the case in debt-based finance.
- Islamic banking is less prone to inflation and less vulnerable to speculation, which is currently being fueled by the presence of huge quantities of debt instruments in the market.
- Islam encourages people to invest their money and to become partners in order to share profits and risks in the business instead of becoming creditors. As defined in the Shari'ah, or Islamic law, Islamic finance is based on the belief that the provider of capital and the user of capital should equally share the risk of business ventures, whether those are industries, farms, service companies or simple trade deals.
- Interest Free Islamic Banking in India helps to develop Inclusive Growth and Social Uplift.
- Financial inclusion: Islamic banking would open new doors for the Muslim communities.
- Broader range of Financing options: Islamic banking introduces new modes of financing not available in India and these would make the financial market more competitive.
- Equity finance is extended by lower cost of credit.
- Poor people can easily avail loans to promote self employment .Thus reducing income disparity in India.
- It would add real estate boom.
- Islamic banking helps to promote the inflow of funds from GCC countries.
- It leads to increase in the work participation of Muslims in banking industries.

- It helps to counter terrorism
- Islamic banking will help to promote Muslim entrepreneurs in India.
- Islamic banking through equity financing can help to reduce the burden of keeping current account and fiscal account deficit under control.
- It promotes economic growth in the country.

Disadvantages of Islamic Banking

- Money is only a medium of exchange, a way of defining the value of a thing; it has no value in itself, and therefore should not be allowed to give rise to more money, via fixed interest payments, simply by being put in a bank or lent to someone else.
- Investments should only support practices or products that are not forbidden or considered unlawful, or haraam, by Islamic law. Trade in alcohol, for example would not be financed by an Islamic bank; a real-estate loan could not be made for the construction of a casino.
- The bank could not lend money to other banks at interest.
- Islamic banking goes against the secular fabric of nation.
- It may bridge financial segregation, so regulatory authority may oppose.
- Micro finance is a good competitor.

Though Islamic banking has a few drawbacks, it has its own advantages to stand on.

Islamic (sharia) banking and its prospects in India

In India, The Raghuram Rajan Committee (2007) on Banking Sector Reforms in its report had recommended introducing Islamic banking in India, creating a flutter of excitement in the Muslim investment community. Rajan, who earlier was appointed economic advisor to the Prime Minister, prefers the term "interest-free banking" instead of "Islamic banking". According to estimates, globally, assets worth \$300 billion are under the management of Islamic banks at present, and this is set to cross \$1 trillion by 2013. People are starting to see that Islamic banks are not a threat but an opportunity for economic growth. In India, with the world's second largest Muslim population of 154 million, the lack of Islamic banking is a barrier to the flow of substantial funds into the market.

Major challenges in India

- Establishing appropriate risk and liquidity management techniques.
- Achieving consistent Shariah supervision.
- Lack of experts and man power shortage in Islamic banking.
- Modification in banking Act regulation needed.
- Standard non uniformity.
- Addressing legal and tax restriction.

Infeasibility of Islamic Banking

Total revenues of Muslim owned businesses touched INR 31000 Crores in 2008. In the absence of Islamic Banking in India, they use the conventional banking and finance for their business needs. However, corporate India has started taking cognizance of Islamic Banking and Financial products. However, Islamic banking is infeasible under the current RBI regulations. Indian Banking system is based on certainty of Capital and Returns, both of which are in conflict with Shariah principles.

Few Islamic products are permissible through the NBFC route. RBI can learn from the experiences in countries like Pakistan and Iran, where the entire banking system is based on Islamic principles and from countries like Malaysia, Jordan, Bangladesh and Egypt where Islamic banks operate along with conventional commercial banks.

Key Stakeholders: RBI, Islamic Banks and Tax Authority

In order to accommodate the Islamic banks within the conventional banking system, existing procedures require modifications and new procedures need to be developed.

Changes required in the existing system

- RBI Policy Changes
- RBI has to allow riba free deposits-lending on PLS basis
- Allowing Profit- Loss sharing for Islamic Banking
- Accepting and granting interest free loans to Islamic Banks
- Lender of last resort
- Developing Islamic Bond market

Changes in the Tax Laws:

- Avoid double taxation of Islamic activities (bai inah).
- Treating 'Income from partnerships' as 'interest income' in Islamic banking.
- Indian banking guarantee deposits.
- Follow AAOIFI accounting standards.
- Total regulatory compliance with RBI
- Maintain SLR and CRR requirements

The above changes are aimed at attacking the three major impediments for Islamic Banking: Certainty of Capital and Return, Liquidity Management: Integrating Islamic Banking in financial system, Supervision and control

Conclusion:

Even though there are some barriers in the path of Islamic banking in India we can accommodate it by making the above changes in the existing operational and regulatory aspects of RBI and Tax Authorities. With the above mentioned minor changes in their practices, Islamic banks can get rid of their cumbersome and can offer an efficient and effective interest free banking which will make it favourable to India. To conclude, Islamic banking has good prospects in India, given the required changes in the existing banking system and holds good for India from a development point of view. Islamic banking will be able to improve the socioeconomic condition of not only Muslims but also the downtrodden section and this system will be helpful in eradicating poverty and leads to the overall upliftment of Indian economy. Hence we personally believe to refer 'Islamic Banking' as 'Interest Free Banking' so that it could be looked through the broad economic kaleidoscope and not a narrow religious prism. It is hoped that their participation in Indian banking will lead to further infrastructural development in India and better allow it as a part and parcel of our Indian conventional cum organized Indian banking system. Because, around 170 million Muslim community people will get benefit on the basis of religious beliefs and further, Indian industries will grow by getting lot of foreign funds from Gulf region and can use these funds on win-win basis.

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Effect of Aneurysm on Blood Flow through Small Arteries

Mohammed Musad Saleh

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ABSTRACT

In this paper the mathematical models have been developed to study the effect of aneurysm of artery on the blood flow hydrodynamics. The artery considered to be rigid vessel and the blood flow to be non-Newtonian fluid flow of viscosity μ_c . It is shown that wall shear stress has an inversely proportional relation with aneurysm radius R_h and pressure drop so. Wall shear stress also has direct proportional relation with viscosity. The study also estimated the ranges of wall shear stress, pressure drop, and viscosity for small arteries of radius 0.02 and arterioles of radius 0.0025 cm. It is observed that wall shear stress have maximum value when $R_h=1.4R_0$, and minimum value equals yield stress at $R_h=2R_0$.

KEYWORDS

Aneurysm, Rigid Vessel, Wall shear Stress, and non-Newtonian Fluid.

1- Introduction

The artery with small diameter μm considered to be rigid artery have resistance to flow, so they need a pressure difference along the length of the vessel to drive the blood flow, and the blood flow through it considers to behave like a couple stress fluid, plasma layer near the walls consisting of only the plasma with viscosity coefficient μ Newtonian fluid and core layer consisting of red cells in plasma with viscosity coefficient μ_c Non-Newtonian. (Kapur 1985). (Musad 2013) have assumed that, the non-Newtonian fluid in core layer as Casson fluid and considered that Casson fluid model holds for blood flow in tubes of diameter 0.013 cm. The flow of blood in the vessels of the circulation system can be modeled using the resistive and compliant nature of the flow. These models can be used to understand the problems in the circulation system, such as aneurysms (Irving 2007). Aneurysm is an enlarged blood vessel caused by a localized weakening and dilation. Factors that contribute to the weakening of the wall tissue include irregular wall shear stress (Kondo *et al* 1997). This weakening can lead to rupture of blood artery at aneurysm location, which can cause internal bleeding and stooped the blood supply. For instance, rupture an aneurysm in the artery supplying blood to brain can bring about strokes. Likewise in abdominal artery leads to death from internal bleeding in 75% to 90% of cases (Sheard 2008). (Shojima *et al* 2004) have reported low wall shear stress related to aneurysm growth and rupture as it promotes various mechanisms that cause arterial wall remodeling.

2- Geometry of Aneurysm Model and its Boundary Equation

The figures below present the geometry of the model and its coordinates system. The aneurysm introduced into the geometry is made to be axis symmetrical i.e. symmetrical around the axis of artery. From figure 1 it is clear that $2z_0$ is the artery aneurysm length through which the blood flows, R_0 is the radius of the artery in normal condition, $R(z)$ is the radius of the aneurysm part of the artery, and h is the extra length on normal radius.

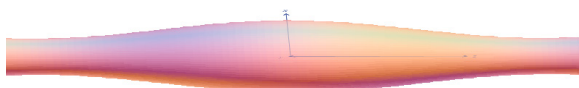


Figure 1: The geometry of aneurysm artery

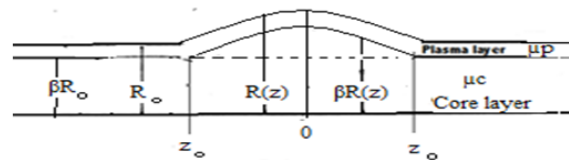


Figure 2: Coordinate system of flow in an aneurysm artery
The boundary of the aneurysm is represented in below equations

$$R(z) = \begin{cases} (1 + \frac{h}{2R_0}(1 + \cos 2\pi \frac{z}{z_0})) & -z_0 < z \leq z_0, \\ 1, & 2z_0 < z \leq -z_0 \end{cases} \quad (1)$$

$$R_1(z) = \begin{cases} \beta(1 + \frac{h}{2R_0}(1 + \cos 2\pi \frac{z}{z_0})) & -z_0 < z \leq z_0, \\ \beta, & 2z_0 < z \leq -z_0 \end{cases} \quad (2)$$

While the equation of velocity in aneurysm vessel can be expressed as

$$V_c = \frac{\Delta p}{4L\mu_c} [R^2(z) - R_0^2] + \frac{\Delta p}{\mu_c} [R^2(z) - (\beta R_1(z))^2] \frac{\mu_c}{\mu} - 1 \quad 0 \leq R_1(z) < R(z) \text{ and } 0 < \beta < 1 \quad (3)$$

Where Δp is pressure drop, μ_c is the core layer viscosity, μ is the viscosity of plasma layer, L is the length of artery, z_0 is the artery aneurysm length through which the blood flows, R_0 is the radius of the artery in normal condition, $R(z)$ and $R_1(z)$ are the radii of the two layers of aneurysm part of artery, and h is the extra length on normal radius.

3- The Model Developed

We assume that the artery to be rigid and the small artery under consideration for the development of model is with an axially aneurysm (fusiform). The blood flow is assumed to behave like a couple stress fluid. Peripheral layer is plasma with viscosity coefficient μ and core suspension layer is erythrocytes with viscosity coefficient μ_c .

For small artery the equations of wall shear stress and velocity are given as follows

$$\sqrt{\tau} = \sqrt{-\mu \frac{\partial v}{\partial r}} + \sqrt{\tau_y} \quad (4)$$

By taking the derivative of equation (3), we get

$$\left(\frac{\partial v}{\partial r}\right)_{r=R(z)} = \frac{\Delta P}{2L\mu} [R(z) + 4\left(\frac{\mu_c}{\mu} - 1\right)R(z) - 4\left(\frac{\mu_c}{\mu} - 1\right)R_1(z)] \tag{5}$$

$$\left(\frac{\partial v}{\partial r}\right)_{r=R(z)} = \frac{\Delta P}{2L\mu} [R(z) + 4\left(R(z)\left(\frac{\mu_c}{\mu} - 1\right) - R_1(z)\left(\frac{\mu_c}{\mu} - 1\right)\right)] \tag{6}$$

But $R_1(z) = \beta R(z)$

$$\left(\frac{\partial v}{\partial r}\right)_{r=R(z)} = \frac{\Delta P}{2L\mu} [R(z) + 4\left(R(z)\left(\frac{\mu_c}{\mu} - 1\right) - \beta R(z)\left(\frac{\mu_c}{\mu} - 1\right)\right)] \tag{7}$$

Put $\beta = 0.95$ then equation (7) reduced to

$$\left(\frac{\partial v}{\partial r}\right)_{r=R(z)} = \frac{\Delta P}{102\mu} \left[4 + \frac{\mu_c}{\mu}\right] R(z) \tag{8}$$

Then from equations 1, 4 and 8 the wall shear stress along the aneurysm artery will be as

$$\sqrt{\tau} = \sqrt{-\mu_c \frac{\Delta P}{102\mu} \left[4 + \frac{\mu_c}{\mu}\right] R(z) dz + \sqrt{F_y}} \tag{9}$$

$$\sqrt{\tau} = \sqrt{-\frac{\Delta P}{102} z_0 \left[4 + \frac{\mu_c}{\mu}\right] \int_{-z_0}^{z_0} \left(1 + \frac{k}{2R_0} (z + \cos 2\pi \frac{z}{z_0})\right) dz + \sqrt{F_y}} \tag{10}$$

$$\sqrt{\tau} = \sqrt{-\frac{\Delta P}{102} z_0 \left[4 + \frac{\mu_c}{\mu} \left(\frac{k}{R_0} - 1\right)\right] + \sqrt{F_y}} \tag{11}$$

$$\sqrt{\tau} = \sqrt{-\frac{\Delta P}{102} z_0 \left[4 + \frac{\mu_c}{\mu} \left(\frac{k}{R_0} - 1\right)\right] + \sqrt{F_y}} \tag{12}$$

$0 < h \leq R_0$ put $h+R_0=R_h$ then equation (12) reduce to

$$\sqrt{\tau} = \sqrt{-\frac{\Delta P}{102} z_0 \left[4 + \frac{\mu_c}{\mu} \left(\frac{R_h}{R_0} - 2\right)\right] + \sqrt{F_y}} \tag{13}$$

Equation (13) is the equation of wall shear stress of blood flow in small artery with aneurysm. Where τ is wall shear stress, R_0 is the radius of the vessel, z_0 is the half length of aneurysm part, ΔP is pressure drop, R_h is the radius of aneurysm part, L is the total length of artery, μ , μ_c are the viscosity of plasma layer and core layer respectively and τ_y is the yield stress.

4- Boundary Conditions

1- When $R_h=2R_0$ equation (13) become

$\tau = \tau_y$, This means that, wall shear stress equals yield stress

2- When $\mu = \mu_c$ and $\tau_y = 0$ equation (13) reduce to power low model as follow

$$\tau = \frac{\Delta P}{2L} z_0 \left(\frac{R_h}{R_0} - 2\right), \text{ which hold good for Newtonian}$$

fluid flow

5- Results and Discussion

The results based on the numerical solution of equation (13) by using mathematical software for $R_0=0.02\text{cm}$, $L=1\text{cm}$, $z_0=R_0$, yield stress= 0.3dynes/cm^2 and for aneurysm radius (R_h) range ($1.4R_0$ to $2R_0$) or 0.028 to 0.039cm for small artery and 0.0035 to 0.005 for arteriole, show that, wall shear stress decreases with the increase of aneurysm radius R_h and pressure drop so. It is observed that wall shear stress decrease with the decrease of core layer viscosity μ_c while other parameters are constants.

The results of wall shear stress, pressure drop and viscosity of aneurysm artery of radius 0.02cm are listed in tables 1 and graph 3. Its shown that the range of wall shear stress is (1.12 to 0.54 dyes/ cm^2) and pressure drop range is (25 to 40 dynes/ cm^2) for aneurysm radius (R_h) range 0.028 to 0.039cm ,

and maximum viscosity 0.04dynes-s/cm^2 . And for the same range of aneurysm radius R_h and maximum pressure drop 40 , the range of wall shear stress is (1.08 to 0.41 dynes/ cm^2).

While in table 2 and graph 4 we listed the results of wall shear stress, pressure drop and viscosity for the arterioles of radius $R_0=0.0025\text{cm}$ and length $L=1\text{cm}$. the results predict the ranges of wall shear stress, pressure drop and viscosity are (0.41 to 0.30), (6 to 10), and (0.04 to 0.01) respectively, for the range of aneurysm radius 0.0035 to $.0050\text{cm}$.

It is clear the maximum of wall shear stress at $R_h=1.4R_0$ is suitable to maintaining the thickness of aneurysm wall. But enlarge radius of aneurysm part $R_h \geq 1.4R_0$ leads to large pressure and low wall shear stress. This change in pressure will damage the thickness of artery and become compliance artery acceptable for rupture, response to increase a pressure drop and decrease the wall shear stress.

Table 1. Estimated wall shear stress, pressure drop and viscosity of aneurysm artery for range of R_h from 0.028 to 0.039cm , $z_0 = R_0$ where $R_0=0.02\text{cm}$, $L=1\text{cm}$.

R_0	Pressure drop	viscosity	Wall shear stress
0.028	25.0	0.040	1.14
0.029	26.6	0.036	1.12
0.030	28.3	0.033	1.08
0.032	30.0	0.030	1.04
0.033	31.6	0.026	1.00
0.034	33.3	0.023	0.94
0.035	35.0	0.020	0.90
0.036	36.6	0.016	0.80
0.037	38.0	0.013	0.70
0.039	40.0	0.010	0.55

Table 2. Estimated wall shear stress, pressure drop and viscosity of aneurysm for arterioles of, $R_0=0.0025\text{cm}$, $z_0 = R_0$, $L=1\text{cm}$, and range of R_h from 0.0035 to 0.005cm

R_0	Pressure drop dynes/ cm^2	Viscosity dynes-s/ cm^2	Wall shear stress dynes/ cm^2
0.0035	6.00	0.040	0.410
0.0036	6.44	0.036	0.404
0.0038	6.88	0.033	0.400
0.0040	7.33	0.030	0.396
0.0042	7.77	0.026	0.389
0.0043	8.22	0.023	0.382
0.0045	8.66	0.020	0.372
0.0046	9.11	0.016	0.360
0.0048	9.55	0.013	0.343
0.0050	10.0	0.010	0.300

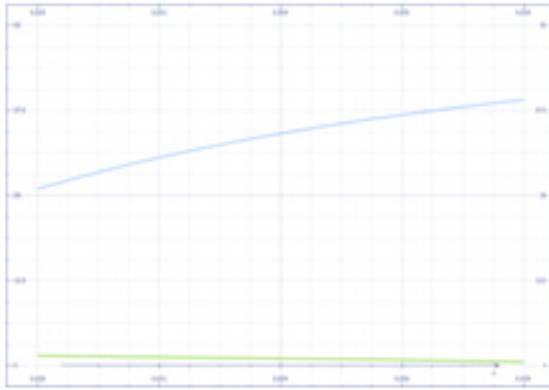


Figure 3: Graph of wall shear stress and pressure drop of blood flow in aneurysm artery of $R_0=0.02\text{cm}$ with respect to aneurysm radius R_n .

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A PRAGMATIC STUDY ON WORKERS PARTICIPATION IN MANAGEMENT (With special Reference to PepsiCo India holdings put ltd)

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ABSTRACT

The worker's participation in management is an essential ingredient of industrial democracy, unless the status of the worker is raised and recognized as a partner in the industry and as a co- trustee of the community, he cannot be persuaded to put in his very best in the work. Participation brings the two parties closer and makes them aware of each other's problems. As a result, a better understanding and mutual trust can be created between employer and workers. Workers participation in management helps to reduce industrial disputes and to improve workers loyalty. Continuous dialogue between management and workers improves peace in industry. They become more able and ready to adopt themselves to technological and other changes made to improve the competitive position of the company.

KEYWORDS

worker's participation, management, labor management relations.

Introduction

The worker's participation in management is an essential ingredient of industrial democracy, unless the status of the worker is raised and recognized as a partner in the industry and as a co- trustee of the community, he cannot be persuaded to put in his very best in the work. Thus the status of the worker is the most important issue in the industry. Through participation improves employee motivation and job satisfaction which in turn help to increase their efficiency PepsiCo India holdings is a private limited is a holding company which through subsidiaries. It makes further changes to its core marketing item as it fights intense competition from curial co-cola in the local market. PepsiCo India holdings put a seeking to make acquisition is snakes sector according to market speculation. There is speculator that PepsiCo is trying to acquisition more regional players to strength it snacks portfolio

Objectives of the study

- To assess how the Workers Participation in Management impacted in achieving the goals of the organization
- To ascertain the workers level of involvements in the decision making process of the work.
- To investigate the implementations of workers participation to work level of their organization.

Statement of the Problem

Worker's participation in management is the participation of the workers in decision- making as well as various important aspects of an organization, which has been accepted as a fundamental concomitant of harmonious labor management relations. The need for the researcher to study "worker's participation in management" is to find out the workers' need level.

Scope of the study

Scope of the study is confined to, what are the various facets and involvement of the organization, that are motivating the employees to stay with the organization. To find out what aspects are satisfied and dissatisfied by the employees of the organization and the difference in the satisfaction level of workers of the organization.

Limitation of the study

- The sample size chosen is occurred only a small portion of the whole population.
- Accuracy of the study is purely based on the information as given by the respondents.
- Time attitude of the employee change from time to time, hence the result of the period may not an applicable in long run.

Literature Survey

Tung,Amy,Baird,KevinSchoch, Herbert.-2014 "Journal of Environmental Management; Nov2014, Vol. 144, p186-196, 11p" This paper examines the relationship between specific organizational factors (top **management** support, training, employee **participation**, teamwork and the link of performance to rewards) with the effectiveness of environmental **management**. The effectiveness of environmental **management** is measured in respect of the effectiveness of environmental **management** processes and environmental performance.

Wagner, A.J. 1994. "Participation?s effects on performance and satisfaction: A reconsideration of research evidence,Academy of Management Review", vol.19, pp. 312-30-In line with the research on Employee Participation has been emphasized in relation to job satisfaction (Cotton et al 1988; Norton 1989). In Past studies showed that employee participation is positively related to performance, satisfaction, and productivity of an employee.

Research Methodology

Data Collection

Primary data

Primary sources are original sources from which directly collects data that have not been previously collected. Primary data are first-hand information collected through questionnaire.

Secondary data

These are sources containing data which have been collected and compiled for some purpose. A secondary source consists of various journals and magazines.

Sampling Design

It refers to the technique or the procedure the researcher would adapt in selecting some sampling units from which inferences about the population is drawn.

Sampling Techniques

Convenience sampling technique was adopted. In this method the researcher select those units of the population in the sample, which appear convenient to him or the management of the organization where he is conducting research.

Selection of sample

The universe selected for the study consists of employees, involving in work process at PEPSICO HOLDINGS Pvt.ltd which has a total population of 323, from which 150 respondents

(samples) of employees at staff level has been chosen for study

Tools used

Chi-square

Correlation

Table.1
Table showing Association between nature of employment and gender

	Observed N	Expected N	Residual
male	28	37.5	-9.5
female	65	37.5	27.5
3	42	37.5	4.5
4	15	37.5	-22.5
Total	150		

Source: Primary Data

Test Statistics		
	Nature Of Employment	Gender
Chi-Square	22.480 ^a	36.613 ^a
df	3	3
Asymp. Sig.	.000	.000

Inference:

The above mentioned table of association between gender and Nature of experience value is 22.48 and 36.13 expected frequencies less than 5. The minimum expected cell frequency is 37.5 So Accept the Criterion.

Table.2
Table showing Association between Nature of employment & Workers Participation in Management

Nature Of Employment	Mean	Std. Deviation
	2.32	.985
Workers Participation in Management	1.94	.793

Correlation			
		Nature Of Employment	Workers Participation in Management
Nature Of Employment	Pearson Correlation	1	-.010
	Sig. (2-tailed)		.905
Workers Participation in Management	Pearson Correlation	-.010	1
	Sig. (2-tailed)	.905	

Source: Primary Data

Inference:

There is a significant relation between nature of employment and Workers Participation in Management the mean value 2.32 and 1.94 is positively correlated at the level of 1 % significant

Findings & Suggestions

- 30% of the respondents agree that there is strong and representative unionism in the organization.
- 66.7% of the respondents agree that the evaluator there is mutually agreed and clearly formulated objectives.
- 61.1% of the respondents agree the there are strategies like suggestion scheme, works committee and joint council shop councils in the organization.
- 56.7% of the respondents agree that there is communication at all levels
- 67.8% of the respondents agree that Workers Participation in Management it helps to achieve profit maximization
- Employers and workers should agree on the objectives of the industry. They should recognize and respect the rights of each other.
- Management should take care of successful implementation and dynamic function of suggestion scheme, works committee, joint council and shop council.
- A mutual co-operation and commitment to participation must be developed by both management and labor.

Conclusion

The concept of workers participation in management is considered as a mechanism where workers have a say in the decision making process of an enterprise. It crystallizes the concept of industrial democracy and indicates an attempt on the part of an employer to build his employees in to a team which work towards the realization of a common objective. the major findings and the suggestions would help to improve existing level of workers participation in Management. So that it may result in better relationship, better performance, greater productivity and improved Human Resources practices.

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Microstructure evolution in friction-loaded layers of nickel

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ABSTRACT

The kinetics of microstructure formation and destruction in friction-loaded layers of nickel are discussed from the perspective of dislocation representations. The mechanisms of surface layer destruction are addressed in detail, along with the characteristics of the destruction material.

KEYWORDS

nanocrystalline structures; friction loading; destruction of submicrocrystalline structure; mechanisms of intercrystalline destruction; electron-microscopic research; intensity of wear.

Introduction

The physical processes of deformation-induced dispersion and subsequent destruction in friction-loaded metal layers are affected mainly by dislocation structure kinetics. The microstructure elements of strengthening and destruction in friction-loaded polycrystalline surface layers of nickel have been partly described in [1-4]. It has been shown that, by comparison with other forms of loading (such as rolling or pressure), observed changes in the strength characteristics under friction loading follow a cyclic pattern. Cycles in structure evolution have been established by ferromagnetic resonance [1-4], electronic microscopy, electron diffraction analysis [1, 3], X-ray crystal analysis [3], and intensity of wear measurement [4].

This paper continues the examination of the strengthening and destruction mechanisms in the crystalline structure of friction-loaded surface layers of nickel consistent with the oscillating kinetics of the strength characteristics.

Experimental details

The experimental method was similar to one described in [5]. The dislocation structure in the nickel-molibdenum pair under friction loading was studied using the ferromagnetic resonance method (FMR) and electronic microscopy. FMR methods appear to be the most appropriate for the study of the dislocation structure in ferromagnetics. At external electromagnetic field frequencies of 9400 MHz ($\nu = 9400$ MHz), the broadening of the FMR absorption lines in a deformed ferromagnetic is caused by elastic stress fields, while small-scale defects (such as impurity atoms or vacancies) and large-scale defects (e.g. cracks or pores) lie outside the absorption spectrum [5, 6]. In the above works, a linear relationship was established between the breadth of the FMR line (ΔH) and dislocation density (ρ). Another advantage of the method is that the depth of penetration in the skin metal layer (δ) is $10^{-7} - 10^{-6}$ m at external electromagnetic field density of 9400 MHz. This makes the method sufficiently selective and sensitive when used for the study of defect microstructures in thin surface layers, particularly under friction loading, when the depth of the surface layers affected by plastic deformation is comparable to the thickness of the skin layer [6]. Consistent with the above conclusions, the observed cyclic function $\Delta H = f(t)$ reflects the dislocation structure kinetics in friction-loaded surface layers of nickel.

Results and discussion

In the cited works, interpretation of the cycles in the function $\Delta H = f(t)$ is made within the framework of the loop theory of

surface wear and destruction under friction [7]. Analysis of the electron microscopy images suggests that in each cycle, the surface layer structure undergoes extreme strengthening (with maximum dislocation densities (ρ) of $10^{16}m^{-2}$), before returning to the original specimen structure with minimum dislocation densities ($\rho = 10^{13}m^{-2}$) [1]. In this scenario, there is no high-dispersion phase, and grain size approaches that of the original specimen (only two cycles of the function $\Delta H = f(t)$ were considered in the study). A comprehensive examination of the cited works suggests that destruction and selective peeling of the entire layer of the dispersed material occur within a single cycle. Repetition of the cycles is due to the dispersion and wearing of the lower layers [1, 8].

Figure 1 (Curve 1) shows the function $\Delta H = f(t)$ during extended periods of friction loading. The changes in the strength characteristics in friction-loaded metal occur in two observable phases. In phase 1, the oscillating curve (uniquely related to dislocation density) rises to a peak, where a critical level of elastic strain energy is achieved. In each new cycle, the effects of residual deformations in the underlying material are seen at the minimum points, along with continual increases in the absolute values of the strength characteristics at the peaks. Bearing in mind the layered pattern of the strengthening and micro-destruction processes, this means that each new cycle starts at a progressively higher level of dislocation density. These peculiarities in the strength property kinetics are indirect evidence that microstructure transformation in friction loaded material is related to the duration of exposure. Peak strengthening at the end of the first friction loading stage, ultimately leading to sufficient levels of material dispersion, seems to be the prime cause of the deep break in the monotonously ascending cyclic curve. Subsequent phases in the course of the surface layer strengthening and destruction processes are characterized by these breaks in cyclicity.

Wear intensity kinetics (I) was also studied in connection with the microstructure transformations of the surface layer (Figure 1, Curve 2). By analysing the relationships in Figure 1, it may be concluded that the periodic surges in the intensity of wear coincide with the minimum values of dislocation density in the cyclic curve $\Delta H = f(t)$. This suggests that wear product generation may be concentrated in time, a process determined by the specifics of elastic stress deformation in the surface layers of solid-state bodies under friction. After maximum dispersion is reached (Curve 1, Point A), a series of deep declines in dislocation density occurs (points M, N, K), coinciding in time with extreme surges in wear intensity (by two orders of magnitude), exceeding the maximum values observed during the

run-in wear phase. For clarity, the intensity of wear (including at the peak point E) caused by layered microdestruction at the surface run-in phase ($I = 10^{-7}$ - 10^{-6} kg/m) will be referred to as microdestruction, and the abnormal peaks in wear intensity coinciding with the deep declines in the strength parameters (points F, G for which $I = 10^{-4}$ kg/m), will be referred to as microdestruction peaks. Further insights into the processes of surface layer destruction in nickel can be obtained by assessing the size and number of the wear particles using the optical method. Mean size of destruction fragments shows a tendency to decrease as loading time increases. The kinetics of this process was as follows. Mean particle size decreased from $\approx 4 \mu\text{m}$ at $t = 25,2$ ks to $3,2$ and $2,5 \mu\text{m}$, respectively, at $t = 93,6$ ks and $t = 126,8$ ks. The percentage distribution of the particles at $t = 25,2$ ks was $\approx 80 \%$ for small particles ($d=2,5 \mu\text{m}$), $\approx 20 \%$ for medium sized ($d=3,2 \mu\text{m}$) and large particles ($d \geq 4 \mu\text{m}$); at $t = 93,6$ ks, these percentages were 90% for small particles and $\approx 10\%$ (medium sized and large particles); at $t = 126,8$ ks, there were 90 % of small sized, and 10% of medium-sized particle, with no large particles present. The progress of material embrittlement during friction loading is related to this dynamic, if indirectly.

Thus, along with the cycle of selective layered micro-peeling in the surface layer, another cycle is observed, related to the accumulation of elastic stress energy in the underlying layers and the accelerated micro-destruction of these layers under friction loading (represented by the dashed line in figure 1). Electronic microscopy analysis was performed to compare the FMR results with data on microstructure changes in friction loaded surface layers of nickel.

As suggested by the microstructure analysis, a highly dispersed crystal structure is formed at the initial stages of friction loading, with block size ≈ 10 - $2 \mu\text{m}$. (Figure 2). The nanostructuring of the thin surface layer alters the deformation mechanism within the layer to a significant degree. As seen from Figure 2, a growing tendency for the dislocation clusters to texturise unidirectionally can be observed already at the beginning of the loading. Fine microcracks emerge within this microstructure. Typical dimensions are $0,01 \mu\text{m}$ in diameter and $0,1 \mu\text{m}$ in length (Figure 2, Insert at $t = 0,9$ ks). As indicated in [9], these cracks may be characterized by dislocation defect nucleation even in isolated slip lines, independent of the activation effect from the same or adjacent slip line. As seen from the figures, a series of open microcracks spreads unidirectionally across isolated dispersion chains in the dislocation clusters. According to [8], the origin of these micropores related to the action of two mechanisms: 1) vacancies merging into micropores under the action of temperature gradients in the actual contact points; 2) formation of surface slides and breaks, caused by the dislocation transformations; these specifically involve dissociation of dislocation loops, and dissociation of dipoles to form edge dislocations of opposite orientation; the surface shifts, extrusions and intrusions caused by these edge dislocations act as powerful stress concentrators [10].

Intrusions may obviously be identified with surface microcuts; in the presence of these microcuts, tensions are concentrated at the tips, and vertical and horizontal elastic stresses are generated [11]. During the formation of the microcut, normal stresses greatly exceed the shear stresses in magnitude, and the tendency towards proliferation of cleavage cracks is readily observable, the result of constrained material flow in the small localized space at the tip of the cut. This type of destruction is related to atomic plane breaking by elastic stresses perpendicular to the fracture surface. In sufficient numbers, microcracks coalesce into major cracks through macroscopic material destruction (Figure 2). However, given the variety of the factors active during friction loading, and the wide variations in stress and temperature gradients, brittle fracture mode may be transformed into elastic or complex fracture modes.

Further microstructure transformation is marked by increased material fragmentation through slide line formation (Figure

3, A). At the initial stages of the process, the microstructure resembles the common structure of a stable fatigue line with uniform distribution of dipole dislocation clusters. Continued loading transforms these lines into centres of localized deformation as extrusion material (meso-strips). These meso-strips are uniquely characteristic of the elastic strengthening processes in nanostructure surface layers of nickel under friction loading. The boundaries of these structure elements and the cleavage pattern have a clearly localized structure (Figure 3, B, arrows). This conclusion, however, cannot be made with certainty. As suggested by the data from a number of microscopy images, the formation and migration of localized meso-strips of elastic deformation, a dissipative subgrain structure can be observed within the surface layer areas adjacent to the micro-strips, with block sizes of $0,08 - 0,1 \mu\text{m}$ (Figure 4). This microstructure is characterised by quasi-uniform distribution of the dislocation clusters. According to [12], the formation of dissipative subgrain and nanocrystal structures in nickel and nickel alloys leads to significant increases in cyclic hardening stress, while also raising cyclic loading strength and decreasing cyclic crack growth parameters. This is apparently due to main microcrack generation along and across the textural formations (Figure 4, arrows). The mechanism through which these microcracks are generated is related in complex ways to the above-mentioned properties of dissipated subgrain structures.

Consistent with Figures 2 the localization area of the slide lines is rich in crack nuclei (as marked by the arrows). Crack formation can be attributed to crystalline grid dispersion. Alternating deformation intensifies dispersion, and causes slide packets and cracks to form at lower stresses than under static deformation. The most probable explanation is that during the transitional friction loading phase ($t = 54$ ks), the fatigue cracks are formed exclusively in areas where the slide traces are located.

According to [13, 14], the deformation and destruction processes in friction loaded surface layers may be interpreted from the perspective of mesomechanics. Plastic strain localization in the contact areas of conjugate planes creates a mesoscopic layer. The structural evolution of this layer defines the strengthening and destruction mechanism in the material under friction. As suggested in these works, this structure evolves into a highly dispersed polycrystalline structure with maximum strength performance. Consistent with the physical mesomechanics scale level scheme presented in [15], surface layer strengthening and destruction at maximum dispersion (Figure 1, Position A) may be identified as global loss of shear stability in the surface layer after nucleation and migration of localized plastic deformation meso-lines (Figure 5, A and B). Fragmented layer formation, affecting with time the underlying layers to depths of tens of micrometers was the key determinant of the destruction process [16]. Surface layer destruction led to catastrophic wearing, consistent with [4].

The effect of growing porosity in the material during the destruction process should also be noted. Prior to the destruction phase, the formation of multiple micro-pores along and within the tabular structure boundaries under friction loading (Figure 5, A and B) is related to thermal cycling in friction contact areas, vacancy diffusion mobility, and conglomeration. Under applied stress action, the micropores become stress concentrators, potentially causing transcrystalline and intercrystalline destruction (Figure 5, B, positions A and B). High porosity is observed within the tabular microstructure (Figure 5, A). The degree of porosity reaches 15% of the entire observation area.

The presence of stable slide lines determines the hardening and destruction kinetics in the surface layer. As established in [8], the slide lines are transformed into tabular structure elements along the boundaries formed by elements of crystalline plane non-alignment and acting as elastic stress concentrators. As seen from Figure 6, microcracks are formed along the boundaries of the slide lines within a highly fragmented band

structure (arrows). Localised peeling and shifts along the slide line boundaries leads to main microcrack formation (Figure 7, arrows). These processes are facilitated by temperature surges at the friction contact points.

Highly dispersed meso-substructure areas can be observed during the maximum hardening phase (Figure 1, Position A), explained by dislocation shifts and micropore formation along grain-oriented structure boundaries (Figure 8, A and B). Elements of intercrystalline destruction at this phase are considered in [8]. In this paper, the mechanisms involved in this type of destruction are studied by electron microscopy analysis. In the unique conditions of friction loading, determined by temperature fluctuations and alternating interactions of extrusion and intrusion, the processes of recuperation, dynamic recrystallisation, tenacity and creep may be initiated in the surface layer. In this respect, grain boundaries become vulnerable to microcrack and pore formation under the influence of combined loading pores and temperature gradients under friction loading. They act as primary areas of vacancy drain and as vacancy sources. This causes pore formation during vacancy conglomeration and pore growth during migration of the pore defects to the surface. Through the action of combined stresses and temperature surges, the surface metal layer may approximate plane flow conditions, enabling slippage along the grain boundaries. The number of pores and microcracks is proportionate to the degree of the slippage [17].

At the rapid destruction stage, multiple micropores were found inside the blocks and along block boundaries. Through observed micropore coalescence, near-spherical cavities are formed. Localised deformation within the micropores creates fault-like shear cracks. The observed direction of the destruction is also related to material strength reduction along the grain boundaries.

The microstructure at the minimum points of the cyclic curve $\Delta H = f(t)$ is shown in Figures 9. The images show no elements of dispersed microstructures, apart from several isolated dislocations at the residual traces of stress-induced destruction that exhibit oscillating contrast. Thin extinction contours indicate the presence of crystalline grid torsion elements facilitated by the action of torsional modes in the overlying layer. In this process, the structure in Figure 9 is similar to that of the undeformed specimens. This conclusion is further supported

by the similarity of the electron microscopy images (Figure 9, insert) is further evidence to this conclusion.

Conclusion

In friction-loaded metals, intense grain refining occurs to nano-range sizes, with quasi-uniform distribution of the nanocrystalline blocks over the volume of the surface layer. In the course of the friction loading, the microstructure is transformed, first into textured elements shaped as thin dislocation lines, and subsequently into slide lines and a lamellar mesoscopic structure. Microcracks are generated along the boundaries of these lines that coalesce into main cracks, accompanied by the formation of material wear blades.

Numerous micropores within the deformed grid and along the grain boundaries - accompanied by micropore coalescence - create centres of transcrystalline and intercrystalline destruction. Extended exposure to friction loading leads to progressive roughening of the surface layer, facilitated by proliferation of the centres of destruction. At the maximum dispersion phase, the roughening affects the underlying layers; in combination with advanced surface layer roughening, this process leads to rapid increases in the amount of loose material peeled as a whole layer. Escalation of this process leads to isolated release of the destruction products from the friction contact zone.

The curves shown in Figure 1 confirm that each minimum point in the function $\Delta H = f(t)$ has a corresponding maximum in the intensity of wear cycle, suggesting time localization of the wear product generation process. Visible troughs in the Δ curve and the major surges in wear intensity corresponding to those troughs suggest that the embrittlement process penetrates the underlying material layers latent stress energy. In the process, thin layer destruction (and peeling at the end of each cycle) precedes the peeling of a thicker underlying layer (tens of microns in length) during the buildup of strain energy, which corresponds to intensive destruction.

In sum, the results of the study confirm that destruction of thin surface layers of metal under friction loading follow a bladed and layered pattern and is localized in time.

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Radiographic analysis of the restoration of hip joint following open reduction and internal fixation of acetabular fractures: A retrospective cohort study

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ABSTRACT

Background: Acetabular fracture remains as a major challenge to orthopaedic surgeons despite of decades of improvement in its operative management. Unfavorable reduction is considered one of the key factors leading to joint degeneration and compromised clinical outcome in acetabular fracture patients. Besides the columns, walls, and superior dome, the postoperative position of hip joint center (HJC), which is reported to affect hip biomechanics, should be considered during the assessment of quality of reduction. Objectives: In this study, we aimed to quantify the postoperative shift of HJC radiographically, and to evaluate the relationship between the shift of HJC and the quality of fracture reduction following ORIF of acetabular fractures. Material and Methods: Patients with a displaced acetabular fracture that received open reduction and internal fixation in the authors' institution during the past three years were identified from the trauma database. The horizontal and vertical shifts of HJC were measured in the standard anteroposterior view radiographs taken postoperatively. The radiographic quality of fracture reduction was graded according to Matta's criteria. The relationships between the shift of HJC and the other variables were evaluated. Results: Totally 95 patients with 36 elementary and 59 associated-type acetabular fractures were included, wherein the majority showed a medial (92.0%) and proximal (94.0%) shift of HJC postoperatively. An average of 2.9 mm horizontal and 2.3 mm vertical shift of HJC were observed, which correlated significantly with the quality of fracture reduction ($P < 0.001$ for both). The horizontal shift of HJC correlated with the fracture type ($P = 0.022$). Conclusion: The restoration of HJC correlates with the quality of reduction in acetabular fractures following open reduction and internal fixation. Further studies are required to address the effects of HJC shift on the biomechanical changes and clinical outcomes of hip joint, especially in poorly reduced acetabular fractures.

KEYWORDS

Acetabular fracture, Open reduction and internal fixation, Hip joint center, Radiography

Introduction:

Acetabular fractures are becoming more common in older patients and a recent study reported a 2.4-fold increase in their incidence.¹ The mean age of patients being treated for an acetabular fracture also seems to be rising.² In younger patients, long-term results for the treatment of acetabular fractures are available^{3,4} and factors associated with a favourable outcome and the indications for treatment are now well accepted.⁵⁻⁷

Acetabular fracture remains as a major challenge to orthopaedic surgeons despite of decades of improvement in its operative management. Following well-planned open reduction and internal fixation (ORIF), a good to excellent result can be estimated in a large part of the patients with acetabular fractures. Meanwhile, the complication rate is still high, which leads to poor long-term outcomes in approximately 20% of the patients.^{8,9}

Post-traumatic osteoarthritis, usually accompanied with loss of hip motion and increase of pain, has been considered one of the most common complications associated with compromised outcomes in acetabular fractures.¹⁰ It's generally accepted that biomechanical alterations in hip joint, caused by an

unfavorable fracture reduction, play undoubtable roles in the development of arthritis. In previous studies, special emphases were placed to analyze the changes of intraarticular contact characteristics and the loss of stability after acetabular fractures.^{11,12}

The hip joint center (HJC), also known as the rotation center of hip joint, is considered crucial for the biomechanical reconstruction of the hip joint during total hip arthroplasty (THA) and revision surgeries.^{13,14} When an acetabular fracture occurs, it's not rare that the position of HJC will change following the destruction of acetabulum and innominate bone. Since an unfavorable position of HJC was reported to cause increased hip load, compromised soft tissue balancing, and even gait changes^{15,16}, it might contribute to the development of post-traumatic arthritis in patients with acetabular fractures as well. Currently, the postoperative assessment of fracture reduction focuses on the residual displacement of columns, walls, and the superior dome.^{17,18} A clearer understanding of the restoration of postoperative HJC in acetabular fractures, which was merely addressed previously, might shed lights on further optimization of the surgical management.

Aims and objectives:

In this study, we aimed to quantify the postoperative shift of HJC radiographically, and to evaluate the relationship between the shift of HJC and the quality of fracture reduction following ORIF of acetabular fractures.

Material and methods:

We retrospectively reviewed the patients with acetabular fractures that were recorded in the trauma database in the orthopaedics department of *Shri Guru Ram Rai Institute of Medical and Health Sciences (SGRRIM &HS), Dehradun*. The patients were admitted through emergency department or referred from other hospitals. Totally 101 displaced fractures (95 patients) were considered not fitted for Matta's criteria of nonoperative treatment¹⁹, and then received ORIF between January 2014 and December 2014. Of these reviewed cases, we included those with a full series of standard radiographs, including pre- and postoperative anteroposterior (AP), iliac oblique and obturator oblique Judet views, as well as preoperative computed tomography (CT) scan of the pelvis. Patients with bilateral acetabular fracture, associated fractures of ipsilateral femoral head, fracture of pelvic ring, or those operated on more than two weeks after injury were excluded. The study protocol was approved by the Medical Ethics Committee of *Shri Guru Ram Rai Institute of Medical and Health Sciences (SGRRIM &HS), Dehradun*.

Surgical approaches including Kocher-Langenbeck, ilioinguinal, combined or extensile approaches were determined by the fracture pattern to facilitate reduction and fixation of the innominate bone and the articular surface of acetabulum. Definitive fixation was applied with reconstructive plates and screws to stabilize the fracture according to the standard techniques recommended by Letournel²⁰.

Radiographic examination was performed right after the removal of drainage (usually 48 to 72 hours) postoperatively. Standard AP radiograph of the pelvis were taken with the patients placed supine and their feet in a standard position to minimize the effect of rotation of the hip joint. To evaluate the restoration of the HJC following ORIF, we measured the vertical and horizontal shifts of the postoperative center of femoral head from the estimated center of femoral head referring to the contralateral intact hip joint

Analysis of the data was performed using proportions and frequencies for categorical variables and means along with CIs and ranges for continuous variables. Means were weighted for sample size, and statistical comparisons between the different treatment modalities were performed where appropriate using Student's *t*-test. Odds ratios (OR) with 95% confidence intervals for binary outcomes were calculated and compared with Fisher's exact test. Analysis was conducted with SPSS version 17.0, and a *p*-value of < 0.05 was considered statistically significant.

Results:

Totally 95 patients (101 fractures) with an average age of 42.5 years (range 18 to 75 years) were included in this investigation, consisted of 62 male and 33 female patients. According to the Letournel and Judet's classification, there were 46 elementary and 55 associated-type fractures identified in preoperative radiographs and CT images. According to our surgical records, the mean length of surgery for all the patients was 220.8 minutes (range 90 to 440 minutes), while significant difference was detected among different fracture types (one-way ANOVA, *P* < 0.001). Comparing the use of different surgical approaches, the length of surgery also varied significantly (one-way ANOVA, *P* < 0.001).

The mean horizontal and vertical shifts (X and Y) of the postoperative HJC were 2.9 mm (range 0.9 to 10.6 mm) and 2.3 mm (range 0.9 to 7.8 mm) respectively, while X showed statistically significant correlation with the fracture type (*P* = 0.022). Besides, no correlation was found between the shift of HJC and the surgical approaches. A high inter observer reliability

was testified with the ICC of X and Y was 0.88 and 0.81 respectively. Considering the direction of the shift, 93 cases (92.0%) showed a medial shift of postoperative HJC, while 95 (94.0%) of the vertical shift was proximal.

The quality of fracture reduction was graded radiographically as anatomical in 70 cases, imperfect in 21 cases, and poor in 10 cases, which correlated with the type of fracture classified as elementary or associated-type (chi square = 6.689, *P* = 0.035).

Discussion:

To recover a functional and pain-free hip is the main goal in the treatment of acetabular fracture. Among the identified poor prognostic factors, unfavorable fracture reduction is considered the most important one leading to biomechanical alteration and accelerated degenerative changes in hip joint^{21,22}. Previously, the restoration of HJC was merely investigated during the postoperative assessments of the quality of reduction in acetabular fractures. In this study, prior to further biomechanical investigation and clinical follow-up studies, we examined the radiographic restoration of HJC following ORIF of acetabular fracture. The results showed a 2.9 mm horizontal shift and a 2.3 mm vertical shift of postoperative HJC in average, which correlated with the radiographically graded quality of fracture reduction.

The biomechanical importance of an anatomically restored HJC has been widely investigated in THA and revision surgeries. Superior or lateral displacement of HJC, causing a decreased moment arm of abductor muscles, was testified to generate increased hip load during gait cycles and lead to higher rate of implant wear and loosening in THA²³⁻²⁵. Using mathematical models, Bicanic reported a 0.7% or 0.1% increase of hip load respectively, following every millimeter of lateral or proximal shift of HJC¹⁶. Similar in the opposite way, the hip load would decrease when the HJC shifted medially or distally. Considering an acetabular fracture, the alteration of the loading pattern was believed to be more complicated¹¹. In our study, the majority of the cases presented varying degrees of medial and proximal shifts of HJC. It's hard, therefore, to clarify the changes of hip load caused by the shifted position of HJC in our study, unless further biomechanical studies could be conducted.

Besides the hip load, a shifted HJC may also lead to the changes of surrounding muscle forces in order to balance the moment of body weight. Delp observed a 44% decrease of abduction force and a 27% decrease of flexion force following 2 cm proximal shift of HJC²⁶. A 2 cm medial shift of HJC, in the same study, was testified to reduce 26% of the adduction force. In our study, again, the mean values of postoperative HJC shifts were relatively small compared to a 2 cm scale. Therefore the potential contribution of the shifted HJC to the subsequent muscle imbalance and gait changes might be trivial.

However, future studies using experimental or computer models would be needed to provide direct evidence for this hypothesis. Radiographic criteria suggested by Matta are generally used to evaluate the quality of fracture reduction¹⁸. In our study, an anatomical reduction was achieved in 80.0% of the elementary fractures and in 55.5% of the associated fractures, while the rate of poor reduction was 3.6% and 11.3% respectively. These were comparable with the results of the other studies²⁷. An important finding of our study was that the postoperative shifts of HJC were correlated with the quality of fracture reduction. This was reasonable since anatomical reduction would theoretically lead to an ideal restoration of HJC, while a poorly reduced fracture might leave residual displacements of columns and/or walls to hinder the restoration of HJC. Based on this finding, the quality of fracture reduction graded using Matta's criteria might imply the status of HJC restoration. An anatomical fracture reduction, therefore, should be aimed and checked intraoperatively to restore an optimal HJC. In this study, the horizontal shift of HJC was found to

be correlated with the fracture types. This reflected the clinical reality that an associated-type or so-called complex acetabular fracture would lead to an increased duration of surgery, a decreased quality of fracture reduction, and a higher value of horizontal shift of HJC. Specifically, patients with a both-column or T-shape type of fracture presented highest value of horizontal shift of HJC. Meanwhile, the highest rate of poor functional outcome, as reported by Briffa's, was observed in the patients with a posterior column, posterior column and posterior wall, or posterior wall type of fracture⁴. This inconsistency between the radiographic and functional evaluations was also reported by Magill previously²⁸. As a potential influencing factor for the horizontal shift of HJC, the displacement of the quadrilateral plate was not analyzed in this study because it's not specifically considered in the Matta's grading system.

Various methods have been reported to determine the anatomical HJC on two-dimensional pelvic radiographs. Anatomical landmarks like teardrops, Shenton's line, Köhler's line, and inter-sacroiliac line were used by different investigators, while the HJC was testified to be most precisely determined referring to the teardrops²⁹. However, in our pilot study, the ipsilateral teardrop could only be precisely identified in less than 20% of the postoperative pelvic radiographs due to fracture disruption or implant obstruction. Therefore we used the contralateral intact acetabulum and femoral head as mirrored template to determine the estimated HJC. Similar methods were reported previously in other studies, showing acceptable accuracy and repeatability³⁰.

Conclusion:

In conclusion, varying degrees of medial and proximal shifts of HJC were observed in the majority of the acetabular fractures following ORIF. The postoperative restoration of HJC showed significant correlation with the quality of fracture reduction. A perfect fracture reduction should be aimed to achieve appropriate HJC restoration. Further studies are required to address the effects of HJC shift on the biomechanical changes and clinical outcomes of hip joint, especially in poorly reduced acetabular fractures.

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Learned Affective Norms: Affective and Cognitive Factors InWeb SearchBehavior Relating to Optimism, Self- Efficacy, Locus of Control, Affectivity, Loyalty

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ABSTRACT

This research explores the dynamic interaction between affective norms and cognitive habits in Web based information search behavior longitudinally self-monitored over several weeks. Learned affective norms are motivations people have regarding initiation of information seeking, its direction, and its cessation. Content analyses of searchers' comments explore the relationship between affective norms and cognitive habits of Web searchers. Sample analyses are given of cognitive justifications given by searchers before, during, and after searching. Learned affective norms influence searchers' mood, optimism, locus of control, expected difficulty, uncertainty, time pressure, coping skills, satisfaction, and affectivity.

KEYWORDS

Information Searching, Information behavior, Web, Content analysis, Affective norms, Cognitive habits, Optimism

1 Introduction

This research explores the dynamic interaction between affective norms and cognitive habits in information behavior. Prior research on the affective-cognitive interaction in information seeking behavior with college students indicates that search success and efficiency is higher when the searcher maintains a positive expectation about search outcome and one's own search skills (Nahl, 1996, 1998; Nahl and Harada, 1996; Nahl and James, 1996). This methodology relies on the normal literacy activity of being able to make a self-report of one's thoughts and feelings in a given situation, and in this instance, of their expectations about a search, whether it will be easy or difficult, take long or not, and also, why they think so (Nahl, 1997; Eastin and LaRose, 2000). The data presented in this article use content analysis of comments that searchers typed out in a document while searching with a Web browser.

The expression "learned affective norms" (LANs) is introduced and explored in its relation to associated cognitive habits. It was shown previously (Nahl, 2007a) that affective and cognitive interactions form the basis of establishing and maintaining normal activities in online socializing and task teams. Further, the members of a task group working together online adjust the character of their affective-cognitive interactions to be consistent with each other, so that no one in the group is seen as 'standing out' or doing something outside the expectations of what is defined as normal in the practices of that group (Nahl, 2007). There is therefore a process going on of mutual adaptation and conformity to expected limits of behavior and intervention. Expectations with conformity limits of normalcy are often called norms. This article discusses the dynamic interaction between affective norms and the cognitive habits that are associated with them in the case of Web searchers.

In general life situations, affective norms are characteristic motives people need in order to generate cognitive solutions to problems, and then to execute or perform them. For example, a characteristic affective norm in many daily situations is the common sense rule about how long things should take. This is conditioned by personal experience as well as community expectations. With few exceptions, waiting in a line should not take more than a few minutes. When this affective norm is broken, frustration increases and motives change. A new goal now takes hold, as shown by external behavior—leaving the line and doing something else. Or else, making a phone call, complaining, talking to the others in the line, etc. Every activity has associated with it a number of affective norms that determine goal-setting and new behavior. Another example is topicalization behavior in talk. We discuss particular topics within specific affective limits—what is permissible with one

person is off limits to another person.

In information behavior, affective norms are motivations people have regarding initiation of information seeking, its direction, and its cessation (Nahl, 2005a). For example, people have specific affective norms regarding how long it should take for a particular Web page to load. There are personal and sub-cultural variations or limits. People extend their limit for popular sites at certain times of known or expected high demand. Another example is the affective norm people have regarding returned hits to a query with electronic databases—sometimes there are "too many" so that the query is reformulated before looking at any of the returns. The feeling of "too many" or "not enough" is an affective norm. Another common example is the affective norm of how long a search activity or session should take—if it takes longer, frustration and dissatisfaction start and can intensify until they put an end to the information behavior.

Another common affective norm with searchers is the content or relevance of the information to be expected. Certain sources of information are evaluated as more consistent with one's own attitudes. When a contrary attitude is found from that source the affective norm of information acceptance is broken. The result is a change in goal-directed behavior. New cognitive activity is generated to help resolve the affective imbalance or conflict. There are external behavioral consequences riding on the outcome of the problem solving—ignore the conflict and remain on the page, back out, send email, come back some other time, never come back, etc.

The present approach is consistent with the traditional principle in behavior theory that all learning and task performance must be motivated, and if there is insufficient motivation, no learning or performance can occur (Fishbein and Ajzen, 1975). More specifically, this investigation explores the conditional relationship between affective norms and cognitive habits of Web searchers. The monitoring of affective norms is based on the traditional method of evaluative ratings given by people about their current affective state. Cognitive processing accompanying each affective norm is supplied by the individual in a comment immediately after giving the numerical rating (see examples below).

2 Literature Review

Searchers make a series of cognitive decisions and sensorimotor actions, moment by moment as the search task proceeds. Learned affective norms (LANs) provide the adequate motivation and persistence required for proceeding with the task and for valuing goal attainment, that is, willing to exert effort and not quitting. In accordance with the traditional behavioral ap-

proach, it is assumed in this research that LANs exert control over the direction and duration of every cognitive process required for task performance.

For example, the decision to avoid alternative A and to select B, is under the control of learned affective norms, as indicated by evaluational expressions such as "*I don't like things like A*" or "*A is not as good as B, but I can't tell you why. It just is.*" or "*I don't feel like going on. It just doesn't feel right.*" etc. There may or may not be a conscious cognitive justification that a searcher can offer for avoiding A. The affective operation of avoidance may be based on personal or social, rather than logical considerations about the consequences of selecting A. Personal and social categories of affective norms supersede cognitive considerations, as expressed in people's statements: "*I know A is a better way but I've gotten used to B so it's easier just to stick with it*" or, "*People told me A is pretty easy to use but I'm not very good at things like that, so I don't know.*" Or, "*I feel that this task will not take too long because it is not for my bibliography so I am not as concerned about it, which means that I do not have to be picky about what I find.*"

These attributional expressions are actual things people said while searching. They show that affective norms of approach-avoidance can override cognitive choices in the searcher's sequence of actions. This super-ordinate relationship of the affective over the cognitive (Nahl, 2007b; Simon, 1967; Zajonc, 1984; Fishbein and Ajzen, 1975) is especially noticeable in one crucial area of information behavior – the intention to quit or not to quit some ongoing activity. This affective norm operates at all levels of cognitive processing. Globally, this LAN determines the length and effort of a search session, whether it is abandoned in a few minutes or prolonged.

For example, one subject explained at the start of a search session: "*I'm tired and want to take a nap soon.*" This subject quit after 30 minutes. Another subject explained: "*My interest for today's topic is exceptional. I really look forward to finding something about it.*" and went on for 60 minutes. Another explained: "*Since I didn't find anything the last time, I have to be extra persistent.*" This individual went on for 180 minutes. It is clear that "quitting time" in search behavior is determined by the complex of LANs that operate in the motivational system. This principle also applies to less global affective issues, such as how long a particular cognitive strategy will be pursued vs. modified or interrupted. Here too, a complex of sub-LANs interact to determine the quitting time for any particular search strategy. "Sub-LANs" designate a sub-category of learned affective norms.

An example of a sub-LAN is the motive that determines the decision to scroll down a Web page or to back out. This decision may not be based on cognitive considerations such as recognizing that the content is not relevant and deciding to back out. It may be based on situationally activated LANs that influence choice making. For instance, under certain conditions, there is a tendency to consider scrolling as effortful or tedious, thus unpleasant to some extent. Hence for the scrolling behavior to go on, second by second while inspecting a list, the searcher must continually overcome the negative affective norm with which scrolling is associated. In other words, the behavior of scrolling continues as long as it is controlled by the sub-LAN of "Keep Postponing Quitting" or "Do Not Quit Yet."

Note that scrolling down a long list of search results or a directory, is associated with a negative affective norm ("*This is endless. When can I stop...*"), while on the other hand, scrolling down a visual object such as a large photograph or map, has a positive affective norm attached to it "*Oh, how interesting. What comes next...*"). The sensorimotor scrolling behavior of the hand and eyes can be motivated either by a negative or a positive affective norm. For instance: (a) "*Oh, I got a lot of hits on this. I'm lucky today.*" vs. (b) "*Oh, so many hits to go through. I've got to specify my topic better.*" All cognitive

facts derive their importance and relevance from their associated affective norms. This research assumes that every cognitive choice is directed by an affective norm that sets the expected goal. All goals are defined in terms of the individual's affective states or motives. This applies at all levels of goals and sub-goals of a task. Modifying the affective state by removing the motive also removes the goal, and this act interrupts or inhibits the cognitive decision-making process. Some other affective goal then takes control of the cognitive process which continues in a new direction.

3 Methodology

In theory, a complex of global LANs with their specific sub-LANs are constantly operational during information behavior. As information managers, the more we know about the hierarchy of LANs that users typically have in an information setting, the better we can adjust the technical and social environment of information consumers. This research investigates the usefulness of one method for monitoring concurrent affective norms of users in relation to their cognitive explanations or "accounts". The method has been called "accounted ratings" (Nahl, 2007b) and consists of items on a questionnaire form that searchers are requested to fill out during these search session (see Appendix below). For instance:

12) How motivated are you to keep on trying today until you succeed?

Type a number here: _____

1 2 3 4 5 6 7 8
9 10

slightly motivated very highly motivated Please give in an explanation for your answer: _____

One subject picked 2 and wrote: "*I don't really have the motivation to keep on going until I succeed because for one thing, after sitting in front of a computer screen for too long my eyes hurt, then my head hurts. And I also have other things to do that I consider more entertaining and self fulfilling.*" The session lasted 30 minutes before the person decided to quit. The affective norm of "sitting in front of a computer screen for too long" is set by personal and cultural limits.

Another subject picked 10 and wrote: "*Unless I fall asleep, I will continue to try and find relevant articles.*" This session lasted 180 minutes. Every searcher has a learned affective norm installed at the start of the task that will keep postponing quitting—until the affective norm reaches its limit and fails, at which point the search session ends. The "accounted rating" method has the advantage of being concurrent rather than retrospective from memory (Ericson and Simon, 1993). All affective monitoring reports in searching need be *concurrent* measures for obtaining greater accuracy and specificity of detail than what is the case with retrospective reports that rely on long term memory. The intensity of the rating given by the user provides an index of the motivational intensity of the affect or, what is called "affectivity". The first individual mentioned gave a very weak affectivity self-rating of 2, while the second person gave a very intense affectivity rating of 10. These two online searchers were operating under different global motivational norms for postponing quitting – 30 vs. 180 minutes.

The explanation that is provided by the user in the accounted rating is a cognitive account that the searcher formulates as a justification for the affectivity felt and rated. The less motivated searcher who quit after 30 minutes explained the affectivity level of 2 in terms of "*being tired, uninterested, and busy*". The more motivated searcher who quit after 180 minutes explained the affectivity level of 10 in terms of "*Don't quit till you drop*" or "*Keep going no matter what.*") The two individuals in this situation were operating with different sub-LANs regarding the affect or motive of task persistence. Since learned affective norms are culturally acquired through socialization and enculturation, the population of searchers will

overlap in terms of the typology of LANs that are operational in a particular search situation. This research uses a longitudinal approach that can uncover the extent to which searchers vary in LAN style over time, by inspecting the range of accounted ratings in cumulative search sessions for the same searcher. Students enrolled in a class were trying to improve their online search skills and practiced for 10 weeks in a row, one search session per week to be done on their own time and choosing.

The affective intensity of the motivation to postpone quitting always operates on a particular cognitive sub-behavior, which insures that an efficient strategy can be pursued long enough to yield success. Typically, a search task is composed of a sequence of sub-goals, each requiring its own affective norm of persistence in order to allow it to complete itself. But in novel search situations LANs may not be operative consistently, and conflicting sub-categories of learned affective norms may interfere with one another. Searchers in unfamiliar situations may not have in place an efficient inventory of LANs to direct their decision-making behavior moment by moment. This can be a source of information anxiety and uncertainty (Nahl, 2004).

With practice and some success, users have the opportunity to acquire new learned affective norms that are specifically appropriate to a particular information situation. The newly acquired affective norms allow them to direct and organize the unfamiliar cognitive decision-making sequence. Eventually the learned information behavior becomes a cognitive "habit" that appears to run itself off spontaneously and does not need to be rehearsed with awareness. What allows the new cognitive habit to run itself off spontaneously is the hierarchy of affective norms that is now in place at the end of the practice phase. The same LAN hierarchy may be applied by users to different search tasks at different times, so that it becomes a signature of their personality and information literacy style.

College students were encouraged to improve their online search skills by practicing one weekly search task for several weeks. They discussed their self-monitoring findings in their online forum discussions. While practicing their weekly Web searches, they kept track of their affective and cognitive be-

haviors during these search sessions, entering their feelings and thoughts in a document that was kept open along with the browser. Searchers kept track of three items: (1) comments that were entered at the start of the session; (2) comments that were typed during the session, and (3) comments that were typed at the end of the session or at quitting time. This approach was based on a form used by Nahl (2003, 2004).

4 Findings

4.1 Cognitive Justifications For How Long It Should Take

The 42 individuals kept track of their 10 weekly search sessions, but some students did not complete their ten weeks. In Table 1 below ratings were logged for Question 6 that was to be filled out just before the start of searching for each search task. The answer to this question provides information regarding the searcher's initial expectations of how long this particular search should normally take. The questions are reproduced in the Appendix below.

Table 1 shows an analysis of the accounted ratings for that question. The explanations given by searchers are grouped by category of justification, as shown in all caps for each rating. The cognitive categories are arranged in order of the affective intensity of the associated rating. For instance the first category listed gives the cognitive justification for why the person thinks that the session should take much longer than usual (mean of 8). The reason for this expectation in this case is the belief that a lot of information is available on the search topic.

There are variations in affective intensity within each cognitive category. When the categories justify the expectation of a longer session the mean rating is above 5. When a shorter session is expected, the mean rating is under 5. This shows the face validity between the intensity of the affective ratings in relation to their cognitive justification despite some individual variability of the ratings. The wording of the explanation makes clear whether the person is expecting a shorter or a longer session.

**Table 1
Cognitive Justifications For How Long the Session Should Take**

6) If you compare this task to other search tasks you've done, how long should it take?										
1	2	3	4	5	6	7	8	9	10	
much less than others							much more than others			
Please type in an explanation for your answer:										
Affective Rating	Cognitive accounts by searchers giving that affective rating									
8	EXPECTING A LOT OF INFORMATION ON THIS TOPIC (expect session to take longer) "There is a lot more information and research on this topic than the previous ones. There are more articles to read through and select from." Or, "It may take a little longer to find results because there may be a lot of information to look through."									
8	EXPECTING DIFFICULTY OR HAVING SELF-DOUBTS (expect session to take longer) "It's been taking a pretty long time to do my weekly research ever since we started the forum discussions. I don't know if I am good at this kind of task." Or, "Searching for articles that cover two topics may not be easy." Or, "When you haven't found the right combination of search engine and key words the search will take a long time." Or, "This is not going to be fun. I have a lot I have to accomplish." Or, "This task requires a lot of time." Or, "In order to find at least 5 accurate articles pertaining to my other research topic, spirituality, I would allot myself 2 to 3 hours." Or, "Because I just got out of work and I'm tired. It is harder for me to focus when I tired, hence the longer the time will be to complete this task."									
7	RESTRICTING FOCUS TO MORE DETAILED INFORMATION (expect session to take longer) "It may take a little longer because I am looking for a sub topic under my main topic." Or, "I think that this would take a little longer than usual because I'm looking for something very specific. I think it's going to take time to read through the articles to see if it is something that I want to write about."									
7	STARTING A NEW TOPIC. (expect session to take longer) "Since I am not just looking up the same research topic I have been for about three weeks now, I am thinking it will take a little more time to research a new topic." Or, "Because I haven't used this topic before"									
7	IT BEING THE FIRST SEARCH (expect session to take longer) "I think it will take longer because this is one of my first searches, I am entering the search with very broad expectations." Or, "Longer because this is the first search session and I do not have a clue on what I am looking for even though I have a topic."									

5	SIMILARITY TO PREVIOUS TASKS OR TOPICS (expect average length session) "I think that it will take the same amount of time because I know where more information is located." Or, "It just seems like it should be the same." Or, "I don't know why it would take any longer to find info about this topic." Or, "Since I know which topic I am going to use. So it shouldn't take long." Or, "Based on the recent searches that I have done, I think that it should be about the same in terms of the time."
5	IT BEING THE FIRST SEARCH IN THE SERIES (expect session to take shorter) "I predict that it will be fast because this is my first search." Or, "This is my first time with this new topic so it should take less time." Or, "Not long since I just want to find a bit of information to use for my weekly posting."
4	EXPECTING A LOT OF INFORMATION ON THIS TOPIC (expect session to take shorter) "I think that it may take a little shorter than other searches that I have done because there should be a lot of information on this topic on the web."
4	RESTRICTING AMOUNT OF INFORMATION WANTED. (expect session to take shorter) "I just want to find a bit of information to use for my weekly posting." Or, "I just want to find a bit of information to use for my weekly posting."
4	EXPECTING VERY LITTLE INFORMATION ON THIS TOPIC (expect session to take shorter) "It may take less time because I don't expect to get a lot of results returned." Or, "It may take a little less time because there will be less results to look through."
4	CUMULATIVE EXPERIENCE (expect session to take shorter) "I am more certain that I will be done faster since I have been researching this information for some time now and I can recognize what works and does not work easily."
3	SIMILARITY TO PREVIOUS TASKS OR TOPICS (expect session to take shorter) "Since I am looking for the same information, it shouldn't take long." Or, "This task should take less time than others. I will be able to find anything as usual." Or, "I think this search will end up taking about the same amount of time as my other searches." Or, "Not much since I know exactly what I want to find."

It is interesting to discover that the same cognitive justification is sometimes made for either expecting a longer session or a shorter session, showing their conflictual nature. To see the comparisons more easily Table 1 is compacted and shown without the examples.

Table 2
More Compact Version of Table 1

Means	Cognitive Accounts	expect session to take
8	EXPECTING A LOT OF INFORMATION ON THIS TOPIC	longer
7	EXPECTING DIFFICULTY OR HAVING SELF-DOUBTS	longer
7	RESTRICTING FOCUS TO MORE DETAILED INFORMATION	longer
7	STARTING A NEW TOPIC.	longer
7	IT BEING THE FIRST SEARCH IN THE SERIES	longer
5	SIMILARITY TO PREVIOUS TASKS OR TOPICS	average length
5	IT BEING THE FIRST SEARCH	shorter
4	EXPECTING A LOT OF INFORMATION ON THIS TOPIC	shorter
4	RESTRICTING AMOUNT OF INFORMATION WANTED.	shorter
4	EXPECTING VERY LITTLE INFORMATION ON THIS TOPIC	shorter
4	CUMULATIVE EXPERIENCE	shorter
3	SIMILARITY TO PREVIOUS TASKS OR TOPICS	shorter

Under some conditions searchers predict a longer session (8) when they expect a lot of information to sift through, but under other conditions they predict a shorter session (4). The difference depends on the overall information need. When the searcher's information need is perceived as general or non-specific ("anything will do"), then expecting a lot of information on the topic promises a shorter session. But when the information need is specific, expecting a lot of information on it means having to sift through more material to find what's wanted, and so the expectation is for a longer session.

There is therefore a dynamic interaction between LANs at different levels of specificity or applicability to the situation. Some of the learned affective norms apply to non-specific information needs such as "the quicker I can get this done, the better." Others are sub-LANs that have to be made to fit into the overall operation, creating conditional LANs, as for example, "I want to get this search task done quickly, but I also need to follow the instructions for this topic, and if there is a lot of information I have to sift through, this session may take a lot longer."

Characteristic learned affective norms for expecting longer search sessions include

- expecting a lot of information on this topic
- expecting difficulty or having self-doubts
- restricting focus to more detailed information
- starting a new topic.
- it being the first search

Characteristic LANs for expecting shorter search sessions include

- it being the first search in the series
- expecting a lot of information on this topic
- restricting amount of information wanted.
- expecting very little information on this topic
- cumulative experience
- similarity to previous tasks or topics

The condition of being the first search in the ten weeks is associated with ambivalent LANs—it either leads to the expectation of a longer search session (7) or shorter (5), which is right at the midpoint of the affectivity scale. But the condition of being the first search on a new topic in a series of topics leads to the expectation of longer sessions (7). For comparable reasons the condition of "similarity to previous topics" leads to the expectation of a much shorter session (3). People also have LANs regarding the expectation of shorter sessions when they feel more experienced due to cumulative searches (4), and also when they decide to restrict the amount of information wanted (4).

4.2 LANs of Optimism

Prior research with students under similar conditions (Nahl, 2005b, 2004) indicates that self-efficacy perceptions are powerful learned affective norms that influence the motivational dynamics of several interrelated factors, including mood, optimism, locus of control, expected difficulty, and urgency (Bandura, 1997; Rotter, 1990; Seligman, 1998). The searcher's feeling of optimism at the start of a search task may take several forms that vary in goal function and assessment. For instance, to the question "How sure are you that you will succeed in this task?" filled out at the start of the search, the

same searcher may answer differently for different sessions:

Table 3
Justifying Optimism (searcher 1)

9) How sure are you that you will succeed in this task?									
1	2	3	4	5	6	7	8	9	10
doubtful								almost certain	
Please type in an explanation for your answer:									
AFFECTIVE RATING	Cognitive Account for Optimism--Pessimism (One Searcher)								
4	"I am a bit nervous about this particular search. I really do not have a clue as to how much information is available in the scientific world that pertains to rage."								
5	"I have faith that at least one person has created a site to help individuals cope with their pets' illnesses."								
10	"I am very confident that the Internet has information pertaining to at least one form of spirituality."								

The searcher in Table 3 shows a range of optimism from 4 to 10. When looking on the Web for specific information (e.g., What is the scientific definition of "rage"), this searcher is somewhat doubtful of success (4), reflecting on some nervousness and uncertainty. But when expecting a lot of information on a general topic (e.g., "spirituality"), the optimism reaches near certainty of success (10).

Table 4
Justifying Optimism (searcher2)

9) How sure are you that you will succeed in this task?									
1	2	3	4	5	6	7	8	9	10
doubtful								almost certain	
Please type in an explanation for your answer:									
AFFECTIVE RATING	Cognitive Account for Optimism--Pessimism (Student 2)								
5	"I am not sure if I will succeed in this task. I realized that research for a specific topic needs some skills, but actually I do not have them."								
7	"EBSCO database has lots of information. I will be able to find anything."								

The searcher in Table 4 feels more optimistic (7) when expecting a lot of information in a familiar search environment, and less optimistic (5) when being self-doubting. The searcher in Table 5 is pessimistic (3) due to prior lack of success, but very optimistic (10) when she gives herself a pep talk.

Table 5
Justifying Optimism (searcher 3)

9) How sure are you that you will succeed in this task?									
1	2	3	4	5	6	7	8	9	10
doubtful								almost certain	
Please type in an explanation for your answer:									
RATING	Cognitive Account for Optimism--Pessimism (Student 3)								
3	"I have been having such a hard time so far that to find something would be a real miracle."								
10	"I have to try and think optimistically."								

Table 6 summarizes the distribution of ratings for Question 9 on how sure they are that they will succeed in the task for each of the ten sessions. About half of the students (43 percent) show a small range of longitudinal variation across the sessions (0-2). Their expectation of success are similar across the 10 weekly sessions. The other half show greater variation across the sessions – 38 percent varying moderately (3-4 range) and 19 percent varying considerably across the sessions (5-7 range). The modal rating for the group as a whole was a 9 or a 10. The mean was 8.7 (sd=1.6) indicating a generally high self-assurance of success for these types of search tasks.

Table 6
Longitudinal Variation in Optimism

RANGE OF AFFECTIVE RATING	N	Percent	Searchers' Consistency Across Time For Optimism-Pessimism
0-2	18	43	Expect same success across time
3-4	16	38	Expect moderately different success across time
5-7	8	19	Expect different success across time

Table 7 shows a selection of concurrent accounts given to the self-efficacy affectivity ratings. The cognitive justifications are labeled high or low depending on whether the LAN contributes or detracts from performance outcome.

Table 7
Varieties of LANs of Optimism and Their Cognitive Justification

9) How sure are you that you will succeed in this task?									
1	2	3	4	5	6	7	8	9	10
doubtful								almost certain	
Please type in an explanation for your answer:									
RATING	CONCURRENT ACCOUNTS GIVEN BY DIFFERENT SEARCHERS			LANs LEARNED AFFECTIVE NORMS	COGNITIVE JUSTIFICATION				
3	I am very certain that I will be able to complete my task because I will not stop until it is finished.			feeling self-reliant	determined not to quit before success				
4	I am a bit nervous about this particular search. I really do not have a clue as to how much information is available in the scientific world that pertains to rage.			feeling apprehensive	there will not be information on the topic				
4	Simply because the Internet provides such a wealth of information, I have no doubts that I will be able to find information pertaining to my topic. It is not that specific.			feeling optimistic	there will be a lot of information on the topic				

4	Science and spirituality don't seem to be a likely pairing. Maybe I will have a hard time finding even one journal article on the subject, but I am going to try.	feeling pessimistic	there will not be information on the topic
5	I'm not sure the technique I use would help. I'm not sure about my ability of searching on the Internet.	feeling self-doubt	doesn't know enough about search techniques
5	I am not sure what to expect. I have a pre-idea about what I will encounter, but this is new to me. I have never used the Internet to track down research articles.	feeling uncertain	inexperience in searching
5	I still have some doubt about my searching skills at the Internet, although I have been doing it for a long time.	feeling self-doubt	low assessment of skills despite some experience
5	I am doubtful since I failed to search for the same topic once.	feeling self-doubt	prior experience of failure
5	I usually find something interesting, but not always useful.	feeling conflictual	results may not be relevant
6	I don't know about this one just because I haven't heard a whole lot about it. I will just keep trying different key words and see what works best.	feeling optimistic	determined not to quit before success
6	I'm quite certain that I will find something because I usually do but like I said it's late and I'm already cranky.	feeling optimistic	prior experience of success
6	I expect there are few resources for the topic.	feeling pessimistic	there will not be information on the topic
6	I am not sure if I will succeed in this task because I have no specific skills in research.	feeling uncertain	inexperience in searching
7	The internet has so much information, I'm sure I'll find something that will be useful.	feeling optimistic	there will be a lot of information on the topic
7	So far I found everything that I needed so far. I am certain that I am able to succeed in this task.	feeling optimistic	prior experience of success
7	I am trying to remain optimistic about this search however since I have not completed a search of this type before I am not sure how easy or difficult it will be.	feeling uncertain	inexperience in searching
8	I heard others in class say that there are a lot of information that deals with pets and dying.	feeling optimistic	there will be a lot of information on the topic
8	I do think there is a good chance I will get something useful. The web has yet to fail me in providing useful info, so I don't see any reason why it would be different now.	feeling optimistic	prior experience of success
8	I am a little unsure because I have made my topic a little less broad than it was before.	feeling conflictual	topic specificity makes search more difficult
8	I feel confident that I'm going to find some information on this topic. The internet has a lot of articles, but I think it's just going to take some time.	feeling optimistic	there will be a lot of information on the topic
8	I'm pretty good at searching and finding the things that I need.	feeling self-reliant	prior experience of success
9	The topic of workplace rage should not be hard to find online. I am sure I will find something on it.	feeling optimistic	there will be a lot of information on the topic
9	I am very confident because my other searches have gone well so far.	feeling optimistic	prior experience of success
9	I am pretty sure that I will find something in this time period I have designated for this task because I am feeling very motivated to get it done.	feeling optimistic	determined not to quit before success
10	I search using search engines a lot.	feeling self-reliant	prior experience of success
10	I am very certain that I will be able to complete my task because I will not stop until it is finished.	feeling optimistic	determined not to quit before success

The main LANs of optimism identified in this analysis are:

- feeling optimistic
 - feeling self-confident
 - feeling self-reliant
- and

- feeling pessimistic
- feeling apprehensive
- feeling self-doubt

The main cognitive justifications are:

- determined not to quit before success
- there will be a lot of information on the topic
- prior experience of success

and

- there will not be information on the topic
- doesn't know enough about search techniques
- prior experience of failure

Once again the patterns in Table 6 show that it is not safe to rely solely on the affectivity ratings since the same rating can mean optimism, pessimism, or uncertainty. For instance:

6	I'm quite certain that I will find something because I usually do but like I said it's late and I'm already cranky.	feeling optimistic	prior experience of success
6	I expect there are few resources for the topic.	feeling pessimistic	there will not be information on the topic
6	I am not sure if I will succeed in this task because I have no specific skills in research.	feeling uncertain	inexperience in searching

And also:

4	Simply because the Internet provides such a wealth of information, I have no doubts that I will be able to find information pertaining to my topic. It is not that specific.	feeling optimistic	there will be a lot of information on the topic
4	Science and spirituality don't seem to be a likely pairing. Maybe I will have a hard time finding even one journal article on the subject, but I am going to try.	feeling pessimistic	there will not be information on the topic

The same justification may be given for different affectivity ratings, and the same affectivity rating may have a different cognitive justification. Nevertheless, these differences operate within

recognizable limits so that more extreme ratings of positive affect (7 or above) are strongly associated with LANs of optimism and self-reliance.

4.3 Tracking Longitudinal Patterns in Affectivity

**Table 7
Longitudinal Pattern for Some Affective Ratings**

	MEAN FOR WEEKLY SESSIONS (N=42 students)										Standard error, range
	1	2	3	4	5	6	7	8	9	10	
Expected Relative Length (Q6)	5.3	5.2	5.4	5.3	5.6	6.1	8.2	5.0	4.5	4.6	.31 to .55
Importance of Task (Q7)	7.6	7.8	7.8	8.0	8.3	8.6	8.2	8.0	7.3	7.5	.27 to .57
Distressed if nothing found (Q.8)	5.1	5.2	5.2	5.3	6.2	6.4	6.0	6.0	5.4	5.3	.43 to .64
How lucky are you (Q11)	7.8	7.9	7.3	7.8	7.6	8.0	7.8	7.6	7.4	7.7	.26 to .53
Expected Minutes for Session (Q5)	51	52	51	54	74	71	64	54	48	51	6.3 to 8.8

Table 7 shows an overall consistency of searcher behavior over the ten weekly search sessions they scheduled for themselves. The

standard error range shows that some sessions have their own scenario which is somewhat different from the rest. These are sensitive measures of affective operations that can pick up slight but improbable and significant changes in affectivity. There appears to be a stronger affectivity for sessions 5, 6, and 7. They expect these searches to take longer than the others (70 minutes. vs. 52; and for the rating: 6.6 vs.5.0). These sessions are felt to be more important (8.4 vs. 7.7) and lack of success would cause greater distress (6.2 vs. 5.4). There is a general face validity showing that the motivational dynamics in information behavior is integrated at both the general level of the affective environment (across sessions) as well as for local conditions (particular sessions).

It is assumed that the main reason for local variation of the affective environment in this study is the topic itself. Some topics appear more difficult to searchers and they expect more difficulty. Future research will need to explore such topical perceptions in information behavior. During each self-initiated weekly session, students made a choice of which of five topics to research that were specified for the searches. They had the option of doing three weekly searches for each topic in any order. The topics were specified as follows:

- How do people deal with sick pets or pets that get old and no longer function normally.
- What are the differences between men and women in how they handle relationships.
- What do people do while they are driving and what are the consequences. Examples include, but are not limited to: eating, talking on the phone, listening to music, partying, fighting, etc.
- How and when do people express rage in their normal daily settings. Examples include, but are not limited to: workplace, home, sports, games, crimes, portrayals on TV, novels, etc.
- What are the forms of spirituality in our society today? Examples include, but are not limited to: religions, lifestyles, disciplines, belief systems, etc., all relating themselves to spirituality or God.

4.4 LANs of Self-Efficacy

Table 8 explores the interaction dynamics between affectivity (intensity of affective rating) and the consequences on the level of cognitive processing. The theory assumes that these two interact through the intermediary of the affective norm involved. For instance, as a measure of self-efficacy motivation, searchers were asked to rate themselves on how they

feel about getting good at this type of search task (Question 10). The first entry in Table 8 is as follows:

4 LOW	I may get better at choosing what key words to put in the search box to help me out, but I think it really depends on the amount of information available.	SELF-DOUBT based on pessimism
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This searcher(above) gave an affectivity rating of 4, indicating self-doubt about self-efficacy. The associated cognitive account is categorized as "self-doubt based on pessimism." This type of justification is labeled as a low level of cognitive processing or effort. By contrast, another student's entry is as follows:

9 HIGH	I feel that I am becoming better and better at searching on Google each time I do it.	SELF-EFFICACY based on practice and success
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Here the affectivity rating is very high (9), indicating strong self-confidence in becoming competent. The LAN category assigned to the associated cognitive justification is "Self-efficacy based on practice and success." This is categorized as a high level cognitive processing or effort.

Exploring the other entries in Table 8 shows that the same affective-cognitive habit association is used by various searchers, but with different consequences on expectation of success – from doubtful (1) to certain (10). For example:

6	I have confidence in myself, but there will always be doubts.	SELF-DOUBT based on caution
6	I think if I keep doing it, I can be pretty good at this kind of task, hopefully.	SELF-EFFICACY based on practice and success

Both students gave an affectivity rating of 6 yet have associated with it opposite cognitive processing effort. One student's cognitive account is "self-doubt based on caution," while the other is "self-efficacy based on practice and success."

Table 8

Relationship between Affectivity, Learned Affective Norms, and Cognitive Level of Processing

10) How likely is it that you will become good at this type of task? 1 2 3 4 5 6 7 8 9 10			
pretty doubtful almost certain Please type in an explanation for your answer			
AFFECTIVE RATING	SAMPLE CONCURRENT ACCOUNTS GIVEN BY DIFFERENT SEARCHERS	LANs LEARNED AFFECTIVE NORMS	ASSOCIATED LEVEL OF COGNITIVE BEHAVIOR
4	I may get better at choosing what key words to put in the search box to help me out, but I think it really depends on the amount of information available.	SELF-DOUBT based on pessimism	LOW
5	At this point, I doubt my ability according my previous experiences. However, as long the continuing searching experience, I think I would improve my ability.	SELF-DOUBT based on lack of success	LOW
6	I know I need to improve in becoming better at this type of task.	SELF-EFFICACY based on practice and success	HIGH
6	I don't think I will get "better" it really depends on what's out there.	SELF-DOUBT based on pessimism	LOW
6	I have confidence in myself, but there will always be doubts.	SELF-DOUBT based on caution	LOW
6	Don't know how good I'll become at the task, but I know that as I progress through this project I am becoming more and more familiar with the Internet. I expect that the more specific my goals are for a particular search, the more difficult it is going to be.	SELF-DOUBT based on anticipation of difficulty	LOW
6	I am not sure if I will become 'good' at looking for these materials. I do intend to find what I am looking for. I will have to wait and evaluate my progress on this issue.	SELF-DOUBT based on caution	LOW
7	I don't do this kind of searching that often.	SELF-DOUBT based on inexperience	LOW
7	I've been searching a lot for this class. I should be getting the hang of the Internet by now.	SELF-EFFICACY based on past experience and self-confidence	HIGH
7	Now, I do not have skills for searching for something specific. If I have more experience and learn skills, I will be better.	SELF-EFFICACY based on practice and success	HIGH
7	I will become good at this task because I will complete it.	SELF-EFFICACY based on determination	HIGH
8	I think I'm good at finding information on the internet because I've been doing it for a while now.	SELF-EFFICACY based on practice and success	HIGH
8	I don't know how well I am at surfing online, but it is nothing new to me so I have high hopes that I will become good at it.	SELF-EFFICACY based on past experience and self-confidence	HIGH
9	The more time and exposure I give to this task, the more efficient and knowledgeable I will be.	SELF-EFFICACY based on practice and success	HIGH
9	I am almost certain because each time I search, I learn how to find things a little easier.	SELF-EFFICACY based on past experience and self-confidence	HIGH
9	I feel that I am becoming better and better at searching on Google each time I do it.	SELF-EFFICACY based on practice and success	HIGH
10	I haven't failed yet.	SELF-EFFICACY based on practice and success	HIGH
10	I have had to do a lot of research using the computer. I feel comfortable using the computer and know how to research for topics.	SELF-EFFICACY based on past experience and self-confidence	HIGH
10	I know if I practice long and hard enough eventually I will be a great web searcher.	SELF-EFFICACY based on practice and success	HIGH

Table 8 also shows that certain LANs are associated with lower level cognitive behavior than others. In other words, learned affective norms exert an effect on cognitive skill level. At the start of each weekly search session, searchers were asked "How likely is it that you will become good at this type of task?" Searchers answered using a scale of 1 ("pretty doubtful") to 10 ("almost certain"), and then typed an explanation for the rating. In Table 8 the answers are quoted in the column marked "Sample Concurrent Accounts." Each explanation or account of what the rating represented, is a representation or index of the affective and cognitive interaction dynamics that each searcher experiences and monitors in conscious awareness.

Each account indexes two elements in relation to the question or prompt: (1) the affective norm that motivates the rating

or self-assessment, and (2) the cognitive justification given in the explanation. Table 8 categorizes each cognitive justification into "low" level and "high" level. Low-level cognitions justify negative LANs such as pessimism and self-doubt, while high-level cognitions are associated with positive LANs such as self-efficacy and optimism.

The patterns in Table 8 indicate that self-efficacy and optimism LANs have stronger positive affectivity ratings and are associated with high level cognitive processing operations. In contrast, LANs of negative affectivity or self-doubt, have generally weaker ratings and are associated with low level cognitive processing operations.

4.5 Locus of Control LANs or Control Beliefs

Prior research has shown that an important affective norm in many circumstances is the feeling that we are in control of the situation. This has been discussed in the psychological literature under the topic of "locus of control" and under "control beliefs" (Rotter, 1990; Fishbein and Ajzen, 1975). Since this is a general affective norm we would expect that it is operating in information behavior as well. The expression "a searcher's control beliefs" echoes the synergistic operation of the affective and cognitive operations in information behavior. "Belief" refers to a cognitive operation involving knowledge facts in memory. But "control" refers to an affective operation involving goal motivation, which directs, selects, or controls a cognitive operation.

A searcher's control beliefs refer to the "locus" of control involving search results. When searchers are experienced with some search routine and environment, they tend to feel that they are in control of results. They attribute the outcome to their search capabilities or skills. The "locus of control" is located in their competence and performance. At other times searchers feel "control shy" and tend to attribute the outcome to other factors – luck, the search engine, the amount of information available, help from others, or a combination of reasons.

ior in a number of ways. Under affective conditions of being control shy, searchers show more negative affectivity like frustration, dissatisfaction, and low self-efficacy motivation, which lead to maladaptive information behaviors that reduce the likelihood of positive outcomes (Nahl, 1997). On the other hand, when searchers are in a state of positive affectivity like optimism and high self-efficacy, they tend to attribute success to their own search skills. They perform more efficiently and experience a stronger sense of satisfaction and victory (Nahl,2005).

Table 9 presents a sample of answers to the following question about luck. It was filled out at the start of each weekly search session (the overall mean was 7.7).The accounted ratings show that searchers use two main categories of affective norms regarding their attribution of reasons for search success – luck vs. skill. Searchers who do not believe in luck as a significant factor attribute their success to skill from practice, to specificity of the query, and to the large amount of information available. Searchers who believe in luck feel that it nevertheless varies with day, topic, and resources used. Some searchers attribute all of the search success to luck.

Table 9

Searchers' control beliefs influence their information behavior
LANs Related to Control Beliefs

11) How much luck do you have in searching in comparison to other types of tasks? 1 I have bad luck I always find something useful Please type in an explanation for your answer: 2 3 4 5 6 7 8 9 10		
RATING	SAMPLE CONCURRENT ACCOUNTS GIVEN BY DIFFERENT SEARCHERS	LANs LEARNED AFFECTIVE NORMS
2	I do not believe luck has to do with searching.	LUCK IS NOT INVOLVED other search factors are important
4	I normally get what I need eventually, even though it may take longer than other tasks to complete. I would say I am more persistent then lucky.	LUCK IS NOT INVOLVED other search factors are important
5	I am beginning to feel that I am not as lucky as before in searching for the things that I need	BAD LUCK feeling less lucky lately
5	I have luck in searching compared to other tasks.	GOOD LUCK in searching
5	Half and half because luck will come only if you give effort to it.	LUCK AND SKILLS mixed together
5	I do not really believe in luck. I suppose it is through sources or internet search engines that will guide in my results.	LUCK IS NOT INVOLVED other search factors are important
6	I feel the same as I have felt in the past that I do not believe it takes too much luck in finding information.	LUCK IS NOT INVOLVED other search factors are important
6	Sometimes I find really good information out of nowhere, so maybe I will get a little luck this time too.	GOOD LUCK in searching
6	It totally depends on the day. Luck in searching is much more unstable than luck in other types of tasks.	LUCK VARIES depends on the day
7	I have always had good luck and have gotten what I have needed.	GOOD LUCK in searching
7	With the proper key words, something good always comes up.	LUCK IS NOT INVOLVED other search factors are important
7	If I just stick to my task, I usually find something. I feel lucky today since I am looking up workplace rage.	LUCK AND SKILLS mixed together
8	I try to use reliable search engines, and usually bookmark useful links.	LUCK IS NOT INVOLVED other search factors are important
8	When it comes to searching on the internet, I normally have good fortune, that is luck is on my side, because I can always get something that is close to what I need.	GOOD LUCK in searching
8	I would like to think that it is skill and not luck, but I usually find what I need without any problems.	LUCK IS NOT INVOLVED other search factors are important
9	I think that I usually have pretty good luck when I search for something. There is so much information available on the internet that I almost always find something of use or at the very least of interest to me.	GOOD LUCK in searching
9	My luck has been good to me lately so I believe I will be lucky.	GOOD LUCK in searching
10	I have been lucky so far and I believe that I will be lucky again.	GOOD LUCK in searching
10	There's so much information available out there. It would be very unusual not to find anything.	LUCK IS NOT INVOLVED other search factors are important
10	I got to narrow my search down from the last session so hopefully I would have much luck finding something useful	LUCK AND SKILLS mixed together

When the affective ratings are related to the cognitive explanations it appears that the ambiguous wording of this question was interpreted in various ways by the respondents. There appears to be no logical relationship between the intensity of the affective rating and the content of the explanation, unlike the other questions considered above where the relationship is visible. Further research needs to be done to unravel what's going on.

4.6 Coping Skills: The LAN of Postponing Quitting

Every cognitive sequence of decision-making in any information behavior faces sudden death if the affective norm for Postponing Quitting is lifted. The point of quitting for any cognitive operation is now, unless the cognitive sequence is kept connected to the goal hierarchy that exerts control over it. People learn affective norms in task situations and use them to manage their goal-directed behavior. One of the cultural LANs known in our society is the affective norm against quitting something too soon. Searchers are constantly faced with the dilemma of when to quit some information behavior sequence that is unfamiliar or uncertain. Quitting an ongoing information behavior sequence allows the searcher time out for cognitive reappraisal of what's going on, and this may be beneficial. On the other hand, quitting at a higher level in the goal hierarchy may or may not be beneficial depending on the motive for quitting and its level in the overall hierarchy of LANs that are in control of that behavior sequence.

Table 10 explores the coping strategies used by searchers for different affectivity levels, which indicate the strength of the overall goal motivation for the search session. The Table indicates that there are both supportive LANs and conflictual LANs operating in information behavior. Supportive LANs are various affective norms that the searcher subordinates to the main goal for the session, thus increasing the likelihood of success and satisfaction. Conflictual LANs are various affective norms that the searcher super-ordinates to the session's goal. These other super-ordinate goals interfere with the goal of the search task.

Table 10 indicates that searchers are constantly faced with multiple affective norms operating simultaneously in the search situation. Quitting vs. Postponing Quitting depends on the searcher's skill in subordinating all other affective norms during the search session. Quitting behavior is associated with different cognitive operations than those involved in not quitting behavior. Not quitting is associated with coping styles that are success and mastery oriented. Quitting is associated with both coping and not coping. For instance, quitting due to fatigue or limited time and rescheduling, is a coping strategy that may yet lead to mastery and success, but quitting due to uninvolved or limited goal, is a "not coping" mode that inhibits mastery and success.

The same person at different times or search conditions may use all the available affective norms described in this table, indicating that LANs related to information behavior are culturally acquired, shared, and maintained. Nevertheless, there may be preferred LANs which an individual maintains consistently across situations and time.

Table 10
LANs of Quitting vs. Not Quitting

12) How motivated are you to keep on trying today until you succeed? 1 2 3 4 5 6 7 8 9 10 slightly motivated very highly motivated Please type in an explanation for your answer:		
RATING	SAMPLE CONCURRENT ACCOUNTS GIVEN BY DIFFERENT SEARCHERS	LANs LEARNED AFFECTIVE NORMS
1	I frequently experience rage when working with my computer. Extreme frustration overcomes me. Knowing, however, that my search was left incomplete also adds to my stress level.	NOT COPING quitting due to excessive frustration
1	I am not totally motivated to find information right now. I have other classes to worry about at the moment.	NOT COPING quitting due to conflictual emotions
1	Very little motivation, I'm just hoping to find something to keep me going for just a little while, then maybe I can fall asleep.	COPING by postponing quitting
2	I am not in a situation that requires much expenditure of motivation because what I am doing is extra collection, in addition to what I already have.	COPING by limiting goal
3	It is late at night. I just ended a 3 hours night class and I am tired. I want to perform this search and do a good job. I am not that motivated to stick it out, if I don't get results within half an hour.	COPING by postponing quitting
3	Not as motivated today because I have other things to worry about at this moment.	NOT COPING quitting due to conflictual emotions
3	I'm not that motivated to keep trying because I'm just not feeling up to it. I guess I have a lot of information, so if I find anything, it will be very minimal.	COPING by limiting goal
4	I am not totally motivated to find information today. I have a short amount of time at the moment, but I know that I have more time later, so I'll just see what comes up.	COPING by limiting goal
5	Gotta get the report finished.	COPING by postponing quitting
5	I'm tired now, but it is homework; I have to do my best.	COPING by supportive LANs
6	I am motivated, but my eyes are very heavy.	COPING by postponing quitting
6	Though I am getting a bit tired of using the Internet, I am quite motivated to finish these searches so I can participate in the forum discussions in a timely manner.	COPING by supportive LANs
7	The subject topic at hand is somewhat interesting to me and I would like to learn more about it.	COPING by supportive LANs

Table 10 shows that coping has three main sub-components: (a) postponing quitting; (b) limiting the search goal; and (c) activating supportive LANs (e.g., doing well on the assignment). Not coping two main sub-components: (a) quitting due to excessive frustration during searching; (b) quitting due to conflictual emotions or competing goals.

Coping strategies are related to motivational intensity. Weaker affectivity ratings have more limited coping strategies such as postponing quitting for a few minutes or limiting the search goal. Stronger affectivity ratings are associated with coping strategies that activate supportive LANs such as doing well on assignments or personal interest in the topic.

4.7 LANs of User Trust and Acceptance

Users develop positive affective norms as they cumulate experience and success. Negative LANs are acquired with failure caused by hardware or software problems. Every LAN has its cognitive justification. Positive LANs are associated with scenarios of what would happen without computers and search engines. Negative LANs are associated with scenarios of computers and search engines going wrong. Mixed LANs are associated with scenarios of computers and search engines functioning properly or not.

Table 11
LANs of System Acceptance and Loyalty

13) computers and search engines make it easy for people to find what they're looking for.
1 2 3 4 5 6 7 8 9 10
I strongly disagree I very much agree
please type in an explanation for your answer:

AFFECTIVE RATING	SAMPLE CONCURRENT ACCOUNTS GIVEN BY DIFFERENT SEARCHERS	LANs LEARNED AFFECTIVE NORMS	COGNITIVE BEHAVIOR-- ATTRIBUTION
4	Computers have the potential of creating enormous headaches for its users. I have had the worse luck, specifically, with my computer screen freezing. This causes me a great deal of stress, for I have no other choice than to start my search over again.	negative LAN experiencing failure	problems with software
5	Yes, I feel search engines make it quite simple to find what they are looking for but, it also brings up a lot of other sites that are not useful to what you are looking for and makes the task even harder to sift through the rumble of sites.	mixed LAN conditional acceptance	depends on relevance of information
5	My computer has not been letting me get on the internet lately which makes my computer useless it also makes my search engines useless if I am not able to use them when I cannot get on the internet!	negative LAN experiencing failure	problems with online access
5	I suppose they help but if the search engine is junk how are you to know because that's the only place you can find your information.	mixed LAN conditional acceptance	depends on relevance of information
6	When I search for a specific topic, I eventually need to read the whole article or paper. If search engines show main idea or thesis, the task would be easier.	mixed LAN conditional acceptance	depends on quantity of relevant information
6	Dogpile should be a lot easier to me because now I have the experience in using it.	positive LAN experiencing success	selective and cumulative familiarity
6	While search engines are quite convenient, I believe they are in need of more advancement. It is extremely frustrating when results do not appear for particular searches. I have, in the past, found myself searching for something that I knew existed, but for whatever reason, my search results would never contain specifically what I wanted. Perhaps it is not the search engine, but my search techniques that are in need of improvement.	mixed LAN conditional acceptance	combination of search engine problems and inadequate search skills
7	I think that computers and search engine are very helpful as opposed to not having them at all. BTW, computers make the internet.	positive LAN experiencing success	usefulness and convenience
8	I agree that computers make it easier to look up research than the old way of looking up a book and then skimming it until you found something. This is a lot more useful it searches for you in minutes.	positive LAN experiencing success	usefulness and convenience
8	If the person knows how to correctly search for something effectively then it's easy	mixed LAN conditional acceptance	depends on having adequate search skills
8	There are good search engines yet search techniques play a role as well	positive LAN experiencing success	depends on having adequate search skills
8	I agree because it is much easier for me to search from my home than have to go to the library.	positive LAN experiencing success	usefulness and convenience
9	I suppose that search engines make it easier for people too search the web because it provides a place to go where information on any topic can be found.	positive LAN experiencing success	usefulness and convenience
10	Search engines help a lot because you type in a few words and there in front of you is all the info. in the world. It's like your own personal library.	positive LAN experiencing success	usefulness and convenience

Table 11 shows that there is a strong relationship between affectivity and LANs. Positive LANs of search engine acceptance occur mainly with affectivity ratings of 7 or above, as found earlier in previous tables. Low acceptance ratings and negative or mixed LANs are associated with prior unsuccessful experiences:

- quantity of information to sift through
- problems with online access
- unfamiliarity with software
- software problems with inadequate skills

Table 12 shows a sample of cognitive justifications for choosing a search engine. Google was the choice of most students in this group (N=42).

Table 12
Justifying Search Engine Loyalty

15a) Please list the databases and search engines you are using today and why.		
SEARCH ENGINE	SAMPLE REASONS GIVEN BY DIFFERENT SEARCHERS	COGNITIVE ATTRIBUTION
google.com	I have used this engine since it had given me good results in the past.	prior success
google.com	My friend mentioned that this was the search engine that she most often used. I had heard of it, but never used it personally.	friend recommended it
google.com	I always use it first.	loyalty and regular use
google.com	I like google, and a lot of other people recommend it.	loyalty and popularity
google.com	The best!	loyalty
yahoo.com	I chose yahoo because I wanted to rotate the search engines that I use.	strategy with multiple search engines
yahoo.com	It is very popular website, it must have many information in there.	popularity and reputation
msn.com	I trust it.	loyalty and trust
academic search premier/ seattletimes.com/	I tried to find something form scholarly databases./ Since I failed to find what I looked for on EBSCO database, then I tried to find something from online newspapers.	strategy with multiple search engines

Table 12 shows that the main reasons given for choosing a search engine include

- loyalty
- popularity
- trust
- regular use
- prior success with that search engine
- recommendation
- strategy with multiple search engines

4.8LANs of Expected Effort

Previous research under similar conditions (Nahl, 2004) showed that the motivational LAN of expected effort is associated with conditions of lower self-efficacy and mood. Students who expect a search task to take a lot of effort actually spend more time completing the search task.

Table 13
LANs of Expected Effort and their Cognitive Attribution

15) How much effort do you expect this task to take today? 1 2 3 4 5 6 7 8 9 10 not much a tremendous amount Please type in an explanation for your answer:			
AFFECTIVE RATING	SAMPLE CONCURRENT ACCOUNTS GIVEN BY DIFFERENT SEARCHERS	LANs LEARNED AFFECTIVE NORMS	COGNITIVE ATTRIBUTION
1	I know where it is already.	EXPECT MINIMAL EFFORT	knowing the location
2	I don't think there's that much effort as long as you put in the specific topic you are looking for. There is so much information.	EXPECT MINIMAL EFFORT	predicting quantity and availability of information
3	Not that much effort since I've done this topic before so I know what I am looking for.	EXPECT MINIMAL EFFORT	prior searching with same topic
4	I'll have to actually read articles to see if it's what I'm looking for so that will take some effort.	EXPECT SOME EFFORT	searching and reading combined
5	I don't expect to use a lot of effort because I did this search before and found a lot of hits.	EXPECT SOME EFFORT	prior success with this topic
6	I think it will take a little more effort than usual because I'm not very motivated to do homework today.	EXPECT MORE EFFORT	takes effort to compensate for low motivation to do task
7	I am a little tired.	EXPECT MORE EFFORT	takes effort to compensate for tiredness
8	Because it's my first one.	EXPECT MORE EFFORT	unfamiliarity with system or topic
9	I really want to read through the material and make sure it is relevant and useful to anyone who reads the posting.	EXPECT MORE EFFORT	searching and reading combined

The pattern of results in Table 13 indicate that expecting more effort relates to

- compensating for being tired or having low motivation to do a task
- unfamiliarity with the system or the topic
- having to do searching and reading combined

Expecting less effort relates to

- knowing the location of the information
- having prior success with this topic
- predicting that a lot of information is available on a topic having done prior searching with the same topic

6	The computer lab is closing soon so I feel rushed.	QUITE A BIT	rushing due to closing hour
7	I was a little anxious because it was in the back of my mind that I needed something to use in my research.	QUITE A BIT	pressure to come up with something
8	Because it took forever to find something relevant.	QUITE A BIT	took too long time for success
9	I am extremely anxious at this point because I want to finish writing up my report but, I am sleepy and just want to go to bed, but I know when I wake up I would not have finish my task and all day at school I am going to be stressed out because it is going to be at the back of mind that I did not complete my task.	EXTREMELY	pressure to finish even though sleepy
10	The due date is extremely near.	EXTREMELY	pressure to meet deadline

Table 15 shows the cognitive justifications that searchers have for the affective norm of feeling anxious and how strongly. The table may be summarized for greater clarity as follows:

Feeling anxious--None: affectivity 1-2

- no time pressure
- search success not required

Feeling anxious --Somewhat: affectivity 3-4

- uncertainty of success
- first user of this engine

Feeling anxious --Quite a bit: affectivity 5-7

- rushing due to closing hour
- pressure to come up with something

Feeling anxious --Extreme: affectivity 8-10

- took too long time for success
- pressure to finish even though sleepy t
- pressure to meet deadline

There appear to be two main categories of justifying the LAN of anxiety in information searching: uncertainty and time pressure. Both of these affective factors were related in prior research to coping skills, satisfaction, and self-efficacy (Nahl, 2007b, 2005b).

Conclusion

This research has shown that searchers operate with leaned affective norms and their cognitive justifications. These are acquired as a result of socialization training and online literacy. Several types of LANs emerged in the content analysis of written comments that searchers made when instructed to keep track of their expectations and beliefs about the search process and likely success. The type of comments given was prompted by a questionnaire referring to their activity before,

during, and after the search session. The important searcher variables were found to involve affective norms of expectation regarding how long the search should take and the uncertainty of search outcome. Affectivity ratings were related to irritation, anxiety, uncertainty, felt time pressure, and self-doubt based on past experience and knowledge of potentially available information.

It is clear that search behavior involves the interaction between affective factors such as norms and expectations, with cognitive factors that justify and give meaning to the searcher's efforts as difficulties are encountered. Further research needs to explore the effect on this interaction due to variation in search topics. In this case the search tasks were specified in the instructions. It is likely that the dynamics between affective norms and self-beliefs may be different whenever searcher according to interest selects search topics.

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Research Paper

Physical education

The Use of Psychological Skills by Male Collegiate Swimmers

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ABSTRACT

The main purpose of the present study was to investigate the use of psychological skills by male collegiate swimmers. A secondary purpose was to investigate use differences between athletes specializing in different swim events. Male collegiate swimmers (N = 27) from different faculty of Banaras Hindu University were surveyed with a researcher-generated questionnaire, the Athlete's Mental Survey. The means indicated that goal setting, positive self talk, and music for psych-up were the skills found to be utilized "almost always" by the subjects. Also, more than 50% of the sample reported "never" using autohypnosis, autogenic training, blank meditation, bracing, color, cue words, mantra meditation, and Transcendental Meditation Copyright. The sample was split into two groups including sprinters (n = 15) and long distance swimmers (n = 12). MANOVA showed no significant differences between the skills used by the swimmers and the distance swam by the athletes. Results are discussed in relation to the need for coaches to educate and encourage athletes' use of psychological skills for performance enhancement.

KEYWORDS

Introduction:

The effects of psychological skills on the enhancement of athletic performance has been studied extensively, especially in the areas of goal setting, relaxation, and imagery/visualization (Cox & Yoo, 1995). Defrancesco and Burke (1997) have indicated that the effective use of psychological skills may depend on specific individual and task factors, such as the skill level of the athlete and the sport skill performed. However, one area that has not been thoroughly investigated is the extent to which athletes utilize psychological skills.

One notable exception was a study by Ungerleider and Golding (1991) designed to investigate track and field Olympic Tri-athletes' use of imagery. Overall, track event athletes were found to use imagery 81.5% and field event athletes reported use 92.7%. Race walkers used imagery 76.2%, compared to 78.3% for the sprinters (races up to 400 meters), 79.8% for the marathoner; 86.1% for the middle distance (over 400

meters) runners; and, 97.2% for the throwers.

Although the use of imagery has received considerable research attention, athletes' use of other mental skills has not been thoroughly examined. Kirkby (1991) attempted to fill the void by investigating the use of a variety of psychological skills by 22 male members of an Australian football league. Results indicated that 100% of the subjects reported using some form of cognitive rehearsal and self talk prior to competition and 78% reported using relaxation at least some of the time. More recently Defrancesco and Burke (1997) tested 115 professional tennis players participating in the 1992 Lipton Tennis Tournament. Results showed that the most commonly utilized psychological skills were imagery, a pre-service routine, relaxation, goal setting and self- talk. Defrancesco and Burke's study is the first to investigate a broad range of psychological skills within a specific sport.

Effects of psychological skills training on performance has received considerable attention, as has athletes' use of imagery, research on the use of other skills is marginal or completely nonexistent. A few researchers have investigated the use of other skills such as self talk and relaxation (Defrancesco &

Burke, 1997; Kirkby, 1991; Ungerleider et al., 1989). If the effective use of psychological skills depends on task and individual factors, as proposed by Defrancesco and Burke (1997), the skills that athletes actually use within sports needs to be examined. Therefore, the purpose of this study was to extend the work of Defrancesco and Burke by investigating the overall use of various psychological skills by collegiate females within the sport of swimming. A secondary purpose was to test for use differences between swim events.

Methods

Subjects

Male swimmers (N = 27) from different faculty of Banaras Hindu University were volunteered to participate in the study. Subjects ranged in age from 18 to 22 years (M = 19.5, SD 1.17).

Participants were assigned to a group based on the distances they typically swam in competition. Therefore, subjects were classified as either sprinters (n = 15) or long distance swimmers (n = 12). Sprinters swam 50, 100, or 200 yard races. Long distance swimmers competed in 400, 500, 1000, or 1650 yard races.

Questionnaire

The Athlete's Mental Survey utilized in the present study was developed by the experimenters expressly for this investigation. Demographic information related to age, school, and specific distances swam in competition was requested from each subject on the first section of the survey. The main body of the questionnaire was comprised of twenty different psychological skills that could be utilized by athletes. Options for the extent of use included "never", "almost never", "almost always", and "always". Interval level data was obtained by assigning a score of 0 for an answer of "never", 1 for "almost never", 2 for "almost always", and 3 for "always". The possible range of scores was 0 - 60 points for each subject.

The psychological skills included on the survey were collected from relevant sport psychology literature. Revisions of the survey were based on the suggestions of a panel of experts who were asked to review the instrument. The four experts from

the areas of sport psychology and swimming (head coach), confirmed the face validity of the instrument

and its appropriateness for testing the college level athlete.

Procedure

In order to obtain a large sample of highly skilled male swimmers, three testing sites were used for data collection. The three sites were all locations of intercollegiate swim meets held in December of 2013 and January of 2014.

Prior to the conference championship swim meet held in December 2013, a letter explaining the purpose of the research was mailed to the head coaches of the

four participating teams.

After volunteers provided their informed consent, instructions for responding to the survey were presented verbally from a written script. Following the completion of the survey, subjects were thanked for their participation.

It was not initially known which BHU faculty swim teams would be attending the meets at second or third testing site; therefore, it was not possible to notify coaches prior to the competition date. At both sites, the researcher approached the coach of each team individually to request permission to talk with the athletes about participating in the study. If permission was granted to approach the athletes, arrangements were made.

Swimmers from two BHU teams were asked to participate in the study at the second testing site held December 2013 through January, 2014 in BHU. Procedures used for data collection were identical to those utilized at the first and second testing sites. Data were collected on the deck of the university pool facilities.

Athletes from four other BHU teams were asked to participate in the study at a third testing site held January 17th through 18th, 2014 in Uttar Pradesh. Data were collected on the deck of the university pool facilities.

Results

Descriptive Data

The primary purpose of the present study was to examine the psychological skills that collegiate male swimmers utilize to prepare for competition. Table 1 presents the means and standard deviations for subjects' use of each technique. Overall, athletes reported high use of goal setting, positive selftalk, and music for psych-up ($M = 2.04 - 2.59$, $SD = .60 - .72$). The proportion of subjects that reported "always" using the top three skills was 66.7%, 40.1%, and 27.9% respectively. Focusing internally, imagery/visualization, and music for relaxation also had relatively high use overall ($M = 1.85 - 1.92$, $SD = .82 - .90$).

Furthermore, analysis revealed that the majority of subjects reported "never" using autohypnosis, autogenic training, blank meditation, bracing, color, cue words, mantra meditation, and Transcendental Meditation Copyright for performance enhancement. The proportion of subjects reporting nonuse of the eight techniques ranged from

63.9% to 82.3%.

Multivariate Analysis

A secondary purpose of the present investigation was to examine differences in the use of psychological skills between subjects in the two swim groups. Based on the length of the event in which the athletes compete, 71.5% of all subjects identified themselves as sprinters (50 -200 yds.), and 28.5% of subjects identified themselves as long distance (400 - 1650 yds.) swimmers.

A one-way multivariate analysis of variance (MANOVA) was conducted to test for group (sprint vs. long distance) differences in athletes' use of each of the 20 psychological skills.

The main effect for group was found to be nonsignificant, Wilks's lambda $M(1, 20) =$

.84, $p > .05$. Subsequent univariate F-tests for autohypnosis, autogenic training, breath control relaxation, blank meditation, bracing, centering, color for mood altering, cue words, focusing externally, focusing internally, goal setting, imagery/visualization, mantra meditation, music for psych-up, music for relaxation, positive selftalk, progressive muscle relaxation, performance recall, Transcendental Meditation(D, and thought stoppage were nonsignificant with $M(1, 145)$

.085 - 1.00, $p > .05$. Although nonsignificant, imagery/visualization and positive selftalk came close to significance with $M(1, 145) = 3.81$, $p = .053$ and $M(1, 145) = 3.63$, $p = .058$ respectively.

Discussion

The primary purpose of the present investigation was to examine the psychological skills athletes utilize to prepare for competition. The second purpose was to investigate possible within sport differences (sprint and long distance swimmers). From a descriptive level, findings revealed that the

athletes sampled used goal setting, positive selftalk, and music for psych-up "almost always" to prepare for competition. Focusing internally, imagery/visualization, and music for relaxation also had relatively high use. Majority of subjects reported "never" using autohypnosis, autogenic training, blank meditation, bracing, color, cue words, mantra meditation, and Transcendental Meditation Copyright for performance enhancement. The within sport analysis yielded no significant differences between sprinters and long distance swimmers in the use of the psychological skills.

Defrancesco and Burke found that goal setting, self-talk and imagery were among the most commonly utilized psychological skills by a large sample of professional tennis players. Ungerleider and Golding discovered a high use of imagery for elite track and field athletes with percentage of use varying between athletes of different events. Also, Kirkby (1991) found that football league athletes utilized selftalk and some form of cognitive rehearsal however small sample size of Kirkby's study limits its application, results from the present study and the work of Defrancesco and Burke (1997) and Ungerleider and Golding (1991) suggest there are certain psychological skills that athletes utilize more than others. In the present investigation use of music for psych-up and/or relaxation was high among athletes. Music is unique as it allows athletes to individualize their psychological preparation. According to Defrancesco and Burke (1997), personal attributes are important factors for psychological skills. Music permits athlete to choose the selections that are best suited to their personality and the desired purpose.

There were eight psychological skills that majority of sample reported "never" using. It is also possible that some of athletes who responded "never" for use are aware of existence of a certain skill but uninformed concerning its positive effect on performance. It is critically important that athletes use all available psychological skills in order to gain control over their competitive environment.

No significant differences in skill use were observed between sprinters and long distance swimmers. However, imagery/visualization and positive selftalk came close to significance. With both skills, sprinters were slightly higher than for the long distance swimmers. Due to nonsignificant findings, however, possibility that slight differences between means were due to chance cannot be discounted. As present study is first to investigate differences in the of psychological skills between events or tasks within sport, further testing is warranted. It may be that task demands within swimming do not differ as much as they might in a sport where athletes performs different skills (e.g., track and field).

While findings of the present study do shed light on the use of a broad range of specific psychological techniques, further study is recommended in order to clarify remaining questions. Issues yet unaddressed concern relationship between type of task athletes perform and the specific psychological skills employed, as well as factors that determine use. Additional information would allow coaches (a) to identify psychological skills commonly utilized by athletes in a given sport and those which would need to be taught, and (b) to help athletes tailor the use of psychological skills to the specific competitive situation and the competitive tasks performed by the athlete for the desired outcome.

Table 1 Psychological Skill Use by Group
Legend for Chart:

- A - Skill
- B - Group Sprinters (n = 15) M
- C - Group Sprinters (n = 15) SD
- D - Long Distance (n = 12) M
- E - Long Distance (n = 12) SD
- F - Overall (N = 27) M
- G - Overall (N = 27) SD

A	B	C	D	E	F	G
Autohypnosis	0.23 (.49)	0.17 (.49)	0.20 (.47)	0.38 (.69)	0.36 (.73)	0.20 (.47)
Autogenic training	0.41 (.70)	0.36 (.73)	0.38 (.69)	0.52 (.81)	0.50 (.81)	0.41 (.70)
Breath relaxation	1.44 (.92)	1.33 (.93)	1.40 (.91)	0.40 (.70)	0.40 (.70)	0.38 (.74)
Blank meditation	0.52 (.81)	0.55 (.92)	0.50 (.81)	1.10 (1.03)	1.05 (1.01)	1.06 (1.03)
Bracing	0.40 (.70)	0.40 (.70)	0.38 (.74)	0.33 (.65)	0.29 (.55)	0.32 (.61)
Centering	1.10 (1.03)	1.05 (1.01)	1.06 (1.03)	0.67 (.93)	0.67 (.90)	0.63 (.89)
Color for mood altering	0.33 (.65)	0.29 (.55)	0.32 (.61)	1.51 (1.07)	1.52 (1.13)	1.49 (1.07)
Cue words	0.67 (.93)	0.67 (.90)	0.63 (.89)	2.05 (.86)	1.76 (1.01)	1.92 (.90)
Focusing externally	1.51 (1.07)	1.52 (1.13)	1.49 (1.07)	2.64 (0.57)	2.57 (0.67)	2.59 (0.60)
Focusing internally	2.05 (.86)	1.76 (1.01)	1.92 (.90)	1.97 (0.78)	1.69 (0.81)	1.86 (0.82)
Goal setting	2.64 (0.57)	2.57 (0.67)	2.59 (0.60)	0.38 (.71)	0.48 (.94)	0.39 (.76)
Imagery/visualization	1.97 (0.78)	1.69 (0.81)	1.86 (0.82)	2.01 (.71)	2.21 (0.75)	2.04 (.72)
Mantra meditation	0.38 (.71)	0.48 (.94)	0.39 (.76)	1.78 (0.91)	2.05 (0.79)	1.85 (0.87)
Music for psychup	2.01 (.71)	2.21 (0.75)	2.04 (.72)	1.14 (0.85)	1.19 (0.97)	1.13 (.87)
Music for relaxation	1.78 (0.91)	2.05 (0.79)	1.85 (0.87)	1.7 (0.96)	1.43 (0.86)	1.60 (0.93)
Progressive muscle relaxation	1.14 (0.85)	1.19 (0.97)	1.13 (.87)	2.34 (0.62)	2.10 (0.91)	2.23 (0.75)
Performance recall	1.7 (0.96)	1.43 (0.86)	1.60 (0.93)	0.34 (.59)	0.43 (.77)	0.36 (.62)
Positive self talk	2.34 (0.62)	2.10 (0.91)	2.23 (0.75)	0.34 (.59)	0.43 (.77)	0.36 (.62)
Transcendental Meditation copyright	0.34 (.59)	0.43 (.77)	0.36 (.62)	1.11 (0.97)	1.14 (1.00)	1.10 (0.97)
Thought stoppage	1.11 (0.97)	1.14 (1.00)	1.10 (0.97)			

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Effectiveness of special education for students with disabilities

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ABSTRACT

Today, the struggle for ensuring the right to education for disabled children is an undeniable reality. Assuring the social integration of this largely excluded group can only begin when educational inclusion is practiced and ensured. By doing so, we can move closer to the goal of Education for All. Approximately 80 percent of the world's disabled population lives in developing countries. The special education system has given children with disabilities much greater access to public education, established an infrastructure for educating them, helped with the earlier identification of disabilities, and promoted greater inclusion of these children alongside their nondisabled peers. Inclusion is seen as a process of addressing and responding to the diversity of needs of all learners through increasing participation in learning, cultures and communities, and reducing exclusion within and from education.

KEYWORDS

Disabilities, Inclusion, Special education

All children and young people of the world, with their individual strengths and weaknesses,

With their hopes and expectations, have the right to education. Therefore, it is the school system of Our country that must be adjusted to meet the needs of all children.

Over half a billion persons are disabled as a result of mental, physical or sensory impairment. These persons are often limited by both physical and social barriers, which exclude them from society and prevent them from actively participating in the development of their nations.

Education must be viewed as a facilitator in everyone's human development and functionality, regardless of barriers of any kind, physical or otherwise. Therefore, disability of any kind (physical, social and/or emotional) cannot be a disqualifier. Inclusion, thus, involves adopting a broad vision of Education for All by addressing the spectrum of needs of all learners.

Special Educational Needs

According to 1981 Education act special educational needs defined as follows:

A child has 'special educational needs' if he/she has a learning difficulty, which calls for special educational provision to be made for him/her. A child had learning difficulty if he/she:

(a) has significantly greater difficulty in learning than the majority of children of the same

age;

(b) has a disability which either prevents or hinders the child from making use of educational

facilities of a kind generally provided for children of the same age in schools within the

area of the local authority.

Recognizing the need to safeguard the educational rights of all students, recent federal legislation has addressed these concerns. The Individuals with Disabilities Education Act (IDEA)

(USDOE, 1997) specified that students with disabilities must have access to the general education curriculum and participate in assessments. No Child Left Behind (NCLB) (USDOE, 2002), a sweeping reform of the Elementary and Secondary Education Act (ESEA) creates additional provisions to ensure that no children—especially those with the greatest learning needs—are neglected in standards-driven learning environments. NCLB redefines the federal role in K-12 education with the goal of closing the achievement gap between disadvantaged and minority students and their peers. States must establish standards and test every student's progress using tests designed for the standards. Progress must be measured for all. (USDOE, 2002).

The special education system has given children with disabilities much greater access to public education, established an infrastructure for educating them, helped with the earlier identification of disabilities, and promoted greater inclusion of these children alongside their nondisabled peers. Despite these advances, many problems remain, including the over- and under identification of certain subgroups of students, delays in identifying and serving students, and bureaucratic, regulatory, and financial barriers that complicate the program for everyone involved

Barriers in schools:

There are walls between schools and children before they get enrolled, they face walls with curriculum inside the classrooms and finally 'they face more walls when they have to take examinations which determine how successful they will be in life' (Jha, 2002). The most school systems are confronting two types of barriers, external and internal. Children face external barriers before coming to and getting enrolled in schools. The nature of such barriers could be physical location of schools, social stigmatization or economic conditions of children. Sometimes non-availability of school or its location in area that cannot be accessed becomes the major barrier for children to get education. Children face barriers within schools and classrooms owing to organization of curriculum and teaching methodologies. At times, they are assessed and 'identified' and thereafter isolated within schools, or even classrooms, to receive discriminatory curriculum.

Origin of inclusive education:

Inclusion as we know it today has its origins in Special Edu-

cation. The development of the field of special education has involved a series of stages during which education systems have explored different ways of responding to disabled children, and to students who experience difficulties in learning. In some cases, Special education has been provided as a supplement to general education provision, in other cases it has been entirely separate. In recent years, the appropriateness of separate systems of education has been challenged, both from a human rights perspective and from the point of view of effectiveness.

The 'Salamanca Statement' adopted at the 'World Conference on Special Educational Needs: Access and Quality' called upon all governments and urged them to: Adopt as a matter of law or policy the principles of inclusive education, enrolling all children in regular schools, unless there are compelling reasons for doing otherwise (UNESCO, 1994, Statement).

There are two distinct perspectives on inclusive education. First, emerging largely from the developed countries, and the second, owing to the felt need and circumstances prevailing in the developing world. In richer developed countries, education is largely inclusive of girls, the disadvantaged and the ethnic groups. Children with disabilities physical and mental and learning difficulties, earlier getting education in separate special schools, are now being recommended to regular schools with inclusive orientation.

The approach has to be different in respect of the developing countries where large proportion of children is still out of school. Those who get enrolled are unable to complete minimum prescribed number of school years. The 1994 UNESCO World Conference also realized this situation when it argued that a school should,

...accommodate *all children* regardless of their physical, intellectual,

social, linguistic or other conditions. This should include disabled and

gifted children, street and working children, children from remote or

nomadic populations, children from linguistic, ethnic, or cultural

minorities and children from other disadvantaged or marginalized area and

groups. (UNESCO, 1994, Framework for Action on Special Needs Education, p.6)

These inclusive schools,

... must recognize and respond to the diverse needs of their students,

accommodating both different styles of learning and ensuring quality

education to all through appropriate curricula, organizational

arrangements, teaching strategies, resource use and partnerships with their

communities. (UNESCO, 1994, Framework for Action on Special Needs

Education)

Defining Inclusion

UNESCO views inclusion as 'a dynamic approach of responding positively to pupil diversity and of seeing individual differences not as problems, but as opportunities for enriching

learning.' Inclusion is seen as a process of addressing and responding to the diversity of needs of all learners through increasing participation in learning, cultures and communities, and reducing exclusion within and from education. It involves changes and modifications in content, approaches, structures and strategies, with a common vision which covers all children of the appropriate age range and a conviction that it is the responsibility of the regular system to educate all children.

There are four key elements have tended to feature strongly in the conceptualisation of inclusion.

- Inclusion is a process. That is to say, inclusion has to be seen as a never-ending search to find better ways of responding to diversity. It is about learning how to live with difference and learning how to learn from difference. In this way differences come to be seen more positively as a stimulus for fostering learning, amongst children and adults.
- Inclusion is concerned with the identification and removal of barriers. Consequently, it involves collecting, collating and evaluating information from a wide variety of sources in order to plan for improvements in policy and practice. It is about using evidence of various kinds to stimulate creativity and problem-solving.
- Inclusion is about the presence, participation and achievement of all students. Here 'presence' is concerned with where children are educated, and how reliably and punctually they attend; 'participation' relates to the quality of their experiences whilst they are there and, therefore, must incorporate the views of the learners themselves; and 'achievement' is about the outcomes of learning across the curriculum, not merely test or examination results.
- Inclusion involves a particular emphasis on those groups of learners who may be at risk of marginalisation, exclusion or underachievement. This indicates the moral responsibility to ensure that those groups that are statistically most 'at risk' are carefully monitored, and that, where necessary, steps are taken to ensure their presence, participation and achievement in the education system.
- It is important to highlight that a holistic view of the education system, encompassing both the private and public system, must be taken when considering adopting an inclusive approach.

Initiative of Government of India to promote Inclusive school Education of disabled children

1. Sarva Shiksha Abhiyan (SSA)

The key objective of SSA is Universalization of Elementary Education (UEE), three important aspects of which are access, enrolment and retention of all children in 6-14 years of age. SSA ensures that every child with special needs, irrespective of the kind, category and degree of disability, is provided meaningful and quality education. Hence, SSA has adopted a zero rejection policy. The goal of UEE, has further been strengthened by the enactment of the Right of Children to Free and Compulsory Education Act, 2009 making free and compulsory elementary education a Fundamental Right for all the children in the age group of 6-14 years. This Amendment has given a new thrust to the education of Children with Special Needs (CWSN), including autism, as without their inclusion, the objective of UEE cannot be achieved.

2. Inclusive Education for Disabled at Secondary Stage (IEDSS)

The Scheme of Integrated Education for Disabled Children (IEDC) was launched in 1974 by

the Department of Social Welfare and was later transferred to the Department of Education in 1982-83. The scheme was revised in 1992 and provided educational opportunities for disabled children in common schools to facilitate their integration and ultimate retention in the general school system. This has now been replaced by IEDSS, launched in April 2009. It provides assistance for the inclusive education of disabled children

of Classes IX – XII having blindness, low vision, leprosy cured, hearing impairment, locomotor disabilities, mental retardation, mental illness, autism and cerebral palsy.

Funds are provided for activities such as identification and assessment, assistive devices, allowance for transport, escorts, readers, uniforms, books and stationary, stipend for girls, etc. Besides, there is provision for engagement of special teachers, creation of barrier free environment, teachers' training, orientation of communities, parents, educational administrators, etc.

3. Making Schools Barrier Free

All States have been directed to ensure that all primary and secondary schools are made disabled friendly, in a prescribed time bound manner, taking into account the needs of different categories of disabled children. Each district will also have a model inclusive school.

4. Capacity Building of Special Teachers

a) Course curricula has been developed and standardized by the Rehabilitation Council of India (RCI) for

i) Diploma in Special Education (Autistic Spectrum Disorders), introduced in July 2003, and

is operational in 11 institutions registered with RCI, producing 20-25 teachers every year

per institute

ii) B.Ed. Special Education (Autistic Spectrum Disorders) will become operational from the

session beginning in July 2010 at 4 institutions across the country

b) Some other organisations imparting diploma in special education (ASD) include Spastics

Society of Karnataka, Bangalore; School of Hope, Delhi; Action For Autism, Delhi; Jai

Vakeel, Mumbai and Pradeep, Kolkata

c) State Nodal Agency Centre (SNAC) and State Nodal Agency Partners (SNAP) of the

National Trust have conducted trainings on

i Inclusive Education for Private School Teachers to handle the special needs of students

with National Trust disabilities in inclusive classrooms. In the Govt. Schools, this is being

done under the SSA Program.

ii Special School Teachers Training - National Trust has specially focused on Early

Intervention and Autism.

5. The National Award to Teachers, conferred to teachers from across the country by the President of India, has a dedicated category for disabled teachers/special teachers doing yeoman's service for the education of disabled children.

conclusion

All children and young people of the world, with their individual strengths and weaknesses,

With their hopes and expectations, have the right to education. Over half a billion persons are disabled as a result of mental, physical or sensory impairment. These persons are often limited by both physical and social barriers, which exclude them from society and prevent them from actively participating in the development of their nations. Inclusion as we know it today has its origins in Special Education. There are four key elements in Inclusion. Inclusion is a process concerned with the identifications and removal of barriers, is about the presence, participation and achievement of all students and emphasis on those groups of learners who may be at risk of marginalisation, exclusion or underachievement. Indian government has taken many initiatives to promote inclusive school education of disabled children.

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Augmentation of Reading and Communication Skills by Creative Teaching

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ABSTRACT

Effective communication has been the need of any millennium. Over time, the knowledge transfer has brought us to the present day where English has become the most accepted universal medium of interaction for anything and everything. Today, life at any level, from learner to teacher, from consumer to producer, from technology to innovation etc., have become very fast paced and demanding. So, "Speed" is a key differentiating factor which is of very high demand. There is considerable amount of struggle and competition that is ongoing at every level to match up with the demand for this speed. To satisfy this demand, it is very important that everyone uses the common medium for communication. Since English has become the language that has a greater percentage of usage it is playing a pivotal role in helping the cause. This paper brings out the challenges of teaching English as a second language and highlights on how activity based reading skill plays a vital role in developing ones communication skills.

KEYWORDS

Reading skill, activity based learning, creative teaching, communication skill

1. ROLE OF ENGLISH IN RECENT SCENARIO

It is more obviously seen nowadays that the students from different countries gather under one roof to learn, doctors from different regions meet under one frame to find solutions, businessmen of different class share knowledge for effective growth, researchers of different continents gather for new developments where people who know and use English as their language say that they never felt to have any sort of barrier between each other.

This overview focusing on discrepant roles of English language is playing in the present day scenario, elucidates the assistance it has provided in almost all the fields which are very extensive and intensive. The art of effective management, which sits on the throne of every operation irrespective of the field or space or time, is in one sense effective and right communication. This is an application both at the transmitter level as well as the receiver level. As known, a person is directly or indirectly the part of the global machine, that undergoes transformation from one phase to another and for movement with limited friction, the universally accepted language, English, is helping immensely.

2. CHALLENGES OF TEACHING ENGLISH AS A SECOND LANGUAGE

Effective teaching is the primary problem in taking English language to the grass root level. First of all the teacher should be a master in the language and good at analytical skills to teach the students besides creatively conveying the knowledge, that generally observed to be short of. Therefore the primary problem is the dearth of resource personnel who can effectively teach the subject to the learners. It is witnessed that the natural tendency for any individual is to stick to their native language rather than accepting a new one for their day to-day usage or interactions. Irrespective of the learning arena or otherwise, it can be said that people dominantly switch over very rapidly to their native medium of communication which reduces the effectiveness of learning and makes the process a mechanical one. People expects thumb rule for learning languages and fail to gain proper knowledge about the subject.

One of the most important and distinguishing problems in teaching English as second language is the ignorance among individuals about the various advantages one gains through mastering the language. Often this ignorance leads to negli-

gence on the part of students. Due to this failure, students often fail to express themselves properly, which indirectly impacts their confidence level that paves the way for further dip in effective learning. This one way process is seen as chain reaction among students, where it spreads from one to other among students of similar mindset.

The prevalent mindset observed among the individuals is that learning any language is an arduous task as the preoccupied mindset remains an impediment to language learning. The solution is creative teaching, which though evolving is yet to gain currency. Also the system is pre-defined at every level at this moment and often students are forced to get into the flow through monotonous learning to catch up pace with the rest, which results in ineffective mastery of the language. Aforementioned are some of the limitations that are acting as a shortcoming, which if addressed systematically can yield better results.

3. FACETS OF READING

The habit of reading usually gets invigorated in the academia of a student's life. In fact, reading habit of a student reveals tetra facets namely,

- Reading for Academic Progress
- Reading for Updating Knowledge
- Reading for Corporate Induction
- Reading for Corporate Excellence

3.1 Reading for Academic Progress

Academic Performance is the backbone of a student's career. Hence, nurturing the essential knowledge becomes the primary goal of a student. This knowledge is available for students in the form of books, lectures, online materials and so on. In order to absorb this knowledge from the source mentioned above, one should possess desirable comprehension and communication skills in English as most of the texts are printed in English.

3.2 Reading for Updating Knowledge

In continuation to the academic quadrant, the next crucial point in a student's life is getting selected in a company that supports the person's skill and aids growth. If one analyzes the different stages of short listing a candidate by most of the growing organizations, it will have four stages like

- Aptitude
- Technical test
- Group Discussion
- Personal Interview

Ultimately, Communication plays a vital role in all these tests. Also mostly the managers are looking for the students who are not just good in the field of operation but who are able to effectively communicate their idea forward.

3.3 Reading for Corporate Induction

Prospering professionally requires good communication skill. As mentioned earlier, communicating the ideas forward is very vital. This will be at the grass root level but growing ahead, it will progress to discussion of ideas, escalating the developments to managerial. All these require effective communication skill.

3.4 Reading for Corporate Excellence

The world is becoming more competitive day by day and every time the next generation steps in to a more advanced world. In order to help them succeed as student, it is essential to nurture them properly and guide them in the right channel for which the key is effective communication.

4. READING AS A DEVELOPING SKILL

Reading is a skill that will be improved through practice. The process of reading begins with a person's earliest exposure to texts and literature culture and it continues throughout one's life.

For children to become skilled readers (Neuman & Celano 2006) they will also need to develop a rich conceptual knowledge base and verbal reasoning abilities to understand messages conveyed through print. Successful reading ultimately consists of knowing a relatively small tool kit of unconscious procedural skills, accompanied by a massive and slowly built-up store of conscious content knowledge. It is higher-order thinking skills, knowledge and dispositional capabilities that enable young children to come and understand what they read.

Children's earliest experiences become organized or structured into schemas, building blocks of cognition. Schemas (Anderson & Pearson 1984) provide children with the conceptual apparatus for making sense of the world around them by classifying incoming bits of information into similar groupings.

Stein & Glenn (1979), for example, provided a compelling case for schemas and their usefulness for recalling information about stories. Well-read to children internalize a form of story grammar, a set of expectations of how stories are told which enhances their understanding. Knowledge becomes easier to access (Neuman 2001), producing more knowledge networks. And those with a rich knowledge base find it easier to learn and remember.

5. CREATIVITY IN TEACHING

One common uniting factor across the world, among most of the people, is English which is helping them to effective interactions and sharing information at will and in a free flowing manner. If we check the creamy layer of the world, the engine of the universal machine, English has been acting as the key agent for proper functioning and optimal progress.

On the flip side, when you check out the micro level though we can claim the effectiveness by using English language remains intact, the doubt always hovers around the command over the language. So, there arises the need to teach the language creatively, which is never short of headwinds.

By being creative, it would help in creating interest among the learners by extending out innovative ideas and techniques thus making the process of learning simple, easier to understand and fun filled.

One strong limiting factor for reluctance to improve reading habit is the lack of interest and the best medicine to cure this is being creative. The creative elements will break the monotonous patterns and it can bring in the flexibility to adapt to the latest trend in the system and the society. The creative approach will help to extend the teaching arm to any level by minor tweaking according to the recipient.

6. ACQUISITION OF READING SKILL THROUGH ACTIVITY ORIENTED TEACHING

Activity based teaching reading skills help the students in active contextual understanding and momentous language learning. It enhances team work and decision making skills and increasing interest in active team work with the winning attitude of the given activity that helps the students acquire reading skills automatically.

Any learning will become relatively easier if there is a specific reference available and if the reference is practically emphasized, it makes learning much easier. It can be said that the exhibition of the real-life scenario through demo or actual object has huge impact in understanding the subject effectively. The virtual classrooms with video narration and descriptions are result of the impact of the aforementioned idea.

The next phase of demonstrative teaching is activity based teaching where the practical application of the subject in focus is taught through more creative, interactive and practically oriented learning. The participation for such technique is also better and the focus on the learning is far better as the core of this way of teaching is active involvement by the learners.

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Giant Cell Fibroma of Hard Palate- A Case Report

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ABSTRACT

Giant Cell Fibroma(GCF) is a relatively rare fibrous hyperplastic lesion. It represents approximately 0.4 - 1% of total biopsies and 2 - 5% of all fibrous lesions submitted for biopsy. It can be diagnosed on histopathological examination and is named so because of the characteristic cells present within the fibrous stroma of the lesion. It is usually less than 1cm in diameter and frequent sites being gingiva, followed by the tongue and the buccal mucosa. Extensive work up is mandatory for making an accurate diagnosis and for proper treatment planning, for a better outcome. This case is reported for its rare occurrence, larger size and uncommon location.

KEYWORDS

giant cell fibroma, hard palate, histopathology.

Introduction

Giant Cell Fibroma(GCF) is a relatively rare fibrous hyperplastic lesion[1,2]It represents approximately 0.4 - 1% of total biopsies and 2 - 5% of all fibrous lesions submitted for biopsy.[1-9]It can be diagnosed on histopathological examination and is named so because of the characteristic cells present within the fibrous stroma of the lesion.[8] It is usually less than 1cm in diameter [2,3,5,8,10-12]and frequent sites being gingiva, followed by the tongue and the buccal mucosa.[2,10,11] This case is reported for its rare occurrence, larger size and uncommon location.

Case report

A 23 year-old lady presented with a nodular lesion on the hard palate. The patient was apparently well 6 months back when she noticed a small swelling which gradually increased in size. There was no history of trauma. There was no history of pain or discharge from the swelling and no difficulty in speech. Medical history was uneventful. On oral examination, a pedunculated mass was seen on the anterior aspect of hard palate. It was firm, mobile, non-tender, soft tissue nodule measuring 3 cm across. The mass did not bleed on touch. The rest of the oral mucosa was normal (figure 1). Based on these findings, the differential diagnosis was traumatic fibroma and pyogenic granuloma.



Figure 1 – Photograph of GCF of hard palate

Incision biopsy was done. The gross specimen was single grey-white to grey-pink piece of tissue measuring 1.2x1x0.2 cm. Entire tissue was processed. Microscopic examination revealed fibrocollagenous connective tissue with dispersed large stellate giant cells and few multinucleated giant cells. The overlying

keratinized stratified squamous epithelium showed elongated rete ridges. (figure 2)

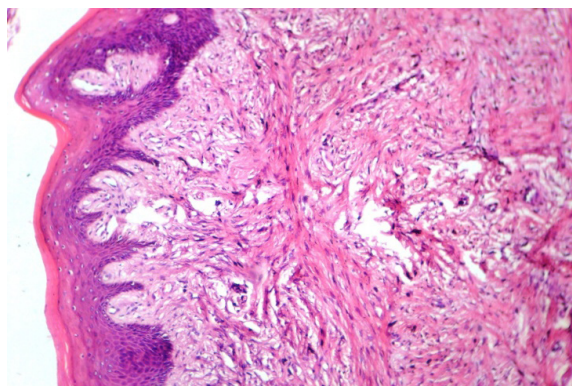


Figure 2. photomicrograph showing multiple stellate cells dispersed in a fibrous connective tissue stroma along with elongated epithelial rete ridges (hematoxylin and eosin stain, original magnification x400).

Discussion

The giant cell fibroma is rare and interesting non-neoplastic lesion of the oral mucosa. Weathers and Callihan in 1974 examined more than 2,000 specimens in a group of fibrous hyperplasias. Out of these 108 met their criteria for this “new” lesion which they called GCF. The name alludes for the presence of characteristic large, stellate-shaped, mononuclear and multinucleated giant cells.[2,13] Before Weathers’ and Callihans’ distinction of GCF, Eversole and Rovin compared and contrasted 279 fibrous hyperplastic gingival lesions, which fell into four categories: Pyogenic granuloma, peripheral gingival fibroma, peripheral giant cell granuloma, and peripheral ossifying fibroma. Each has its own diagnostic histopathologic characteristics but exhibit overlap of clinical presentation.[2,9,14]

Many reports, suggests GCFs are reactive lesions and that minor trauma can trigger its development. It is characterized by functional changes in fibroblastic cells. Possibility of viral aetiology was also made, but was not justified. Hence, they were believed to arise from a stimulus which was of unexplained origin.[2,9]

90 - 97% of GCF are reported in Caucasians.[2,3,5,6,8,9,15] GCF may develop at any age, but the highest incidence[60%] in the third decade of life.[3-6,8,9] There is no significant sex predilection .[8,4]It may be often asymptomatic but may not be esthetic if present in the anterior region of the jaw. 9 GCF occurs frequently in gingiva(362/773, 46.8%) with mandible being most common site than maxilla(2:1 mandible to maxilla ratio however the maxillary gingiva has been reported as the most common location in children under the age of 10.[3-6,8,9,16,17]Other affected locations by descending order of frequency are the tongue, buccal mucosa, palate,lips and floor of the mouth.[2-5,8] Clinically, they may be sessile or pedunculated, with a pebbly surface and normal coloration .[3,5,8,9,16] It is usually less than 1cm in diameter and can be a longstanding lesion.[3,5,6-8] In our patient the lesion was located on hard palate and 3 cm in size which is rare. The histological features of GCF include the presence of spindle and stellate shaped fibroblasts with delicate dendritic-like processes and one, two or multiple nuclei.[3,4,5,8] The stroma consists of fibrous connective tissue 5 The overlying epithelium is usually thin with narrow and elongated rete pegs.[3,-5,8,9,18]

Immunohistochemistry results have shown that giant fibroblasts are positive for vimentin only and negative for cytokeratin, neurofilament, HHF,CD68, HLA DR, tryptase, Leukocyte common antigen and S-100 and Desmin Jimson S et al found positivity for PCNA, with variable staining intensity and negativity for Ki-67.[9]

The treatment of choice for GCF is conservative surgical excision which is usually curative. Electrosurgery, Laser therapy with CO₂,

Nd:YAG, Diode, erbium lasers is another option⁵.The prognosis of GCF is good⁴however periodic long term follow-up is required .Recurrences have been reported only in solitary cases]. If the lesion is left untreated it may continue to proliferate but its benign nature certifies limited growth potential.[3,5,8,9]

GCF resembles irritation fibroma, neurofibroma, papilloma and pyogenic granuloma, because there are no specific clinic features of it. The other differential diagnosis include peripheral ossifying fibroma, focal fibrous hyperplasia, peripheral odontogenic fibroma and odontogenic hamartoma.^{2,8,12}

Conclusion

Giant cell fibroma mimics many soft tissue nodular lesions of oral cavity. Although it is a rare entity, less than 1cm in size and most common site is gingiva, it should be suspected even when the lesion is large and located in other sites of oral cavity. Extensive work up is mandatory for making an accurate diagnosis and for proper treatment planning, for a better outcome.

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CORPORATE SOCIAL RESPONSIBILITY: A REVIEW OF LITERATURE

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ABSTRACT

Businesses are no longer viewed as only the economic entities but are perceived to be an inseparable part of the society. Corporate Social Responsibility (CSR) is basically a concept whereby companies decide voluntarily to contribute to a better society and a cleaner environment. Over the last years an increasing number of companies worldwide started promoting their business through CSR strategies because the customers, the public and the investors expect them to act sustainable and responsible. The government also suggests to the business units that the corporate should enact a framework related to CSR and include them in their vision, mission and strategic planning. CSR initiatives, if being implemented by all the corporations for rural development will have a positive impact in overall development of the society and their business.

KEYWORDS

CSR, Corporations, Development, Strategies.

INTRODUCTION

The broad rationale for a new set of ethics for corporate decision making, which clearly constructs and upholds an organizations social responsibility, arises from the fact that a business enterprise derives several benefits from the society, which must, therefore, require the enterprise to provide return to society as well. This, therefore clearly establishes the state of a business organization in the good health and well being of a society of which it is an integral part. Most pompously, in this age of widespread communication and growing emphasis on transparency, the managers should help their company in developing of a Corporate Social Responsibility (CSR) management and reporting framework.

CSR is a management concept whereby companies integrate social and environmental concerns in their business operations and interactions with their stakeholders. CSR is generally understood as being the way through which a company achieves a balance of economic, environmental and social imperatives while at the same time addressing the expectations of shareholders and stakeholders.

The idea of CSR first came up in 1953 when it became an academic topic in HR Bowen's "Social Responsibilities of the business". Since then, there has been continuous debate on the concept and its implementation. Some of the definitions of CSR are given below:

World Business Council for Sustainable Development defines CSR as "The continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as the local community and society at large"

According to **CSR Asia**, "CSR is a company's commitment to operating in an economically, socially and environmentally sustainable manner whilst balancing the interest of diverse stakeholders"

World Bank Group states that "CSR is the commitment of business to contribute to sustainable economic development by working with employees, their families, the local community and society at large, to improve their lives in ways that are good for business and for development."

According to **Bowel**, "CSR refers to the obligation of busi-

nessman to pursue those policies to make those decisions or to follow those lines of relations which are desirable in terms of the objectives and values of our society".

CSR in India:

In India CSR is known from ancient time as social duty or charity, which through different ages is changing its nature in broader aspect. From the origin of business, which leads towards excess wealth, social and environmental issues have deep roots in the history of business. India had a long tradition of corporate philanthropy and industrial welfare has been put to practice since late 1800s. CSR is recognized as an important function contributing to accelerate the process of overall development of a nation. India being the second most populous country in the world, and home to the largest number of people in need of basic amenities, calls for more intensive efforts as part of such initiatives in the healthcare space of the nation. Indian companies are now expected to discharge their stakeholder responsibilities and societal obligations, along with their shareholder-wealth maximization goal.

The evolution of CSR in India can be divided into four phases.

CSR motivated by charity and philanthropy: It was characterized by the inclination of industrial families of the 19th century such as Tata, Godrej, Modi, Birla, Singhanian towards economic as well as social considerations.

CSR for India's social development: The second phase started with the independence movement where the industrialists were influenced by Mahatma Gandhi for socio-economic development of the nation. During this phase schools, colleges, training centers etc, were set up by various companies.

CSR under the paradigm of the mixed economy: the labor and environment laws were introduced in an independent India. The CSR activities were mainly taken by the Public Sector Undertakings (PSUs).

CSR at the interface between philanthropic and business approaches: the fourth phase started from 1980 till the present. Indian started abandoning their traditional engagement with CSR and integrated it into a sustainable business strategy.

Today, CSR in India has gone beyond merely charity and donations, and is approached in a more organized fashion. It has

become an integral part of the corporate strategy. Companies have CSR teams that devise specific policies, strategies and goals for their CSR programs and set budget to support them.

REVIEW OF LITERATURE:

In view of the changes to the economy in India since liberation, and the rapid growth in certain industrial sector or regions, CSR perception data is an important field to research. It is important for the researcher to be familiar with both previous theory and researches published so far in the field of investigation or study. Every research projects requires the review of concerned literature for doing the research. With the help of review of literature, a researcher can identify the methodology used, research design, methods of measuring concepts, techniques of analysis etc. The researcher presents here the resume on various studies undertaken by several researchers from time to time in India and also abroad.

A comparative study conducted by **Khan and Atkinson** (1987) on the managerial attitudes to social responsibility in India and Britain shows that most of the Indian executives agreed CSR as relevant to business and felt that business has responsibilities not only to the shareholders and employees but also to customers, suppliers, society and to the state.

In a study made by **Caroll** (1998) on top 500 largest Indian companies found that around 49% companies were reporting on CSR. Most of the companies report on donations, renovating schools in villages, mid day meals etc. well defined expenditure on CSR has been shown by very few companies. The study also revealed that only 25% companies CSR activities were for employees and the rest were focusing on vicinity and society at large. Many companies are only making token gestures towards CSR in tangential ways such as donations to charitable trusts or NGOs, sponsorship of events, etc. believing that charity and philanthropy equals to CSR.

A survey conducted by **TERI-Europe and ORG-MARG** (2001) in several cities in India found that more than 60% of the people felt that the companies should be held responsible for bringing down the gap between rich and poor, reducing human rights abuses, solving social problems and increasing economic stabilities.

Conway (2003) in his study on iron ore mining industry in Goa shows that many large mining companies have their own initiatives towards environmental and social development. However, a structured CSR policy and planning is missing especially among the small and medium players in the industry.

In 2003, **James Shyne** conducted a study entitled CSR, public policy and the Oil Industry in Angola on ten major oil companies currently operating in Angola. The study presents a baseline discussion of public sector roles in strengthening CSR. It prompted a detailed analysis of CSR investment in terms of business value and impact upon intended beneficiaries. The study also describes the current role of the public sector in promoting the CSR activities and identifying potential public sector roles that would assist, broaden and deepen corporate efforts. It was found that the representatives of ten oil companies are broadly familiar with current issues in the field of CSR and moreover they tend both to recognize and embrace the ethical and practical imperative for their companies to operate in a safe, socially responsible and environmentally sustainable manner.

Chamhuri Siwar and Siti Haslina Md.Harizan (2004) in their study on CSR practices amongst business organizations in Malaysia aimed to analysed the extent of CSR practices among different types of organizations and industries in Malaysia in terms of environmental and social dimensions. A total of 500 companies were selected based on the quota sampling that comprises 25 Govt. linked corporation, 50 multinational corporation, 50 corporation, 50 other Malaysian corporations and 375 small and medium sized enterprises. The study revealed that multinational companies bring benefits to

the society through width, generation, employment, skill development and transfer and community initiatives. It was also found that small and medium sized enterprises also play a pivotal role and supports the practices of CSR.

Arora and Puranik (2004) reviewed contemporary CSR trends in India concluding that the corporate sector in India. He concluded that the corporate sector in India has benefitted immensely from liberation and privatization process, its transition from philanthropic mindsets to CSR has been lagging behind its impressive financial growth.

D.Y. Chacharkar and A. V. Shukla (2004) in their paper entitled "A study of Corporate Social Responsiveness" tried to highlight theoretically the benefit of CSR through "iceberg effect" diagram. The results showed that just like iceberg, except the recognition and appreciation, the larger part of CSR initiatives for the company are invisible in the form of publicity, image building, expansion of customer base and profit.

R.S. Raman (2006), in a study on "Corporate Social Reporting in India-a view from the top", used content analysis technique to examine the chairman's message section in the Annual Reports of the top 50 companies in India to identify the extent and nature of social reporting. The study concluded that the Indian companies placed emphasis on product improvement and development of human resources.

Buchholtz (2006), in his study on CSR, Corporate Social and Financial Performance: an empirical study on a Japanese Company examined the relationship between corporate social performance (CSP) and corporate financial performance (CFP) through a quantitative analysis. The study was conducted on 295 companies which is one-tenth of the listed companies in Japan. The result showed a significant relationship among CSP, Equity Capital Ratio and the number of employees.

The study on CSR in management research by **Andy Lockell, Jereany Moon and Wayne Visser** (2006) tried to investigate the status of CSR research within the management literature. The study particularly examines the focus and nature of knowledge, the changing salience of this knowledge. The study present empirical evidence based on publication and citation analysis of research published from 1992-2002. The findings showed that the most popular issues investigated have been environmental and ethics (for CSR research published in management journals).

Samuel Odowu and Papisoplomou Ioanna (2007) conducted a study on twenty companies in U.K. They promulgated that the U.K companies has now become ethical in the content of social responsibility as companies disclose its CSR with a view of public benefits, government request and issue information to stakeholders because the companies is of the view that stakeholders of twenty first century are better educated than the past.

Vasanthi Srinivasan (2010) in his study on CSR and Ethics in Medium, Small and Micro Enterprise in India attempts to draw from the existing body of knowledge from both the academic and popular literature in India to identify the CSR practices and develop a research agenda for responsible business practices in the small-medium enterprise in India. The findings highlighted that most of the studies done in the Indian context have largely been qualitative and exploratory in nature. The study also revealed that since small-medium enterprises contribute significantly to the economy and are geographically spread in a country like India, adoption of CSR and ethical practices is crucial to a balanced development. There is a rarity of academic research in this area and therefore the researcher opines that a study of the intra-country similarities and differences in adoption of CSR practices in small-medium enterprises could be a valuable exercise for policy makers.

Jermy Moon in his paper on "Government as a driver of Corporate Social Responsibility" examined the role of government

in driving corporate social responsibility among the corporate. The study exposed that the drivers of CSR are related with business and society. The study further discovered other country's situation and how their government entered into business for driving CSR.

Shashank Shah and Sudhir Bhaskar (2010) made a case study of Bharat Petroleum Corporation Ltd. (an Indian Public Sector Organization). They found that there is a broad relationship between the organization and the society. The organization used the resources of the society like human, material etc and in reverse they provide services to the society. The study also revealed that BPCL has taken a lot of initiatives in order to serve the society.

Debabrata Chatterjee (2010) in his research paper entitled "Corporate Governance and CSR: The case of three Indian companies" tried to analyse the corporate governance practices of three prominent Indian firms viz; ITC Ltd., Infosys Technologies Ltd., and Reliance Industries Ltd. The study was made taking four parameters i.e., Approach to Corporate Governance, Governance Structure and Practices, Board Committees and CSR activities. The study found that though the Corporate Governance practices are exemplary, there exist differences in the way the companies adopt these practices. Infosys seems to be doing much better than the other two.

A paper on CSR in rural development sector: Evidences from India by **Sanjay Pradhan and Akhilesh Ranjan** (2010) concludes that social responsibility is regarded as an important business of Indian companies irrespective of size, sector, and business goal. The study shows that all surveyed companies present themselves as having CSR policy and practices. Most of the companies which design and implement CSR initiatives in the vicinity of their works cover entire community. A wide range of CSR initiatives ranging from income generation activities for livelihood, health check-up camps, mobile health services, education, adult literacy, agricultural development, provision of drinking water, management and development of natural resources, infrastructure facilities being carried out by these companies.

Prasenjit Maiti (2011) on his paper entitled "It is Politics or Profits or even Compassion? Unraveling the Motivation for Corporate Citizenship" tried to analyse theoretically the motives of corporate before their CSR initiatives. The study found that CSR is related to profits, power plays, politico-legal equation, situation of market flux, responsible images, humane concerns and other ethical dynamics.

Monika Hartman (2011) in her article "CSR in the food sector" analyzed the importance of CSR in food sector particularly those companies which have high brand. The study found that SME's are less capable of discharging their obligation towards society. Further the study revealed that food sector always tries to improve the controlling and discharging its services towards consumers. It was also found that consumers show preference for those brands or food sector that give importance to CSR activities.

Mallen Baker (2012) in his article on "Four emerging trends in Corporate Responsibility" tried to elucidate three basic things about the trends of CSR that have changed from last so many years. Firstly, the relationship between business and society has changed. They have come closer because of the social and environmental problem prevailing around the world. Secondly, the strategy of the businessman to develop business also affected the society a lot. Their new ideas, concept, developments also came with CSR management that reflects in their product and services. Lastly, the changes of CSR are also affected by other parties like outside agencies and the firm's own goals that interfere the firm's activity.

Bibhu Prasad and Mohanty (2012) made a study on "Sustainable Development Vis-à-vis Actual CSR". The findings showed that companies today invests in a lot of areas like

child labour, ground water, food, education, etc but they are not aware of the essential need of the poor. The study suggested that though profit earning is a natural fact of companies, CSR is beyond the natural and statutory obligation of the companies. The study concluded that sustainable development is the development of the society as well as the company in a balanced way.

Harbajan Bansal, Vinu Parida and Pankaj Kumar (2012) in their paper entitled "Emerging trends of CSR in India" analysed 30 companies of 11 sectors listed in the Bombay Stock Exchange with the help of their annual reports. Some of these sectors were Transport Equipment sector, Finance and Metal Mining sector, IT & Power, Capital goods, Telecom, Housing, FMCG, Oil & Gas, Cipla etc. The study concluded that the companies today are working not only to earn profit but have also realized the importance of being social friendly. Social Responsibility today has started taking a turn in the new direction.

Harish Kumar (2012) in his research article entitled "CSR Revisited" has thrown lights on four different approaches of companies towards CSR viz; Good Governance, Ruinous CSR, Discretionary CSR, and Illusion CSR. He also tried to highlight argument against the CSR as well as the CSR driver. The researcher also found eight factors that drive the CSR initiatives. They are Philanthropic Attitude, Governmental Actions, Environmental Concern, Ethical Consumerism, Crises and Calamities, Globalization and Market force, Social Awareness & Education, and Social Expectation.

Dr. M. Ramana Kumar (2013) in his study on CSR (Analysis of select Indian Private and Public sector companies) tried to analyse the CSR activities carried out by Indian Private (Reliance Industries Ltd.) and public sector companies (ONGC) and also study the Indian government policies and programmes of CSR. The study revealed that though the Indian public and private firms are making efforts in the CSR areas, still there is a requirement of more emphasis on CSR. The study found that there is a significant difference in the CSR practices of RIL and ONGC as the CSR budget of ONGC is more than RIL during the year 2009-10, 2010-11, and 2011-12 and average CSR score of ONGC is more than that of RIL during 2009 to 2013.

CONCLUSION:

Today the concept of CSR has undergone radical change. It has integrated social as well as environmental issues into their missions and decisions. Companies take keen interest in informing about their CSR activities to their stakeholders as well. From the review, we come to know that across the globe, business enterprises have accepted the concept of CSR as an element of success and survival of business along with fulfilling social objectives. However, the challenge for the companies is to determine a strong and innovative CSR strategy which should deliver high performance in ethical, environmental and social areas and meet all the stakeholders' objectives.

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Ischemic colitis after abdominal aortic surgery

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ABSTRACT

Ischemic colitis represents a major and potentially lethal complication after abdominal aortic surgery. The high incidence of this dangerous complication determined us to study the clinical and imagistic features of the disease, as well as its physiopathology and treatment procedures, in a group of 416 patients operated in our clinic in a five-year period (between January 2008 and December 2012). Postoperative colitis occurred in 6 patients (1.44%), with a higher frequency (4 of 6) in the patients operated for aortic aneurysm. The treatment was conservative for 3 patients, and surgical in the other 3 cases (bowel resection). The mortality rate was 33%, the main cause of death being the multiple system and organ failure.

KEYWORDS

ischemic colitis, abdominal aortic surgery, inferior mesenteric artery re-implantation

Introduction

Abdominal aortic surgery is responsible for many complications, and a mortality of 2.5 - 9%.

After the development of new endoscopic surgical techniques, Becquemin J-P et al. ^[1] realized a comparative study of the incidence of ischemic colitis between open surgery and endovascular aneurysm repair (EVAR) for abdominal aortic aneurysms (AAA); the results showed that ischemic colitis remains a serious complication following AAA repair, but EVAR was associated with a lower rate of colonic ischemia. The logistic regression analysis showed that only rupture, long duration of operation, and prior renal disease were independently associated with ischemic colitis. Within the two treatment modalities, the mortality rate remained identical. ^[1]

However, ischemic colitis is one of the most frequent and dangerous complications, and one which creates a lot of controversy in abdominal surgery.

Material and methods

Between 2008 and 2012 in the Cardiovascular Surgery Clinic of the Heart Institute from Cluj-Napoca, Romania, we performed 416 reconstructive procedures on abdominal aorta, 340 aortic-bifemoral bypass for chronic critical limb ischemia, and 76 for aortic aneurysm.

We did not include in this study the patients with emergency procedures (ruptured aortic aneurysm) and patients with reconstructive procedures on visceral arteries.

The mean age of patients was 63.0 +/- 7.3 years, and 85% of them were males.

The most frequent medical history for our patients were the ischemic heart disease and arterial hypertension.

Postoperative ischemic colitis (POIC) appeared in 6 patients (1.44%). The mean interval for diagnosis was 4.7 days (range between 0 and 17 days) after surgery. The diagnosis was established by clinical and echo-Doppler examination in 4 cases and by iterative laparotomy in 2 cases. The most frequent cases were encountered in the patients operated for abdominal

aortic aneurysm – 66.6% (4/6) (Table 1).

Table 1. Ischemic colitis prevalence according to the underlying pathology.

Underlying Pathology	No. of patients
Chronic critical limb ischemia	2
Abdominal aortic aneurysm	4

Results

The treatment was conservative in 3 cases (50%), represented by antibiotic therapy and parenteral alimentation, and surgical in the other 3 cases (50%) - bowel resection.

Mortality was 33%, 2 patients died with a multiple organic failure syndrome, determined by the ischemic colitis, both patients being treated by surgical intervention.

Discussion Frequency

Ischemic colitis after reconstructive surgery on the abdominal aorta is a well known complication with a high incidence 0.3 – 10% (a mean clinical incidence of 3% and colonoscopic incidence of 6%), and a high mortality rate. Ernest and co. realized a systematic colonoscopic study on 50 patients after aortic surgery stabilizing an incidence rate for aneurysm pathology of 7.4%, and 4.3% for atherosclerotic occlusive pathology ^[2].

Physiopathology

1.Devascularization

There are several factors, which contribute to the appearance of ischemic colitis: the clamping time, the need of vasopressor drugs, inferior mesenteric artery and/or hypogastric artery ligation, the atherosclerotic embolisation or the prosthetic thrombosis.

2.Ischemia – Reperfusion

Ischemic colitis can be generated, even if we have a very short aortic clamping time, and a permeable inferior mesenteric artery and/or hypogastric artery. The precipitating factor seems to be the conversion of the enzyme xanthine dehydrogenase (present in high concentrations in the gut mucosa) to xanthine oxidase, resulting in the release of oxygen derived free radicals. The released free radicals disrupt cell membranes and enzyme

systems and still further damage the mucosal barrier, allowing several toxic substances to be absorbed through the portal blood and peritoneum. The most familiar of these is lipopolysaccharide endotoxin, which is derived from Gram negative organisms, but others include pseudomonas exotoxin, myocardial depressant factors, histamine, and free potassium ions. Moreover, we know that even in normal circumstances, bacteria can translocate from the gut into other areas, and this process is obviously enhanced in ischemia. As a result of these combined effects visceral ischemia may injure the liver, pancreas, myocardium, and lungs, and may also cause down regulation of the immune system. All in all, it is not surprising that an acute reduction in the blood supply to the gut is lethal. Moreover, the generation of free radicals seems to be accentuated by the restoration of the blood supply to the ischemic tissue (reperfusion injury), which explains the classic observation that release of an experimentally applied ligature on the superior mesenteric artery leads to circulatory collapse [2].

Clinical diagnosis

Making a retrospective analysis on our patients symptoms, we can demonstrate that the main diagnostic clinical symptoms are: the early postoperatively diarrhea (60%), the pain in left iliac fossa (44%), and rectal hemorrhage (30%). Less specific elements for diagnosis are: hypo- or hyperthermia (70%), shock (56%), and the occlusive syndrome (38%).

Systemic bacteremia with anaerobic germs is very rare, always being associated with peritonitis by colic perforation (12%) (Table 2).

Table 2. Clinical characteristics of patients who developed ischemic colitis.

Clinical Characteristic	Incidence (%)
Early postoperative diarrhea	60
Pain in left iliac fossa	44
Rectal hemorrhage	30
Hypo- or hyperthermia	70
Shock	56
Occlusive syndrome	38
Systemic bacteremia with anaerobic germs	12

There are other studies that analyzed Prognostic factors of ischemic colitis after infrarenal aortic surgery (Paineau et al.) [3]: early digestive symptoms, use of vasopressors, diagnosis in intensive care unit and a pH <7.35 at D1 were independently associated with acute ischemic colitis. These factors could help take the decision to operate POIC, especially to lower the effect of multiple organ failure syndrome (MOFS). [3]

Imagistic examination

Colonoscopy is the standard examination for establishing diagnosis and for the possibility of taking biopsy samples. On a series of 26 patients, J.C. Farkas found right and left colon lesions in 4 cases, left colon in 18 cases, left colon and rectum in 2 cases, rectum in 2 cases [4].

Another imagistic examination is the abdominal echo-Doppler, which can visualize the origin of superior and inferior mesenteric artery and the possible obstructions with thrombus or atherosclerotic plaque.

We did not use the colonoscopic examination on our patients, the diagnosis being established by clinical and abdominal echo-Doppler examination in all cases.

Medical treatment

The condition resolves completely with conservative treatment in most cases, but late diagnosis or severe ischemia can be associated with high rates of complications and death. [5]

Without a severe infectious syndrome or peritonitis, the antibiotic therapy did not demonstrate its utility; the empiric administration of antibiotics could determine a selection of the resistant germs. Preoperatively digestive decontamination can be an alternative; instillation of Gentamycin in the digestive tube on animals, diminishes the systemic endotoxemia in experimental ischemic colitis and reduces the number of deaths. Other protective measures are: maintenance of normal homeostasis, which has become routine in intensive care units, vasodilator drugs such as Papaverine injected directly into the superior mesenteric artery; antibiotics (Polimyxin B) may have a specific effect against lipopolysaccharide endotoxin, and anticoagulants. From the laboratory evidence it would seem logical to use antioxidants such as allopurinol, superoxide dismutase and dimethyl sulphoxide. [2, 6, 7, 8, 9, 10]

Preventive surgical treatment

Many authors proposed the re-vascularization of inferior mesenteric artery whenever it was possible. Systematic re-implantation of inferior mesenteric artery diminished the incidence of ischemic colitis. [7, 10]

Curative surgical treatment

Surgical indication is established by the presence of multiple organic failure syndrome. Even the presence of one isolated sign can impose the indication for resection. The ideal is a resection in the health tissue, spotted by endoscopy. A second look is indicated if in postoperative period an aggravation in patient status appears, and allows a complementary resection in 60% of cases. [4, 7, 9]

Mortality

Mortality rate varies between 27 and 100%, being determined by the evolution of multiple organic failure syndrome, persistent ischemia of the unresected bowel, or another surgical complication: peritonitis, necrotizing pancreatitis. Attention to preoperative, intraoperative, and postoperative aspects can reduce the incidence and severity of ischemic colitis and significantly reduce morbidity and mortality. [11]

Conclusions

The development of ischemic colitis following abdominal aortic surgery is associated with substantial morbidity and mortality. Ischemic colitis appears in general on a debilitated patient, with cardiac and / or respiratory failure, and it complicates in most cases with a multiple organic failure syndrome. The high mortality rate militates on developing the preventive treatment and early diagnosis of this syndrome.

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Comparative Analysis of Surgical Outcomes for Patients With Acute Aortic Dissection

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ABSTRACT

Introduction: The aim of the paper was to analyze the outcome of the surgical treatment for patients with different types of acute aortic dissection admitted in our service.

Material and Method: We collected the descriptive and temporal parameters, the postoperative results and comparative statistics for the 48 cases of acute aortic dissection operated over a period of 7 years (2006 – 2012). The diagnosis was established by transthoracic and transesophageal echocardiography, and contrast enhanced computed tomography. The emergency surgical treatment consisted in the replacement of the affected aortic segment eventually associated with aortic valve replacement.

Results: The postoperative overall mortality was 41.6%. In the early postoperative period, the main complications were: acute renal failure (31.25%), neurological complications (25%), early postoperative bleeding (23%), and multiple system and organ failure (MSOF) (12.5%).

Conclusions: The acute aortic dissection represents a major emergency, and a continuous challenge for the cardiovascular surgeon.

KEYWORDS

Acute aortic dissection, Surgical outcome, Neurologic complications, Mortality

Introduction

The acute aortic dissection (AAD) represents a major cardiovascular surgery emergency, with a high morbidity and mortality rate in the absence of immediate medical and / or surgical treatment. The incidence of AAD is estimated between 5 and 30 cases / 1 million / year, being more frequent in patients aged 40 to 70 years, and three times more frequent in males.^[1,2] Patients with AAD type Stanford A have a mortality of 50% in the first 48 hours, while type B AAD in the Stanford classification is considered to have a more benign character than type A AAD; most studies estimate a total mortality rate of 50% in the absence of treatment.^[1,3,4] Aortic dissection is considered acute in the first 14 days from onset; patients who survive this period may stabilize in time; between 2 weeks and 2 months it is defined as "sub-acute", and over 2 months, it becomes "chronic".^[1] According to these facts, we tried to analyze the results of surgical treatment of AAD in our clinic.

Material and Method

In a period of 7 years (2006 – 2012), a number of 48 consecutive patients were admitted and operated in our hospital for acute aortic dissection. Patients data were collected from operative protocols, electronic health records and the institution's data base. For statistical analysis we used Microsoft Office suite, the Excel application, charts and graphs.

We assessed the following parameters: descriptive parameters – the type of dissection (Stanford classification), gender, age, investigations used (echocardiography – transthoracic and / or transesophageal; CT-angiography; MRI), type of surgery, arterial cannulation site; temporal parameters: time passed from admittance to the time of surgery, time of extra-corporeal circulation (ECC), aortic cross-clamping time, circulatory arrest time; parameters of post-operative results: number of deaths, neurological complications; parameters of comparative statistics: femoral artery vs. axillary artery as arterial cannulation sites

(from the perspective of post-operative neurological complications), the relationship between dissection type and post-operative mortality, the connection of aortic cross-clamping time and ECC time respectively with the incidence of neurological complications.

At admission, 35 patients (73%) were hemodynamically unstable, requiring inotropic drugs (dopamine, norepinephrine and epinephrine); in this group, the mean blood pressure was 89/49 mmHg, and the pulse rate varied between 91 and 144.

All the 48 patients were investigated by trans-thoracic and trans-esophageal echocardiography, and in 85% of cases we also performed the CT-angiography. The mean time from hospital admission to the surgical intervention was 4 hours and 5 minutes (a minimum of 22 minutes and a maximum of 20 hours). The surgical techniques used were diverse, adapted to the clinical situation, but we mainly performed the replacement of the ascending aorta in supra-coronary position with a synthetic prosthesis (Table 1).

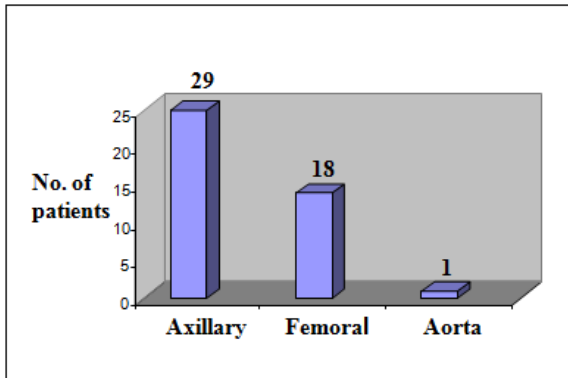
Table 1. Types of surgical procedures

Surgical Procedure	No. of Cases
Ascending aorta replacement with synthetic prosthesis in a supra-coronary position	29
Ascending aorta replacement with synthetic prosthesis in a supra-coronary position and aortic valve repair	5
Ascending aorta replacement with synthetic prosthesis in a supra-coronary position and aortic valve replacement with a mechanical valve	3
Ascending aorta and aortic arch replacement with synthetic prosthesis in a supra-coronary position	5
Ascending aorta replacement with synthetic prosthesis in a supra-coronary position and CABG	2

Bentall procedure and aortic arch and branches replacement	2
Descending aorta replacement with synthetic prosthesis	2

The arterial cannulation site for ECC was through the right axillary artery in most cases (29 patients – 60.5%), through the femoral artery in 18 patients (37.5%), and through the ascending aorta in one patient (2%) (Figure 1).

Figure 1. The site of arterial cannulation for cardio-pulmonary bypass.



The mean ECC time was 168 minutes, the mean aortic cross-clamping time was 118 minutes, circulatory arrest was used in 25 patients and the mean circulatory arrest time was 34 minutes (5 to 55 minutes).

Results

Of the total of 48 patients, 62% were males, and the ages varied between 40 and 77 years (average of 61 years). According to the Stanford classification, 95% of the cases were type A AAD, and 5% were type B AAD.

The post-operative complications were as follows: acute renal failure – 15 cases (31.25%) (of which 11 were treated medically and 4 undergone hemodialysis); multiple system organ failure (MSOF) – 6 cases (12.5%); early post-operative hemorrhage – 11 cases (23%) and 1 case of axillary hematoma (2%) (necessitating re-intervention); sternal wound dehiscence – 6 cases (12.5%) (without mediastinitis) and 1 case of femoral wound dehiscence which needed a secondary suture. Neurological complications were encountered in 12 cases (25%): 1 case of spastic tetraplegia, 1 case of paraplegia, 1 case of paraparesis, 1 case of right brachial paresis, and 8 cases of hypoxic encephalopathy and massive cerebral edema.

The total operative mortality was 41.6% (20 cases), of which 12.5% (6 cases) were intra-operative deaths and 29.1% (14 cases) were early post-operative deaths. The intra-operative deaths were determined by aortic rupture at the distal anastomosis site in 4 cases, and by acute cardiac failure (the impossibility of weaning the patient off ECC) in two cases. Unstable patients had a mortality of 45.7%, while stable patients had a mortality of 30.9%.

The highest rate of early postoperative mortality was determined by major neurological complications (massive stroke or hypoxic encephalopathy), the effective mortality rate in patients with important neurological complications being 62%. The incidence of post-operative neurological complications was significantly higher in patients with femoral artery cannulation (33.4% - 6 / 18 patients), in comparison to patients with axillary artery cannulation (20.7% – 6 / 29 patients).

The relationship between cross-clamping time and postoperative neurological complications showed a strong statistical significance (p-value = 0.019) (Table 2), the mean aortic cross-clamping time for the patients with neurological complications being 153 minutes, versus 103 minutes for the group without these complications. The ECC time had no significant

influence (p-value = 0.07) on the development of neurological complications (Table 3).

Table 2. The influence of aortic cross-clamp time on the incidence of neurological complications (t-Test: Two-Sample Assuming Unequal Variances).

Neurological complications	Mean time	Minimum time	Maximum Time
present	153 min	74 min	234 min
absent	103 min	40 min	190 min

P-value = 0.019

Table 3. The influence of ECC time on the incidence of neurological complications (t-Test: Two-Sample Assuming Unequal Variances).

Neurological complications	Mean time	Minimum time	Maximum Time
present	211 min	99 min	399 min
absent	146 min	82 min	298 min

P-value = 0.073

In the group which developed neurological complications the mean ECC time was 211 minutes, and in the group of patients which didn't develop neurological complications the mean ECC time was 146 minutes.

Discussion

Despite technical progress, the surgical treatment of acute aortic dissection has a high perioperative mortality and morbidity risk. This fact is caused by the gravity of the disease process and also by the potential inadequate cerebral and visceral perfusion during ECC. The most employed imaging for diagnosis in AAD is CT-angiography. According to the IRAD study (2002) ^{15,6,7}, 63% of all AAD were diagnosed by angio-CT, 32% by trans-esophageal ultrasound, 4% by aortic arteriography and 1% by angio-MRI. In our lot the diagnosis was suspected in all patients by ultrasound and confirmed in 85% of the cases by angio-CT. The latter method in now considered the "golden standard" in diagnosing AAD, with a sensitivity of 90% and a specificity of 85% ^{15,7}, bringing important details regarding the type of AAD, the involvement of the aortic arch, it's branches, of the descending (thoracic or abdominal) aorta, and the site of entry point. In 15% of cases, the surgical intervention was performed without an angio-CT examination, the diagnosis being established by cardiac ultrasound, due to the patient instability or technical reasons. Only about half of the patients arrived at our hospital with a diagnosis set by CT-angiography, the rest had to be investigated after admission, which delayed surgery. Surgical treatment is the first choice in Stanford A AAD, and is indicated in Stanford B AAD only if they are symptomatic (persistent thoracic pain, peri-aortic hematoma, pleural effusion, signs of visceral malperfusion). Considering the high mortality in type A AAD (1% each hour), in these cases surgical treatment represents a major emergency. In our study the mean time from admission to the surgical procedure was 4 hours and 5 minutes, due to the necessity to complete the investigation of patients who were hemodynamically stable. Unstable patients were rushed to the OR directly. Surgical resolution of the AAD is complex, with a high degree of difficulty, implying open-heart surgery, ECC with axillary or femoral artery cannulation, deep hypothermia with or without circulatory arrest. In our study the surgical techniques differed according to the location of entry point, the involvement on the aortic valve, or the coronary ostia, varying from ascending aorta replacement with synthetic prosthesis in a supra-coronary position, partial or total aortic arch replacement, associated with aortic valve procedures (replacement or repair), or the Bentall procedure (composite graft replacement of the aortic valve, aortic root and ascending aorta, with re-implantation of the coronary ostia into the

graft). Despite adequate surgical treatment, experienced surgical centers report a mortality rate in AAD between 20 and 35% [3,8]. The mortality rate in our study was 41.6% (12.5% of which were intra-operative deaths and 29.1% post-operative). The main causes of postoperative death were: cerebral implication, hemorrhage, myocardial ischemia/cardiac failure and visceral malperfusion. The highest rate of post-operative mortality was found in the group of patients with major neurological complications (stroke, hypoxic encephalopathy). Out of the 48 patients included in the study, 25% presented neurological complications, with a mortality rate of 62%. The neurological complications can be explained by cerebral hypoxia caused by the dissection involving the major vessels, but also by a potential cerebral mal-perfusion during the surgical procedure. We can conclude from our study that the aortic cross-clamping time and possibly the ECC duration, are involved in the incidence on post-operative neurological complications. In patients where the axillary artery was used for arterial cannulation, performing an antegrade perfusion during ECC, and a selective cerebral perfusion during the circulatory arrest, the incidence the neurological complications was lower than in the group with femoral arterial cannulation which perform a retrograde perfusion and no possibility of cerebral perfusion during the circulatory arrest.

Conclusions

The AAD represents a major surgical emergency, a continuous challenge for the cardiac surgeon, with a high rate of mortality and morbidity, depending on the type of dissection, the patient's co-morbidities, the speed and the accuracy of the diagnosis, the time spent from onset to surgery, and on the aortic cross-clamping time and total ECC time, determined by the surgical team's experience.

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Research Paper

Clinical Research

Indications, benefits and early outcomes for off-pump coronary artery bypass grafts-a single centre experience

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ABSTRACT

Between January 2011 and December 2012, in Cardiovascular Surgery Clinic from Cluj- Napoca, Romania, we operated 604 patients with coronary revascularisation, of which 342 on-pump and 262 off-pump, from which we selected two groups of 100 patients each, that had undergone initial coronary revascularization without any other reconstructive valvular or arterial procedure, and had been matched by age, sex and preoperative estimation of risk of mortality and complications. Postoperative clinical parameters and outcomes data were analysed, and the variable and total costs for each patient were calculated.

Our survey demonstrated that the off-pump myocardial revascularization is a safe method with a low rate of early complications and early mortality, and has decreased the use of limited and costly resources.

KEYWORDS

Coronary artery bypass grafting, off-pump coronary revascularization, low cost coronary artery surgery

Introduction

The extracorporeal circulation – a technique which allows the development of open heart surgery – determines a succession of physiological distresses, which include the activation of inflammatory system, blood cells destruction, neurological disorders etc.

In the last decades the use of less invasive techniques became more important in the therapeutic arsenal of the open-heart surgery. Concerning the coronary surgery, there were developed revascularization techniques on beating heart by carrying out devices used for immobilization of the operative field, that allow the anastomoses to be performed in best conditions.

Theoretically, the coronary surgery on beating heart avoids the occurrence of associated adverse reactions by eliminating the extracorporeal circulation. As a result the patient recovery is much faster and the cost per patient is lower.

The aim of our survey was to evaluate the immediate results and the cost of each type of revascularization with or without extracorporeal circulation.

Patients and Methods

From January 2011 to December 2012, at the Clinic of Cardiovascular Surgery from Cluj-Napoca, Romania, were performed 604 coronary revascularizations, out of which 342 with extracorporeal circulation (on-pump) and 262 without extracorporeal circulation (off-pump). The patients were operated by the same surgical team.

The surgical technique was standard for the patients with extracorporeal circulation: - 32 Celsius degree hypothermia, cannulation to ascending aorta, cold blood cardioplegia 1:1, the distal anastomoses were performed before the proximal anastomoses. For the patients with off-pump operation we used the cardiac stabilizer Octopus II (Medtronic company, Inc., Fridley, MN), heart exposure was facilitated by pulling

wires on the pericardium, and by opening the right pleura to allow the displacement of the heart into the pleural cavity, in the moment of approaching the circumflex artery. Distal anastomoses were performed before the proximal anastomoses and the anastomosis of left internal mammary artery was always performed first.

All patients were subject to the same monitoring and treatment protocol both in the Intensive Care Unit (ICU) and surgical department.

The data was collected prospectively and examined retrospectively, monitoring mainly the preoperative, postoperative and during-the-operation clinical characteristics, such as mechanical ventilation time, number of blood units administered to each patient, incidence of metabolic acidosis (defined by HCO₃ < 21mm/L), maximum level of CPK during the first 24 hours after surgery, overall postoperative length of stay. We also monitored the occurrence of early postoperative complications (atrial fibrillation, re-interventions for bleeding, myocardial infarction), and the early mortality (during the first 30 days). Fixed and variable costs for each patient were calculated. Statistical analyses were performed with SPSS – student t test for Windows.

Results

There were 74% men in the first group (on-pump revascularization) versus 81% men among patients undergoing off-pump coronary revascularization. The mean age was 57.4 years in the on-pump group, and 54.3 years in the off-pump group. Average ejection fraction was 47.1% for the patients operated on-pump (range between 19 – 67%), and 50.7% for off-pump patients (range between 25 – 69%) (Table 1).

Table 1. Preoperative characteristics of patients who underwent off-pump revascularization compared with those who underwent on-pump coronary artery bypass.

Operative technique	Gender : number of patients	Mean age (years)	Mean ejection fraction (%)
ON-PUMP	Males : 74 Females : 26	57.4 (Range: 30 – 82)	47.1 (Range: 19 – 67)
OFF-PUMP	Males : 81 Females : 19	54.3 (Range: 26 – 76)	50.7 (Range: 25 – 69)

The prevalence of risk factors was similar in both groups (Table 2).

Table 2. Risk factors in patients undergoing on- or off-pump cardiac surgery.

Risk Factor	On-pump surgery (no. of patients)	Off-pump surgery (no. of patients)
Diabetes melitus	23	13
Obesity	11	14
Dislipidemia	40	54
Hypertension	30	33
Peripheral arterial obstructive disease	20	18
Previous myocardial infarction	46	40
Rhythm disorders	0	3
Carotid artery stenose	5	2
Stroke	3	0
Pace maker cardiostimulation	0	1
Cigarette Smoking	68	57
Percutaneous coronary angioplasty	5	7
Serum creatinine > 2.0	6	4

The number of distal anastomoses was higher in the on-pump group of patients (an average of 2.92), reporting to the patients who were operated off-pump (an average of 2.37) (Table 3).

Table 3. Number of distal anastomoses in patients undergoing on- or off-pump coronary surgery

Number of distal anastomoses	On-pump (no. of patients)	Off-pump (no. of patients)
1	3	22
2	26	30
3	51	37
4	16	11
5	4	0
Total	100	100
Mean number	2.92	2.37

The significant differences were noticed in the analysis of postoperative clinical parameters (Table 4), such as early post-operative bleeding, the necessary of blood units in the first day, the necessary of inotropic support, the occurrence of the metabolic acidosis. The rhythm disorders occurred on the first two postoperative days on 18 patients operated on-pump, reporting to 10 patients with off-pump surgery. The postoperative time of mechanical ventilation was reduced for the

patients with off-pump surgery - 7.5 hours, reporting to 11.1 hours for the patients with on-pump intervention. The post-operative level of CPK – MB as a myocardial infarction (MI) marker was normal in most of the cases both on pump and off-pump, excepting the patients with perioperative MI. In our study there are significant differences regarding the level of the enzymes (CPK) on the first postoperative day, its level being double (1346.7 u/l) on the off-pump patients reporting to the on-pump patients (600.8 u/l). We can not precisely mention if the level of CPK is given by the myocardial ischemia during the surgical intervention, by the operative mechanical traumatism or by other factors. Still, the low level of CPK – MB excludes the myocardial ischemia as a cause of increasing the CPK level.

Complications of the sternal wound (dehiscence) with mediastinitis were also more frequent in the patients operated on-pump - 3 patients, reporting to only one off-pump patient. The major complications were relatively low in both groups, 1 stroke and 3 myocardial infarction on the first postoperative day on patients in the on-pump group, and 2 patients with myocardial infarction in the off-pump group.

The number of hospitalization days was lower (7.6 days) on the patients with off-pump surgery, reporting to 9.2 days on the patients operated on-pump.

Early mortality occurred in 3 patients from the on-pump group, and in 1 patient from the off-pump group.

Table 4. Postoperative characteristics of patients undergoing on- or off-pump coronary artery bypass.

Parameters	On-pump surgery	Off-pump surgery	P
Average Bleeding (ml) / day 1-2 (ml)	735 / (600-1050)	512 (400-820)	0.001
Transfusion (blood units)	180	30	0.0001
Inotrop assistance (no. of patients)	28	9	0.008
Reinterventions for bleeding (no. of patients)	8	3	0.038
Rhythm disorders (no. of patients)	18	23	0.549
CPK level – day 1 (mg/dl)	600,8	1346.7	0.0001
CPK-MB level– day 1 (mg/dl)	37.6	44.9	0.99
Metabolic acidosis (no. of patients)	27	10	0.001
Average Mechanical ventilation (hours)	11.1	7.5	0.99
Stroke (no. of patients)	1	0	-
Acute myocardial infarction - day 1-2 (no. of patients)	3	2	0.367
Sternal dehiscence (no. of patients) With mediastinitis Without mediastinitis	3 1	1 1	0.038
Average Hospitalization (days)	9.2	7.6	0.001
Early mortality (no. of patients)	3	1	0.038

We have wondered how costly is a surgical myocardial revascularization performed with or without extracorporeal circulation. The appraisal made by our financial department shows that an off-pump intervention is about 1000 – 1500 USD, and an on-pump intervention costs between 3000 and 4000 USD; this amounts do not include the cost of hospitalization in the department of cardiology, where there are no differences between the two groups of patients.

Discussion

The major importance of extracorporeal circulation is represented by the fact that it enabled the rising and development of cardiac surgery. But, the use of extracorporeal circulation determines the occurrence of major complications, especially respiratory malfunctioning, activation of the inflammatory sys-

tem, and neurological disorders.

The off-pump surgery has demonstrated that it produce less organic malfunctioning than the on-pump surgery. For instance, glomerular filtration rate was better to the off-pump patients, beside the on-pump patients^[1]. The incidence of metabolic acidosis was lower on the patients operated off-pump – this fact being remarked both by us and other authors

^[2,3,4] ; similarly the necessary of inotropic

support was lower^[1,5] in the off-pump surgery reporting to the on-pump surgery. Although we did not find significant differences between the other parameters, such as rhythm disorders, postoperative myocardial infarction, sternal dehiscence, this should be due to the relatively small number of studied cases. In spite of these, the significantly lower number of necessary blood units for the off-pump patients, the less mechanical ventilation time, make the cost of an off-pump intervention to be much lower than of an on-pump intervention^[2,5,6,7]. Certainly, a significant importance in cost reducing also have the disposable materials (oxygenators, canulas), more expensive than the cardiac stabilizer.

Even if a lot of reports demonstrated a very favourable short-term grafts permeability rate for off-pump operated patients^[5,6,8,9], recent studies on permeability at distance performed on

large groups of 'off-pump' operated patients, show a higher rate of re-interventions for graft obstruction and a higher frequency of re-hospitalization for pectoral angina^[2].

In 2005, the review of several clinical trials, accomplished by American Heart Association Council on Cardiovascular Surgery and Anesthesia in Collaboration With the Interdisciplinary Working Group on Quality of Care and Outcomes Research, outlined that patients may achieve an excellent outcome with either type of procedure, and individuals' outcomes likely depend more on factors other than whether they underwent standard on-pump or off-pump coronary bypass^[10].

Other studies evaluated the benefit of off-pump interventions by assessing the pre-operative risk profile^[11], the risk of stroke in connection with the use of extracorporeal circulation^[12], or the advantages of off-pump myocardial revascularization in patients with acute coronary syndrome^[13].

Our survey demonstrated that the off-pump myocardial revascularization is a safe method with a low rate of early complications and early mortality, and has decreased the use of limited and costly resources.

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A Study of Research Attitude, Achievement Motivation and Self Concept of Social Science Research Scholars

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ABSTRACT

Increased enrolment in the field of Higher education has led to increase in the number of researchers in all fields including social sciences. It has also deteriorated the quality of researches. Quality of the research varies from institution to institution and in the same institution between departments to department. It is also related to the quality of Guidance as well as the research attitude of the researchers. Research attitude in turn depends upon a number of variables like self concept; achievement motivation e.t.c. Personality factors basically determine the total behaviour pattern of any individual in achieving their life goals. Thus, in this study an attempt has been made to analyse the research attitude of social science research scholars in relation to their achievement motivation and self concept. Data was collected by using standardised tools and analysed by appropriate statistical techniques. Comparative analysis based on gender has also been made. Suggestive measures have also been put forward by the authors of this paper.

KEYWORDS

Researches lead to the generation of new knowledge. It is therefore essential that quality of research should be given utmost priority. Quality depends upon a number of variables related to institution, guide and researcher itself. Environmental factors of the institution help in developing positive attitude of research among researchers. An attitude is a psychological construct or latent variable, inferred from observable responses to stimuli, which is assumed to mediate consistency and co variation among those variables (Green, 1954). Researchers (Swindoll, 2012; Abraham, 2003) claim that attitude is more important than experience and academic preparation. Attitude is a way of thinking and inclining towards optimism and pessimism which exerts a strong influence on the way a person responds to a particular situation or thing (Gross, 2001). It influences the success or overall performance (Bajah, 1999). Shetty (2010) analysed research scenario in ten state universities of India during 2000 to 2006 and found that low quality of researches were being carried out in these universities. Malhotra (2008) pointed out that presently the researchers are provided with basic theoretical knowledge of research process at the masters' level and later they get in touch of the supervisors who without putting the researchers to learn the research process help them in selecting problems and conducting research. The privatization of education right from the elementary level to university level has also contributed to dilution of quality in researches due to mass production of research degrees (Singh, 2008). Papanastasiou (2005) had identified five factors of students' attitude towards research after carrying out factor analysis which were usefulness of research, research anxiety, positive feelings about research, life relevancy of research to the students' daily lives and Difficulties in research. Li. K. Y. L. (2012) found a positive co-relation between the variables—attitude towards research methods and statistics, self-efficacy, effort and academic achievement. The negative attitudes towards research have found to serve as obstacles to learning (Wise, 1985; Waters, martelli, Zakrajsek and Popovich, 1988) as well as associated with poor performance in different programmes at higher education level. Ma in 1995 found that negative attitude towards a course for example, statistics, mathematics or foreign language have been found to have a significant negative effect on students learning. Butt and Shams (2013) found that student teachers have a negative attitude towards research. Sridevi (2010) found that there is

no significant difference in attitude with respect to gender or marital status or with respect to the stream to which the student belong. There are three main goals of the higher education system- multiplications of skills and knowledge, producing excellence in research and related areas, and making impact on or influencing several systems. Multiplication of such knowledge and skills is possible only through quality research. Knowledge gained by research is of the highest order. It is not based upon assumptions, beliefs and untested generalizations. To seek such knowledge, a researcher must develop the right attitude, accurate observation and integrity. Willingness to spend long hours to collect and study all forms of evidences before arriving at conclusions, and originality and objectivity in thinking are equally essential.

Review of various studies in this area, few of them presented above, reveals that research attitude is influenced by a number of factors and there is a need to study these factors and their influence on the research attitude on Social Science Researchers. Keeping this aspect in mind, the investigator made a humble attempt to study the Research Attitude of social science research scholars in relation to their Achievement Motivation and Self-concept.

Objectives of the study:

- To compare the research attitude, achievement motivation and self concept of male and female sample.
- To determine the influence of high and low achievement motivation on the research attitude of total, male and female samples.
- To determine the influence of high, and low self concept on the research attitude of total, male and female samples.

Hypotheses of the study:

The following hypotheses were framed for empirical verifications

- There would be no significant difference between male and female samples on the measure of research attitude, achievement motivation and self concept.
- There would be no significant difference between high and low achievement motivation scholars on the measure of research attitude of the total, male and female samples.

- There would be no significant difference between high and low self concept scholars on the measure of research attitude of total, male and female samples.

METHODOLOGY AND DESIGN OF STUDY:

A random sample of 101 research scholars comprising 47 males and 54 female social science research scholars was selected from 10 different departments of Aligarh Muslim University, Aligarh. The following standardised tools were used to collect the data.

Attitude Scale Towards Research by Sood & Sharma (2012)

Deo-Mohan Achievement Motivation Scale by Deo and Mohan (1985).

Self-Concept Scale by Rani (1979) Reliability of the scale by split-half method, following Spearman Brown Prophecy formula was found to be 0.87.

Statistical techniques used:

The main statistical technique used for the data analysis was 't' test for knowing the significance between the means of different comparative groups. The data was analyzed with the help of computer by using SPSS to get accurate results and also to save time.

ANALYSIS AND INTERPRETATION OF RESULTS

Table -1

Comparison of Mean Scores of Male and Female Research scholars on the measure of Research Attitude, Achievement Motivation and Self Concept

Variables	Group	N	Mean	S.D	t	Remark
Research Attitude	Male	47	154.26	17.198	0.728	Insignificant
	Female	54	156.63	15.575		
Achievement Motivation	Male	47	125.91	19.049	4.432*	*Significant at 0.01 level
	Female	54	141.76	16.882		
Self-concept	Male	47	160.55	14.291	3.850*	*Significant at 0.01 level
	Female	54	172.69	17.373		

Above Table-1 shows no significant difference between the male and female sample on the measure of research attitude however significant difference was seen between males and females on the measure of achievement motivation and self concept. Female researchers were found to have higher achievement motivation and self concept as compared to their male counterparts. The findings are in line with the study conducted by Harikrishnan in 1992 who concluded that girls have a higher level of achievement motivation. Aggarwal (1994) in his research also revealed that girls had more positive self concept than boys. Thus Ho1 is accepted for research attitude but rejected for rest two variables.

Table- 2

Comparison of mean scores of Research Attitude in relation to achievement motivation for total, male and female sample

Sample	Groups	N	Mean	SD	t value	Remark
Total Sample	High Achievement Motivation	33	160.00	14.532	2.142*	*Significant at 0.05 level
	Low Achievement Motivation	33	151.00	19.268		
Male Sample	High Achievement Motivation	10	160.60	9.216	2.290*	*Significant at 0.05 level
	Low Achievement Motivation	23	146.17	18.843		

Female Sample	High Achievement Motivation	23	159.74	16.499	0.381	Insignificant
	Low Achievement Motivation	10	162.10	15.989		

Perusal of the table- 2 reveals that there exists a significant difference between the high Achievement Motivation and low Achievement Motivation groups in regard to the Research Attitude for total sample. The calculated t value 2.142 is significant at 0.05 level of confidence. It can further be concluded based on the mean scores that high Achievement Motivation group had better attitude towards research as compared to their counterpart low Achievement Motivation group. The finding is in line with study conducted by Wang and Guo (2011) who found that higher motivation leads to a better attitude towards research. In case of male sample the difference was significant showing the same trend as in case of total sample. However in case of female sample the difference between the two compared groups was found to be insignificant. Hence H0:2 is accepted partially.

Table -3

Comparison of mean scores of Research Attitude in relation to Self concept for total, male and female sample

Sample	Groups	N	Mean	SD	t value	Remark
Total Sample	High Self Concept	33	163.88	13.301	3.443*	* Significant at 0.01 level
	Low Self Concept	33	150.76	17.389		
Male Sample	High Self Concept	9	158.00	6.557	1.007	Insignificant
	Low Self Concept	26	151.73	18.127		
Female Sample	High Self Concept	24	166.08	14.581	3.007*	* Significant at 0.01 level
	Low Self Concept	7	147.14	14.971		

From table- 3 it is clear that the independent variable self concept has its significant influence on the research attitude of total sample and female sample i.e. students with high self concept have better attitude towards research and low self concept leads to poor research attitude. While for male sample the research attitude for students with high and low self concept is approximately same as the t value (1.007) is insignificant. Thus Ho: 3 is accepted partially.

CONCLUSIONS AND SUGGESTIONS:

In the present study two independent variables i.e. achievement motivation and self concept were analyzed to see their influence on the research attitude on the total, male and female samples. It was seen that to some extent both the variables influence the research attitude of social science research scholars. There is no significant difference between male and female sample on the measure of research attitude, however, there is a significant difference between male and female samples on the measure of achievement motivation and self concept.

- A positive attitude towards research is an important factor which influences the achievement motivation and adjustment in scholars. Attitudes change in slow and steady manner and the most important thing is creation of research environment in all departments. Cooperative efforts on the part of Chairmen, Deans and University administra-

tion may be helpful in creating such positive research environment.

- The present study indicates that achievement motivation and self concept play an important role in affecting the research attitude of scholars. Thus, efforts must be made to increase the level of motivation and develop better self concept among researchers.
- Orientation programmes must be held for researchers at master level acquainting them with desirable traits required, essential qualifications and the responsibilities associated with research work. This may help the students to decide whether or not research work is fit for them and would also lead to better adjustment after they enter in research programme.
- Regular seminars and conferences must be held and the research scholars must be made to engage in presentations, paper writings and discussions in order that they realize their abilities and develop a more positive self concept as well as higher level of motivation to achieve.
- Professional development programmes like research writing skills, use of SPSS, knowledge about plagiarism, Reviewing the researches should be compulsory for research scholars.

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MHD FLOWS-IMAGE OF STREAMLINES IN BELTRAMI SURFACE

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ABSTRACT

Let S be a surface. \bar{S} the corresponding Beltrami surface obtained by surface revolution of S . By using the fundamental magnitudes and the flow on the surface S we study flow on the surface \bar{S} and it is proved that the streamlines in the Beltrami surface \bar{S} are concentric circles or radial.

KEYWORDS

Beltrami surface, Image streamlines, Fundamental magnitudes, concentric circles and radial

1.1 Introduction

The Navier-Stokes equations are highly non linear partial differential equations in almost every real situation. Because of this, most problems are difficult or impossible to solve. Therefore, some special methods which can handle the above type of equations have gained considerable importance. One such technique is the Differential Geometry technique. The geometric technique has attracted the investigator in fluid flow theories as it not only provides the information of flow structure, but also accommodates quite a good number of analytical flows.

Exploiting the geometric properties of streamline triad, first time Kanwal [4] has attempted to describe the equations governing spatial flows in intrinsic form. Truesdell [8] has surveyed the literature and attempted to describe the role of geometries in spatial gas flows. Nemenyi [5] studied the geometric properties of plane gas flows, utilizing the orthogonal geometric net related to the streamline and their orthogonal trajectories.

Chandna, M.R.Garg [2] have considered plane steady, aligned magneto hydrodynamic flow and they have proved that the streamlines are concentric circles, when (i) they are straight lines but not parallel, (ii) they are involute of a curve C . Recently C.S.Bagewadi and K.N. Prasannakumar [1] have studied the geometry of stream lines in spherical, inverse and parallel

surfaces as image surfaces. They have considered non parallel straight streamlines enveloping a curve C in plane steady aligned MGD flow on the surface S . By taking tangent lines to C and their orthogonal trajectories (the involutes of C) as a system of orthogonal curvilinear co-ordinates they have established that the streamlines are concentric circles and the magnetic permeability of the fluid medium is constant. Siddabasappa etal [6] established that in a Beltrami surface the image streamlines of steady MGD flow are concentric circles and the magnetic permeability acts in the tangential direction to Beltrami surface.

In this paper by using fundamental magnitudes it is established that If the streamlines in steady plane magnetohydrodynamic flow of a viscous incompressible fluid of infinite electrical conductivity in the surface S are straight lines but not parallel and envelope a curve C , the tangent lines to C i.e., $\eta = \text{constant}$ and the involutes of the curve C i.e., $\xi = \text{constant}$ are taken as orthogonal curvilinear co-ordinates, then the streamlines in the Beltrami surface \bar{S} are concentric circles or radial .

1.2 SURFACES

Let $r: D \rightarrow E^3$ be a differential map defined by $(\xi, \eta) \rightarrow r(\xi, \eta)$, where D is an open subset of E^2 and $(\xi, \eta) \in D$. Then the curve $\xi \rightarrow r(\xi, \eta_0)$ defined by $\eta = \eta_0$ is called ξ -parameter curve and the curve $\eta \rightarrow r(\xi_0, \eta)$ defined by $\xi = \xi_0$ is called η -parameter curve. By giving values for ξ and η we get points on the surface. The intersection of the curves $\xi = \xi_0$ and $\eta = \eta_0$ represents a point (ξ_0, η_0) on the surface. The pairs (ξ, η) define the curvilinear co-ordinates on the surface. The surface is covered by these two families of curves. If these two curves intersect orthogonally then they are said to form orthogonal curvilinear co-ordinate system, otherwise non-orthogonal.

The vectors $\frac{\partial r}{\partial \xi}$ and $\frac{\partial r}{\partial \eta}$ are called Tangent vectors to curves $\eta = \eta_0$ and $\xi = \xi_0$ at the points (ξ_0, η_0) respectively. Set

$$r_1 = \frac{\partial r}{\partial \xi}, r_2 = \frac{\partial r}{\partial \eta}, r_{12} = \frac{\partial^2 r}{\partial \xi \partial \eta} = r_{21} \quad \text{and} \quad r_{11} = \frac{\partial^2 r}{\partial \xi^2}, r_{22} = \frac{\partial^2 r}{\partial \eta^2}$$

The arc length dS in curvilinear co-ordinate system (ξ, η) is given by

$$dS^2 = dr \cdot dr = E d\xi^2 + 2F d\xi d\eta + G d\eta^2 \quad (a)$$

where E, F and G are called first fundamental magnitudes and are given by

$$E = r_1^2 = g_1^2(\xi, \eta), \quad G = r_2^2 = g_2^2(\xi, \eta), \quad F = r_1 \cdot r_2 = |r_1||r_2|\cos\theta = \sqrt{EG} \cos\theta$$

$n = \frac{r_1 \times r_2}{W}$ is the unit normal to the surface and $W^2 = EG - F^2$. Let K denote the Gaussian curvature, then

$$K = \frac{LN - M^2}{W^2} = \frac{1}{2W} \left[\left\{ \frac{F}{EW} \frac{\partial E}{\partial \eta} - \frac{1}{W} \frac{\partial G}{\partial \eta} \right\} + \left\{ \frac{2}{W} \frac{\partial F}{\partial \xi} - \frac{1}{W} \frac{\partial E}{\partial \eta} - \frac{F}{EW} \right\} \right]$$

is called Gauss characteristic equation. If e_1 and e_2 are unit tangent vectors defined on a open subset D of E^2 and $V = (V_1, V_2)$ is a vector, then in an orthogonal curvilinear co-ordinate system, we have-

$$\text{grad } \Phi = \nabla \Phi = \frac{1}{g_1} \frac{\partial \Phi}{\partial \xi} e_1 + \frac{1}{g_2} \frac{\partial \Phi}{\partial \eta} e_2 \tag{1}$$

$$\text{div } \vec{V} = \nabla \cdot \vec{V} = \frac{1}{g_1 g_2} \left\{ \frac{\partial (V_1 g_2)}{\partial \xi} + \frac{\partial (V_2 g_1)}{\partial \eta} \right\}$$

$$\text{curl } \vec{V} = \nabla \times \vec{V} = \frac{1}{g_1 g_2} \left[\frac{\partial (V_2 g_2)}{\partial \xi} - \frac{\partial (V_1 g_1)}{\partial \eta} \right] e_3$$

Where e_3 is a unit vector orthogonal to both e_1 and e_2 .

1.3 Beltrami surface

Let Φ be a scalar point function in the (ξ, η) plane. It is known that the gradient of Φ at any point P of the plane is a vector quantity. Let r be the position vector of any point in the (ξ, η) plane. Construct a vector field V from Φ as follows:

$$V = (G\Phi_1 - F\Phi_2)r_1 + (E\Phi_2 - F\Phi_1)r_2 \tag{2}$$

where $\Phi_1 = \frac{\partial \Phi}{\partial \xi}$, $\Phi_2 = \frac{\partial \Phi}{\partial \eta}$.

Let Ψ be another scalar point function in the (ξ, η) plane. Construct a vorticity vector Ω from the scalar point functions Φ and Ψ as $\Omega = \Psi \nabla \Phi$

In this case the surface generated by $\Phi = \text{constant}$ is called as Beltrami surface and $\Psi = \text{constant}$ is called distance function surface for the family of Beltrami surfaces. The following identities hold true –

$$(\nabla \Phi)^2 = W^{-2} (E\Phi_2^2 - 2F\Phi_1\Phi_2 + G\Phi_1^2), \quad \nabla \Phi \times \nabla \Psi = W^{-1} (\Phi_1\Psi_2 - \Phi_2\Psi_1)n$$

$$\nabla\Phi \cdot \nabla\Psi = W^{-2}[E\Phi_2\Psi_2 - F(\Phi_1\Psi_2 - \Phi_2\Psi_1) + G\Phi_1\Psi_1] \tag{3}$$

where n is a unit vector to the $\xi - \eta$ plane. The curves $\Psi = \text{constant}$ are orthogonal trajectories of the curves $\Phi = \text{constant}$ if the gradients of the two functions are everywhere perpendicular and the condition of the orthogonality of the two systems of curves is $\nabla\Phi \cdot \nabla\Psi = 0$.

If Δ_1 is the Beltrami differential operator of the first order then $\Delta_1\Phi$ is the square of the magnitude of $\nabla\Phi$ that is – $\Delta_1\Phi = (\nabla\Phi)^2$

The mixed differential operator of the first order is the scalar whose product of the gradients of Φ and Ψ , that is – $\Delta_1(\Phi, \Psi) = \nabla\Phi \cdot \nabla\Psi$

Let E, F, G be the first fundamental magnitudes for the parametric variable functions Φ and Ψ in the Beltrami surface and are given by –

$$\begin{aligned} W^{-2} &= (\nabla\Phi \times \nabla\Psi)^{-2} & E &= W^{-2}(\nabla\Psi)^2 = W^{-2}\Delta_1\Psi \\ F &= -W^{-2}\nabla\Phi \cdot \nabla\Psi = W^{-2}\Delta_1(\Phi, \Psi) & G &= W^{-2}(\nabla\Phi)^2 = W^{-2}\Delta_1\Phi \end{aligned} \tag{4}$$

1.4 Image of streamlines of aligned MHD flow of a surface S in the Beltrami surface \bar{S}

We consider steady plane magneto hydrodynamic flow of a viscous incompressible fluid of infinite electrical conductivity. The governing equations are –

$$\text{div } \mathbf{V} = 0 \tag{5}$$

$$(\mathbf{V} \cdot \text{grad})\mathbf{V} + \rho^{-1} \text{grad } P = \nu \text{div}(\text{grad } \mathbf{V}) + \mu_e \rho^{-1}(\text{curl } \mathbf{H}) \times \mathbf{H} \tag{6}$$

$$\text{div } \mathbf{H} = 0 \tag{7}$$

where \mathbf{V} =velocity vector, \mathbf{H} =Magnetic field vector, P =pressure function

ν = kinematic viscosity, μ_e = Magnetic permeability, ρ = fluid density

In this section, we study aligned flows for which the magnetic lines lie in the flow plane and are everywhere parallel to the streamlines. Thus $\mathbf{V} \times \mathbf{H} = 0$ which implies

$$\mathbf{H} = \alpha \mathbf{V} \quad \text{and} \quad \mathbf{V} \cdot \text{grad } \alpha = 0 \tag{8}$$

where α is called abnormality parameter and it is either constant or a function of position and time. Let $\mathbf{V} = V(\xi, \eta)$

In natural, i.e., streamline or curvilinear co-ordinates (ξ, η) with $g_1(\xi, \eta)d\xi$ and $g_2(\xi, \eta)d\eta$ as the components of a vector element of arc length, we have –

$$\text{div } V = (g_1 g_2)^{-1} \frac{\partial}{\partial \xi} (g_2 V) \quad (10)$$

$$\text{curl } V = -(g_1 g_2)^{-1} \frac{\partial}{\partial \eta} (g_2 V) e_3$$

$$\text{curl } V \times V = -V (g_1 g_2)^{-1} \frac{\partial}{\partial \eta} (g_2 V) e_2$$

$$\text{curl } \Omega = g_2^{-1} \frac{\partial \Omega}{\partial \eta} e_1 - g_1^{-1} \frac{\partial \Omega}{\partial \xi} e_2$$

$$\text{curl } H \times H = -\alpha V (g_1 g_2)^{-1} \frac{\partial}{\partial \eta} (g_1 \alpha V) e_2$$

$$V \cdot \text{grad } \alpha = g_1^{-1} V \frac{\partial \alpha}{\partial \xi}$$

$$\text{grad} \left(P \rho^{-1} + \frac{V^2}{2} \right) = g_1^{-1} \frac{\partial}{\partial \xi} \left(P \rho^{-1} + \frac{V^2}{2} \right) e_1 + g_2^{-1} \frac{\partial}{\partial \eta} \left(P \rho^{-1} + \frac{V^2}{2} \right) e_2$$

Where V is the magnitude of velocity e_1 a unit vector in the direction of the velocity, e_2 a unit vector in the direction perpendicular to the velocity but in the plane of flow, e_3 a unit vector in the direction of normal to the plane of flow such that e_1 , e_2 and e_3 form a right handed co-ordinate system. Using equations (10) in (5), (7), (8) we have-

$$\frac{\partial}{\partial \xi} (g_2 V) = 0 \quad (11)$$

$$\frac{\partial \alpha}{\partial \xi} = 0 \quad (12)$$

$$\Omega = -(g_1 g_2)^{-1} \frac{\partial}{\partial \eta} (g_1 V) \quad (13)$$

$$V \frac{\partial V}{\partial \xi} + \rho^{-1} \frac{\partial P}{\partial \xi} + g_1 g_2^{-1} \frac{\partial \Omega}{\partial \eta} = 0 \quad (14)$$

$$V^2 g_1^{-1} \frac{\partial g_1}{\partial \eta} - \rho^{-1} \frac{\partial P}{\partial \eta} + g_2 v g_1^{-1} \frac{\partial \Omega}{\partial \xi} = \mu_e (\rho g_1)^{-1} \alpha V \frac{\partial}{\partial \eta} (g_1 \alpha V) \tag{15}$$

Let us consider the flow in a surface S. the arc length of any streamline in the surface in curvilinear co-ordinate system (ξ, η) is given by (a).

We assume that the streamlines in the surface S are straight lines but not parallel and envelope a curve C and their orthogonal trajectories, the involutes of C, as a system of curvilinear co-ordinates. The squared element of arc length dS in this orthogonal curvilinear coordinate system is given by [9],

$$dS^2 = d\xi^2 + (\xi - \sigma(\eta))d\eta^2 \tag{16}$$

where $\sigma = \sigma(\eta)$ denotes the arc length of the curve C and η - the angle subtended by the tangent line with x-axis and ξ - a parameter constant along the involute of this co-ordinate system. Comparing (a) and (16), we have –

$$g_1^2 = E = 1, \quad F = 0, \quad g_2^2 = G = (\xi - \sigma(\eta))^2, \quad W^2 = EG - F^2 = (\xi - \sigma(\eta))^2 \tag{17}$$

One can easily see that E and G of (17) satisfy Gauss characteristic equation.

$$K = \frac{-1}{\sqrt{EG}} \left[\frac{\partial}{\partial \xi} \left(\frac{1}{\sqrt{E}} \frac{\partial \sqrt{G}}{\partial \xi} \right) + \frac{\partial}{\partial \eta} \left(\frac{1}{\sqrt{G}} \frac{\partial \sqrt{E}}{\partial \eta} \right) \right] = 0 \tag{18}$$

Hence the flow in the surface S is planar and the flow is laminar.

Now differentiating (14) with respect to η and (15) with respect to ξ and adding we obtain –

$$\frac{\partial}{\partial \eta} \left(V \frac{\partial V}{\partial \xi} \right) + v \frac{\partial}{\partial \eta} \left(\frac{g_1}{g_2} \frac{\partial \Omega}{\partial \eta} \right) + v \frac{\partial}{\partial \xi} \left(\frac{g_2}{g_1} \frac{\partial \Omega}{\partial \xi} \right) + \frac{\partial}{\partial \xi} \left(\frac{V^2}{g_1} \frac{\partial g_1}{\partial \eta} \right) = \mu_e \rho^{-1} \frac{\partial}{\partial \xi} \left(\frac{\alpha V}{g_1} \right) \frac{\partial}{\partial \eta} (g_1 \alpha V) \tag{19}$$

Using (11) we have –

$$V = g_2^{-1} A(\eta) \tag{20}$$

where A(η) is an arbitrary function η . As discussed above for an orthogonal system in the Beltrami surface, we must have

$$\nabla \Phi \cdot \nabla \psi = 0 \tag{21}$$

Using (3) and (17) in (21) we have –

$$\phi_2 = -(\xi - \sigma(\eta))^2 \phi_1 \psi_1 \psi_2^{-1}$$

By equation (17), (3), (22) in (4) we obtain

$$E = \psi_2^2 \phi_1^{-2} [\psi_2^2 + (\xi - \sigma(\eta))^2 \psi_1^2]^{-1} = g_1^2$$

$$G = (\xi - \sigma(\eta))^2 [\psi_2^2 + (\xi - \sigma(\eta))^2 \psi_1^2]^{-1} = g_2^2$$

$$W = \psi_2^2 \phi_1^{-2} [\psi_2^2 + (\xi - \sigma(\eta))^2 \psi_1^2]^{-2}$$

Substituting g_1 and g_2 from (23) in equations (11) and (13) with $g_1 = \mathbf{g}_1, g_2 = \mathbf{g}_2$ we have

$$v = A(\eta)^{-1} (\xi - \sigma(\eta))^{-1} [\psi_2^2 + (\xi - \sigma(\eta))^2 \psi_1^2]^{1/2}$$

$$\Omega = A(\eta) [\psi_2^2 + (\xi - \sigma(\eta))^2 \psi_1^2] (\xi - \sigma(\eta))^{-2} [\psi_{22} \psi_2^{-1} + A^{-1}(\eta) A'(\eta) - \phi_1^{-1} \phi_{12} + \sigma'(\eta)(\xi - \sigma(\eta))]$$

Using (23), (24) in (19), after simplification to hold it identically we must have $\xi = \sigma(\eta)$.
 us $v \psi_2^2 \sigma'^2(\eta) A(\eta) (1 - 8 \phi_1 \psi_2) = 0$

On the curve $\xi = \sigma(\eta)$ we have by (22), $\phi_2 \psi_2 = 0$. This gives either $\phi_2 = 0$ or $\psi_2 = 0$ or $\phi_2 = \psi_2 = 0$.

Case (i) : Let $\phi_2 = 0$ and $\psi_2 \neq 0$

$\phi_2 = 0$ implies $\phi = f(\xi)$. This with equation (25), we have-

$$v \psi_2^2 \sigma'^2(\eta) A(\eta) (1 - 8 \phi_1 f'(\xi)) = 0$$

Since $v \neq 0, \psi_2 \neq 0, A(\eta) \neq 0$ we have either

(i) $\sigma'(\eta) = 0$ i.e. $\sigma(\eta) = \text{Constant}$ that is the arc length is same in all directions from a point. Hence the streamlines in the Beltrami surface are concentric circles, therefore complex lamellar flow, the streamlines are concentric circles

or (ii) $(1 - 8 \phi_1 f'(\xi)) = 0$.

$$\text{i.e. } (f'(\xi)) = \frac{1}{\sqrt{8}} \text{ or } \phi = f(\xi) = \frac{\xi}{\sqrt{8}}$$

Case (ii): $\phi_2 \neq 0$ and $\psi_2 = 0$

The equation (25) holds identically, since $\psi(\xi, \eta) = \text{constant}$ is a distant function for the family of Beltrami surfaces $\phi(\xi, \eta) = \text{constant}$ and $\psi_2 = 0$ implies that in a Beltrami surface the streamlines are radial.

Case (iii) $\psi_2 = 0$ and $\phi_2 = 0$

This is same as case (ii) discussed above.

Conclusion: Differential geometry has been of increasing importance to mathematical physics due to Einstein's general relativity postulation that the universe is curved. Differential geometry technique is one of the powerful method in solving nonlinear differential equations. The field of astronomy, especially mapping the positions of the stars and planets on the celestial sphere and describing the relationship between movements of celestial bodies, served as an important source of geometric problems during the next one and a half millennia. Study of images on different surfaces has lot of applications in engineering, Medical and in nature. Images of an object on an eye ball, scanning a body, image of an object in mirror of the vehicles etal are some applications of this study. We conclude the above discussion by the following

Theorem : If the streamlines in steady, plane, aligned MHD flow on a surface S are involutes of a curve C then their images in a Beltrami surface \bar{S} are concentric circles or $\phi = f(\xi) = \frac{\xi}{\sqrt{8}}$ or radial .

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Environmental Awareness and Attitude Towards Science: A Correlation Study

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ABSTRACT

The present study has been conducted to investigate the environmental awareness of under graduate students. Result of the unmindful exploitation of natural resources by human being. There is an urgent need to create environmental awareness among all human beings to conserve, protect and nurture our environmental resources. Consequently the study was conducted on a random sample of 600 under graduate students. The environmental awareness ability measure by P.K. Jha and scientific attitude scale A. Grawal was used collect data. The finding of the study indicated that environmental awareness has positive with scientific attitude among students and Level of environmental awareness intern of components attitude significantly differ to each other.

KEYWORDS

Environmental Awareness, Attitude.

I. Introduction

Environment is a broad term. It includes not only physical or material aspect but psychological, social and cultural aspects as well. Thus, environment consists of material and non-material surroundings of human beings.

Nature provides a limited freedom to man for connecting his exploitation activities. Man is a part of nature and hence cannot exert control over nature on the basis of his free will. When he tries to break the natural laws of nature he is bound to face the serious consequences.

In the contemporary world, the healthy existence of human society is getting worse. This state of affair is due to the unimaginably great volume of environmental maladies or problems which are pushing our planet almost to the brink of mass scale disaster of living beings or species on this good habitable earth. These wild storms of criminality and the volume of un-social passions are dangerously corroding the vitality and integrity of the working people of the world. The harmony of heart has been damaged and the tribunal of conscience has been greatly demolished due to unqualitative environment on this earth. This state of environmental conditions in which the modern man lives can bring into existence unlimited ugly situations and conditions, which can devour much of the potentials of creative and healthy lives of the human society.

Environmental crisis or maladies are the foremost and the most persistently challenging problems which are ready to devour the glories of human existence and are ready to wipe out the human civilization from the earth. The present century is witnessing such problems of environment crisis which are nothing but the creation of a greedy human society which wants to exploit nature beyond any reasonable limit. Dominantly operative environmental maladies today are always active in informing man to think seriously and choose a way between creative and progressive existence or be ready for annihilation.

Conceptual Frame Work

The entire research process is guided by objectives which have been explicitly and precisely spelled out by the investigator in advance.

The present study is aimed at achieving the following objectives:

tives:

1. To examine the relationship between environmental awareness and attitude towards science.
2. To compare the environmental awareness of under graduate students having high and low scientific attitude.

II. Tools Used

Environmental Awareness Ability Measure (EAAM):

In the present study "EAAM" by Dr. Praveen Kumar Jha. The present Tool Environmental Awareness Ability scale purports to measure the extent and Degree of awareness of People about environmental pollution and its protection.

Reliability:

Three indices of reliability were determined secondly it was calculated by K.R. Method and was found 61 found-84 and thirdly, it was determined by test retest method. Two test retest reliabilities were determined and other of 6 months and the values were found -74 and 71 respectively.

Validity:

To determine validity of the Environment. Awareness ability measure coefficients of correlation between the scores of the present scale and environmental awareness scale of Tarniji was computed. The coefficient of correlation was found to be 0.83. The scale also possesses face and content validity science each item was Judged by experts.

Science Attitude Scale (SAS):

The SAS is dependable tool for measuring students attitude towards science. It appears to be useful for teacher of science, guidance workers and research scholars. The students of psychology and Education can also use it to study the development of their attitude towards attitudes.

Reliability :

The reliability of the Science Attitude scale (SAS) was estimated by the split half (0.86) and test retest (0.75) methods which was found to be quite satisfactory. This compares favourably with reliability (0.765) found by Sood (1975) for his scale of attitude towards science and scientists. Reliability of the scale was further checked by two methods of scoring by administering the scale to small sample of 50 subjects with instructions to

check the statements in accordance with the usual Thrustone's in instructions and the science subjects were then asked to check for each item on one of the five alternative in accordance with the usual likert instructions. The coefficient of correlation found between the scores on two scales was 0.94.

Validity:

The SAS appears to have content validity and the method of selecting items supports his supposition. In addition, differences in mean scores was found among the selected groups of known preference for science i.e. Arts (Mean 46.41) and science (Mean 50.58) students which is highly significant (6.62) at 1 percent level.

III. Results and Analysis

1: Relationship of environmental awareness and Attitude towards science.

Find out the relationship between Environmental Awareness and toward the Science Ce. The Total sample were 600 (300 boys) and 300 girls). The mean scores of Environmental awareness is 49.33 and 37.22 respectively where as the standard deviation (SD) of Environmental Awareness and towards science is 9.902 and 6.916 respectively. The estimated correlation coefficient(r) is .026. Which is significant at 0.01 level. Hence the results clearly indicate that a strong relationship between the Environmental and towards science has been demonstrated by this finding.

Table 1: Relationship of environmental awareness and Attitude towards science.

Variables	N	Mean	S.D.	Correlation Coefficient (r)
S.A.	300	49.33	9.902	0.026
E.A.	300	37.22	6.919	

2: Significant of difference between the environmental awareness of under graduate student having high and low scientific attitude.

Table 2 shows that most of the students in terms of sub components viz attitude awareness have high level of environmental awareness students in terms of subcomponent viz have low environmental awareness.

Table 2: Significant of difference between the environmental awareness of under graduate student having high and low scientific attitude.

Level	N	Mean	S.D.	t-Value	Remarks
High S.A.	183	38.13	5.461	.777	Not significant
Low S.A.	183	37.61	7.321		

IV. Findings

T-test and co-relation were used to determine the relationship between environmental environmental awareness and Attitude towards science..

The result clearly indicates that a strong relationship between the environmental awareness and Attitude towards science.

Level of environmental awareness in terms of components attitude significantly differ to each other.

V. Educational Implications

On the basis of a single study, it will be add to suggest some educational implications of the present study.

- Educationist, educational administrators and teachers must acquaint their pupil about pros and cons of environmental pollution.
- Value- originated education in the light of environmental pollution and environmental awareness should be provided.
- Formal system of education should also incorporate in its curriculum. Some elements of environmental awareness programmes.

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INITIAL PUBLIC OFFERINGS UNDERPRICING: A STUDY ON THE SHORT RUN PRICE PERFORMANCE OF BOOKBUILT IPOs IN INDIA

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ABSTRACT

Issuing of shares through book building process leads to efficient price discovery. This study attempts to examine how the initial public offerings (IPO) issued through book building fare in short-run. The study examines the first day returns of 288 book-built IPOs in India for a 7 year period (2004-2010). Based on this set of observations this study builds a comprehensive model of the short term price performance of the new offerings. Results indicate that the IPOs are underpriced in India. Oversubscription and market volatility was found to be the major factors influencing underpricing. The results imply that the investors over react to the market. The presence of deliberate underpricing by the underwriters or the issuing firm to decrease block holdings by the shareholders is also evident. Finally, results illustrate a trend towards a less aggressive underpricing.

KEYWORDS

IPOs, Underpricing, Book-building

INTRODUCTION:

An Initial Public Offering (IPO) is a critical moment for a company. A firm going public relies on the capital raised in its IPO to grow and thrive. The stakes also are high for other parties. Investors can reap huge profits or sustain big losses. For the firm's owners and managers, as well as the venture capitalists with a stake in the firm and the investment bankers who underwrite the sale, careers and fortunes can be made. It is well known that initial public offerings (IPOs) are underpriced. IPO is when an unlisted company makes either a fresh issue of securities or an offer for sale of its existing securities or both for the first time to the public. In the last decades thousands of firms around the world have preferred to go public. Plentiful studies have documented recurring mysteries regarding IPOs and an extensive theoretical literature has attempted to explain the anomalies in the IPO's market. McDonald and Fisher (1972), Ibbotson (1975), Ritter (1984), Koh and Walter (1989), Kim *et al.* (1995), Mohan and Chen (2001), Loughran and Ritter (2004), Kerins *et al.* (2007), among others, consistently document that, on average, the offer price of IPO shares are substantially lower than the closing price on the first day of trading. Rock (1986) proposes a winner's curse model based on information asymmetry. Rock assumes that investors are informationally heterogeneous; that is, some investors (better-informed) know more than others (ordinary investors) about the quality of IPO firms. Hence, better-informed investors only bid on the attractive IPO offerings and leave the overpriced IPOs to ordinary investors. Therefore, to entice the continued participation of ordinary investors, IPO firms use IPO underpricing to compensate for losses by ordinary investors due to the winner's curse. Many studies offer evidence to support the information asymmetry explanation of IPO underpricing. Underpricing is such consistent phenomena across countries with very different company populations, corporate control mechanisms, and institutional, legal, taxation, regulatory, historical and cultural frameworks. Moreover, the challenge for the underwriter is to design a mechanism that induces investors to reveal their information truthfully, by making it in their best interest to do so. Benveniste and Spindt (1989), and all, show that book-building can under certain conditions, be such a mechanism.

The process starts off with the issuing company appointing the lead manager for the issue who in turn will enter into an agreement with a set of underwriters called as syndicate members who will elicit bids from prospective investors. The bids from the investors have to be in a price band determined

in the following way. The company in consultation with the lead managers specifies a minimum acceptable price known as the floor price. Once the floor price is fixed the upper price of the issue is automatically capped at 120% of the floor price as per regulation. Of course, the floor price could be revised by 20% upwards or downwards but subsequently the ceiling price will also gets revised and the books shall be open for a minimum period of three days consequent to the revision subject to the condition that the total bidding time will not exceed thirteen days. Therefore it appears a little restrictive but book building gives ample opportunities for price discovery. All the institutional investors have to place limit orders while retail investors 'can place their bids at the cutoff price to be determined later. Once the bidding process is complete the lead manager and issuer will determine the cut off price or the market clearing price and shares will be allocated¹ on a uniform price basis.

Fig 1: IPO process at a glance

Book building involves soliciting from the professional investors how much they are willing to buy and at what price. On the basis of the resulting demand curve, the firm and its investment bankers determine the IPO offer price.

SEBI brought forward guidelines² for issuing shares through book the building 1998 An Issuer Company can issue capital through book building in following two ways:

(1) 75% Book Building process

The option of 75% Book Building is available to all body corporates that are otherwise eligible to make an issue of capital to the public. The securities issued through the book building process are indicated as 'placement portion category' and securities available to public are identified as 'net offer to public'. In this option, underwriting is mandatory to the extent of the net offer to the public. The issue price for the placement portion and offers to public are required to be same.

(2) 100% of the net offer to the public through Book Building process

In the 100% of the net offer to the public, entire issue is made through Book Building process. The Equity Shares may be offered to the public through the 100% Book Building Process

in accordance with the SEBI Guidelines, wherein

A minimum of 50% of the Net Issue shall be allocated on a proportionate basis to Qualified Institutional Buyers³ ("QIBs") (including 5% of the QIBs' portion that would be specifically reserved only for Mutual Funds and Mutual Fund applicants shall also be eligible for proportionate allocation under the balance available for QIBs);

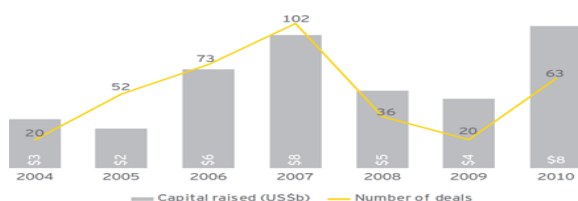
Up to 15% of the Net Issue shall be available for allocation on a proportionate basis to Non-Institutional Bidders; and

Up to 35% of the Net Issue shall be available for allocation on a proportionate basis to Retail Individual Bidders, subject to valid bids being received at or above the Issue Price

This research which investigates the correlates of IPO performance (i.e., those factors associated with the performance of the IPO firm on the day of the initial stock offering) may assist potential investors in evaluating IPO investment opportunities. There have been a lot of theoretical explanations on underpricing. Some of them explain underpricing as a result of asymmetric information. There are some theories which give institutional explanations and explain through ownership and control too. The various factors taken for this study are based on some of these literatures which have been discussed in the next section.

The top issues of 2010 were from Coal India limited (Rs.15,199 crore), NMDC (Rs.9,930 crore), NTPC (Rs.8,480 crore), Power Grid (Rs.7,442 crore), Rural Electrification Corp (Rs.3,530 crore) and Jaypee Infratech (Rs.2,262 crore). The figure below shows the overall IPO activity from 2004 to 2010 in India in terms of the number of deals made and the capital rose.

Fig 2: Overall IPO activity in India by year



Source; Dealogic, Thomson Financial, Ernst & Young

India saw a dramatic recovery in its IPO markets in 2010. This revival has been a domestic consumption led-growth story, driven by an influx of capital from Western economies and a booming local stock market. India saw a growth of 215% in the number of IPOs compared to 2009. **2010 saw a string of IPOs and follow-on offerings** from many previously state-owned enterprises in the materials sector such as steel, oil and gas — all of which helped the Indian Government raise funds to build roads, ports and power plants. This materials sector activity stems from India's US\$10 billion divestment program that spawned the largest IPO in India ever, the listing of the world's largest coal producer, US\$3.4 billion Coal India, a former state-owned enterprise (Ernst & Young).

Objectives of the study are as follows: 1. To find the underpricing of IPOs in India for the past 7 years and the excess returns after adjusting for the market movements.

2. To build a comprehensive model of the short term price performance of the offerings in India.

This paper presents a brief literature review followed by data and methodology used in this paper. Results are analyzed and policy implications are discussed in detail.

LITERATURE REVIEW

There are various models suggested in the literature which

throw light on the IPO behavior. In most of the studies the first day returns after the IPO announcements are positive. There are some theoretical underpinnings which explain this phenomenon; they are discussed below:

(A) ASYMMETRIC INFORMATION

Rock (1986) assumes that some investors are better informed about the true value of the shares on offer than are investors in general, the issuing firm, or its underwriting bank. Informed investors bid only for attractively priced IPOs, whereas the uninformed bid indiscriminately. Hence, underpricing ensures the participation of uninformed investors in the IPO market.

Beatty and Ritter (1986) argue that as repeat players, investment banks have an incentive to ensure that new issues are underpriced by enough lest they lose underwriting commissions in the future. Investment banks thus coerce issuers into underpricing.

Duane B Kennedy, Ranjini Sivakumar and Kennath R Vetzal (2005) differentiated and assessed some of the competing hypotheses about IPO underpricing (6 models) by focusing on explanations based on asymmetric information in sequential financing setting. They assume IPO as the first stage of a two period sell out strategy. The second being seasonal offerings. The data of 2381 IPO from period 1991-1998 were taken. They find that the most compelling explanation comes from entrepreneurial losses model.

Ellul and Pagano (2006) bring in a new theory wherein they say that the investors worry about their after market illiquidity that may arise from asymmetric information after the IPO. To analyze this theory 337 British IPOs from a period June 1998 and Dec 2000 were taken. Liquidity concerns along with adverse selection and risk are taken as a motive for underpricing. They find that after market liquidity and liquidity risk matter for IPO underpricing.

a) Underpricing as a Signal of Firm Quality

Franklin Allen and Gerald Faulhaber (1988) develops a model consistent with the observation that the existence of hot-issue markets for initial public offerings and in certain periods and in certain industries new issues are underpriced and rationing occurs. The model assumes the firm itself best knows its prospects. In certain circumstances, firms with the most favorable prospects find it optimal to signal their type by underpricing their initial issue of shares and investors know that only the best can recoup the cost of this signal from subsequent issues.

Vong and Trigueiros (2010) made a study on the short run price performance of IPOs in Hong Kong. The first day returns of over 483 companies IPOs in Hong Kong were taken for a 12 year period (1994-2005). In the study the returns were regressed on a set of variables reflecting the three hypothesis (1) the informed demand, (2) signaling by means of the reputation of underwriters and (3) signaling with intentional underpricing, together with other variables which might affect the underpricing. They came to a conclusion that irrespective of the time period, the number of underwriters involved in an IPO, their reputation helps to reduce excess returns. The study also showed that the firms facing good prospects tend to under price more so as to distinguish themselves from less accepted firms.

b) Principal-Agent Model

Baron and Holmström (1980) construct models which focus on the underwriter's benefit from underpricing and found that in order to compensate underwriters for the use of their superior information, issuers rationally let underwriters under-price, in an informational environment in which underwriters have superior information about the demand for new shares and that their marketing efforts are unobservable and unverifiable. The more uncertain the value of the firm, the greater the asymmetry of information between issuer and underwriter, and thus the more valuable the latter's services become, resulting in greater underpricing

Beatty and Ritter (1984) developed two propositions in their paper. Firstly, they establish a monotone relation between the underpricing of an IPO and the uncertainty of investors regarding its value. And secondly, that this underpricing equilibrium is enforced by the investment banking industry. For this purpose 1028 IPOs in US from the period 1977-82 were taken. The results showed that IB enforces the underpricing equilibrium. And if the level of ex-ante uncertainty is endogenous, issuing firm can reduce the IPO uncertainty voluntarily.

c) Information Relevation Theories

Marisetty and Subrahmanyam (2009) document the effects of group affiliation on the initial performance of 2,713 initial public offerings (IPOs) in India under three regulatory regimes during the period 1990–2004. They find that the long-run performance of IPOs in general is negative. They also find that Indian investors over-react to IPOs and their over-reaction (proxied by the oversubscription rate) explains the extent of underpricing.

Deb and Marisetty (2010) argue that the introduction of a unique certification mechanism for IPOs in 2007, whereby all IPOs have to undergo mandatory quality grading by independent rating agencies, provides a better opportunity to test the well established certification hypothesis, especially in the context of emerging markets with institutional voids. Using a sample of 163 Indian IPOs they test the efficacy of IPO grading mechanism. They find that grading decreases IPO underpricing and positively influences demand of retail investors. Grading reduces secondary market risk and improves liquidity. However, grading does not affect long run performance of the IPOs. IPO grading successfully capture firm size, business group affiliation and firm's quality of corporate governance. Their findings imply that, in emerging markets, regulator's role to signal the quality of an IPO contributes towards the market welfare.

(B) INSTITUTIONAL EXPLANATION

Kunz and Aggarwal (1993) discusses special institutional settings in the Swizz stock market and provides some explanations implying that underpricing can be regarded as an equilibrium situation. They say underpricing is deliberately done to get free publicity and make investors invest in their stock, and as an indication of growing competition among the investment banks.

a) Price Support

Ruud (1991) addresses the apparent systematic underpricing of initial public offerings. She finds that most IPOs with zero one-day returns subsequently fall in price, suggesting that underwriter price support may account for the skewed distribution of initial returns observed in her study and hence gives the phenomenon of positive average initial IPO returns, even if offering prices are set at expected market value. This paper thus challenges the presumption underlying previous research that positive average initial IPO returns result primarily from deliberate underpricing.

b) Lawsuit Avoidance

Hughes and Thakor (1992) propose a trade-off between on the one hand minimizing the probability of litigation, and hence minimizing these costs, and on the other maximizing the gross proceeds from the IPO (and thus the underwriter's commission thereon). Crucially, they assume that the probability of litigation increases in the offer price: the more over-priced an issue, the more likely is a future lawsuit. In addition, they predict that underpricing reduces not only (i) the probability of a lawsuit, but also (ii) the probability of an adverse ruling conditional on a lawsuit being filed, and (iii) the amount of damages awarded in the event of an adverse ruling

(C) OWNERSHIP AND CONTROL

Brennan and Franks (1997) argue underpricing gives managers the opportunity to protect their private benefits by allocating shares strategically when taking their company public. Managers seek to avoid allocating large stakes to investors for fear

that their non-value-maximizing behavior would receive unwelcome scrutiny. Small outside stakes reduce external monitoring, owing to two free-rider problems.

Laura Casares Field, Dennis P. Sheehan (2004) they analyze whether there is any relation between underpricing when a firm goes public and the subsequent outside block ownership of the firm's stock. They find that the link between underpricing and ownership structure is weak. Most firms have outside blocks in place at the IPO and retain them afterwards. In terms of acquiring new blockholders, there is no difference between firms that underprice and those that do not. Their results say that underpricing is simply not a powerful lever with which to influence the firm's outside blockholdings.

(D) SOCIAL COMPARISON THEORY

Chih-Hsiang Chag (2010) studies a social comparison perspective on IPO underpricing. The social comparison theory in behavioral psychology suggests that when people do not know how to make a decision or are exposed to new information, they refer to the behavioral norm of the public or the behavior of others to frame their decisions. He argues that when IPO firms and underwriters are uncertain about an IPO firm's intrinsic values, they refer to similar IPO issuing firms in the same industry that went public earlier to determine the IPO offer price. Analyzing a sample of Taiwan 1558 IPOs from a period 1962-2009 he found that IPO offer-price setting and first-day IPO abnormal returns are positively correlated with IPO firm peers that went public earlier i.e., he finds evidence that supports the social comparison explanation of IPO underpricing.

The literature review shows that there are various theories explaining the reasons for IPO underpricing. However, the reasons for IPO under pricing may be different for different countries. The literature on the asymmetric information highlights on how the informational environment affects under pricing. It is seen that underpricing is regarded as a deliberate action chosen by the issuing firm in the pursuit of some wealth-maximizing objective and to signal its true value. The institutional explanations concentrate mainly on the price support provided by the underwriters and the fall of litigation risk by lowering the offer price. The literature also provides explanation on deliberate underpricing for retaining ownership by means of oversubscription. Research studies also include factors brought in by the exchanges of the respective country.

The present study highlights on the book-built IPOs price performance in India. The movement of the returns has been captured in a time period which has not been previously analyzed. This time frame has many notable developments to its credit like: the grading system, introduced by SEBI in 2007 and the issuance through book-building at high rate.

An attempt has also been made to examine various factors by classifying them into three categories, namely market related variables, variables relating to issuing firm characteristics and issue related factors. This gives a complete understanding of the factors that might have an influence on the IPO underpricing.

DATA AND METHODOLOGY

Data

The list of the companies which came up with IPOs was taken for a seven year period from January 2004 to December 2010 from the National Stock Exchange (NSE) website. A total 369 public issues were made in this period. The data has been chosen keeping in mind the following criteria

Data should be available for all the variables for the time period 2004 to 2010.

Issuance of stock subsequent to the company's initial public offering i.e. follow-on offering is to be excluded from the data.

Only the valid IPOs through Book building has been taken, which accounted for a sample of 286⁴ companies.

In the first part of the study the underpricing of the issue has been examined. In order to calculate the underpricing of the issues, the closing price on the first day and the offer price was taken from NSE website. In a well-developed capital market and in the absence of restrictions on how much prices are allowed to fluctuate by from day to day, the full extent of underpricing is evident by the end of the first day of trading, and hence, most studies use the first-day closing price when computing initial underpricing returns. First day returns were calculated for the purpose of the study.

The excess returns were calculated to adjust the returns for the market movements. The market returns when deducted from the IPO's returns give the excess returns. For this purpose the market returns were calculated using NSE Index from the NSE website.

Variable Selection

For the second part, my objective is to study the short run price performance of the IPO. The variables used for the study was collected from different literatures on which similar kind of study were already done. The variables I have chosen for my study are the following:

DEPENDENT VARIABLE

Initial Return (Excess Return) (En):

If the initial return is positive, one can infer that the issue is under-priced. If the initial return is negative it may be inferred that the issue is over-priced and if it is zero, it implies that the issue is appropriately priced. As there is a lag between the offer day and listing day (varying from) the price observed in the market on the listing day may be different from the offer price as a result of the overall market movements. Market adjusted returns of the IPOs for the same period are also calculated and excess returns were found to be present the the firms in the sample. If excess returns are positive, one can infer that the issue is under-priced after adjusting for the market movements in the intervening period and a negative value for excess returns indicates that the issue is over-priced. If there are no excess returns, it implies that the issue is fairly priced.

INDEPENDENT VARIABLES

(I) ISSUE RELATED VARIABLES

(i) *Number Of Underwriters* (UNDERWR_NUM): Corwin and Schultz (2005) noticed that offerings where more than one underwriter is involved tend to be less underpriced, since information-gathering and price-setting activities are more efficient. The data was collected from the companies IPO prospectuses.

(ii) *Price Band Width* (BAND):

It is the difference between the cap and floor of the price is taken as price band. This makes a proxy for valuing uncertainty. The range at which the IPOs fix the price range is not binding. Hence, it seems plausible to assume that issues for which valuation uncertainty is greater, is marked with wider price range (Hanley 1993). The data was collected from NSE.

(iii) *Subscription Rate* (LNSUBR):

A measure of times the share offering is over subscribed. The higher the extent of over-subscription, the more severe will be the shortage in the investors' allocation. In order to reach their desired allocation, investors will be forced to buy the stock after listing in the stock market, thus driving up the price. This results in greater underpricing of the IPO, as measured by its initial return. Thus, underpricing and oversubscription should be positively related. This shows that the excess demand of investors, manifested by the extent of their oversubscription, is an important explanatory variable for the greater underpric-

ing of group-affiliated firm IPOs. The data was collected from basis of allotment of the companies published after the IPO is listed.

(iv) *Offer Size* (LNASSET):

It is taken the logarithm of the offering size of the firm. A standard control in IPO underpricing studies is the IPO offer size (see, e.g., Ritter, 1984). Offer size may account for a number of factors, including risk and information asymmetry. Initial offer size is calculated as the offering size multiplied by the offer price of the shares. The data was taken from NSE website.

(v) *Offer Price* (LNPRICE):

The initial price of an IPO offering is the offer price. Logarithm of the offer price was taken. Firms with unusually low offer prices experience very high levels of underpricing. Issuers might choose to set a low price to encourage information production, which could presumably take place in the after market. Also, when new issues are priced lower than they should be, investment bankers reduce their legal liability by lowering the chance of price declines. In the early stages of an IPO, the lead investment bank is responsible for assessing the premarket demand for its client's prospective IPO in an effort to set the offer price. Presumably, a very modest offer price will signal little demand, little value, or both (e.g., Jain & Kini, 1999a). Interestingly, however, Ibbotson, Sindelar, and Ritter (1988) note that firms with unusually low offer prices experience very high levels of underpricing. It has also been demonstrated that lower-priced stocks are associated with higher mortality rates (Seguin & Smoller, 1997) These findings suggest that lower offer prices indicate greater uncertainty with regard to the IPO firm's prospects. Hughes and Thakor (1992) say that lesser offer price reduces the litigation risk. The data was collected from NSE.

(II) ISSUING FIRM CHARACTERISTICS

(vi) *Age Of The Company* (LNAGE):

It is the age of the firm going public at the time of IPO. Logarithm of the age was taken. The age of the firm has served as a surrogate for risk in previous IPO research, i.e., more established firms are less risky (Carter, Dark, & Singh, 1998; Ritter, 1984, 1991). Less-seasoned firms will have fewer years of published financial data and are less likely to have been assessed by financial analysts (Rasheed, Datta, & Chinta, 1997). The IPO literature reflects the posited relationship between firm age and performance (e.g., Megginson & Weiss, 1991; Mikkelsen, Partch, & Shah, 1997; Ritter, 1998). Data for this variable was taken from capitaline.com.

(vii) *Net Asset* (LNASSET):

Logarithm of the asset was taken. Larger organizations, for example, have greater access to resources essential for firm survival and profitability (Finkle, 1998). Larger firms, as compared to smaller firms, present less uncertainty for potential investors. The total asset of the firm in the year preceding that of an IPO was taken, in order to eliminate the inflation effects that distort the result. The data was taken from IPO prospectus and CAPITALINE database.

(III) MARKET RELATED CHARACTERISTICS

(viii) *Market Volatility* (MKTVOLA):

Measure of market volatility and is calculated as the standard deviation of daily market return (NSE Index) over the two months before the closing date of subscription. Ritter (1984) finds that its industry specific events, rather than the changes in the risk that drive changes in the initial returns. The data for the NIFTY was taken from NSE website.

(ix) Year:

A dummy variable has been introduced in the model to capture the time effect. After conducting the first part of the study, it was observed that there was a drastic decline in returns indicating weak underpricing after 2007. Hence a dummy variable (Year) was introduced in the model. This variable accords a value of one if it occurs after 2006 and zero otherwise. The reason for the change in IPO underpricing level may be attributed to recession or the grading system adopted by SEBI during 2007.

(x) Hot and Cold Market Years (HOT_COLD):

Another dummy variable has been introduced in the model. This variable tells us if increased IPO activity has been affecting the underpricing. The period with high volume of offering of IPO is taken as the hot years and assigned the dummy 1 and the ones with lesser activity have been taken as the cold years with dummy 0.

Methodology

The initial returns are calculated using the following formula:

$$\text{Underpricing (IRi)} = [(P_i - P_o) / (P_o)] \times 100\%$$

Where P_i is the first-day closing price and P_o is the offer price. These returns measure whether an investor gained (or lost) by buying the shares during the IPO at the offer price and selling at the prevailing price on the opening day. If initial return is positive one can infer that the issue is under-priced; if initial return is negative it may be inferred that the issue is over-priced and if initial return is zero it means the issue is aptly priced.

As there is a lag between the offer day and listing day (varying from) the price observed in the market on the listing day may be different from the offer price as a result of the overall market movements, we also computed market adjusted returns of the IPOs for the same period. This adjustment is made first by computing the returns on the market index (Nifty) during the same period.

$$R_m = [(I_t - I_o) / I_o] \times 100\%$$

Where I_t is the Nifty index closing/opening value on day of listing of IPO and I_o is the closing level of Nifty on the last day of the IPO offering. If market return, is positive it means the market on the whole has moved up; if it is negative it may be considered that there is a decline in the over all market and if it is equal to zero it may be concluded that market remained unchanged during the interval between IPO offering to its listing.

$$E R = IR_i - R_m$$

If ER is positive one can infer that the issue is under-priced after adjusting for the market movements in the intervening period and a negative value for ER indicates that the issue is over-priced and it is equal to zero it may be concluded that the issue is fairly priced.

For the 2nd part of the study a cross-sectional regression is done for the variables. The initial return is taken as the dependent variable and the others as independent variable.

The model is a linear regression model:

$$ER = \alpha_0 + \alpha_1 LNAGE + \alpha_2 LNSIZE + \alpha_3 LNASSET + \alpha_4 MKTVOLA + \alpha_5 LNSUBR + \alpha_6 UNDERWR_NUM + \alpha_7 LNPRICE + \alpha_8 BAND + \alpha_9 YEAR + \alpha_{10} HOT_COLD + u_i$$

The model was subjected to cross sectional regression and the significance of different variables was found.

RESULTS

The initial return was calculated using the formula mentioned in section 3.3 and the initial returns were calculated for the firms in the sample. The excess return was calculated after adjusting for the market returns and the results are tabulated below. Table 4.1 shows the average offering sizes, initial return, and excess return of IPOs for each of the 7 years from 2004 to 2010. The average excess return for the IPOs for 7 years with their median values and minimum and maximum values are given in Appendix tables A.1 in the end.

Table 1: Under pricing for the years 2004-2010

YEAR	NO. OF IPO OFFERINGS	INITIAL RETURN (%)	MARKET RETURN	EXCESS RETURN (%)
2010	57	15.6269	0.423622	15.13638
2009	20	12.4893	0.934396	9.062267
2008	28	8.7053	-2.09455	11.03253
2007	82	21.8949	-2.52455	29.11834
2006	55	22.7341	3.297601	18.74087
2005	34	27.1144	3.833149	31.21535
2004	10	31.1723	3.091892	38.48989
Total	286	22.4464	0.706532	21.73987

From the table above, one can observe that the initial returns of the IPOs are 22.50 % for the sample period (2004-2010). It implies that the issue is underpriced (positive returns). The market return was is found to be positive indicating that the market on the whole has moved up. We can see that the excess return is also positive. Hence, the issue is under-priced even after adjusting for market movements in the intervening period. The excess return is found to be 21.73%, which differs from the simple return by less than one percent.

The initial returns have followed a decreasing trend. The initial returns on 2004 were 38.48% which has decreased to 15.13% by the year 2010. The decrease is seen to be almost half of the returns in 2004. The returns were on an all period low on 2009, when the underpricing was just 9%. The period after 2007 shows lesser underpricing compared to the period before 2007. This might be because of the grading system adopted by the SEBI wherein any company which has filed the draft offer document for its IPO with SEBI, on or after 1st May 2007, is required to obtain a grade for the IPO from at least one Credit Rating Agency. The grade represents a relative assessment of the fundamentals of that issue in relation to the other listed equity securities in India. Such grading is generally assigned on a five-point point scale with a higher score indicating stronger fundamentals and vice versa. The late-2000s financial crisis is another notable event which occurred during this period of study. Though, the latter cannot be considered as a very valid reason as the crisis had not affected the Indian markets much.

Fig 1: Initial simple returns and Excess returns

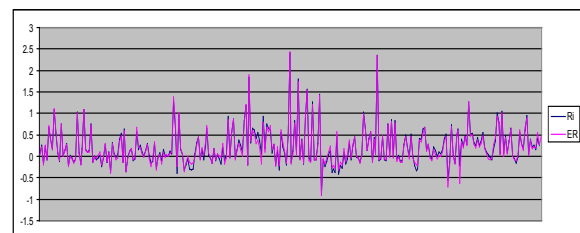


Figure 4.1 graphically explains the simple returns and the excess returns for the sample for the 7 year period. It is evident that the returns after adjusting for the market movements do not differ much from the simple returns. The returns are concentrated more on the region 0-1, implying positive returns which already has been calculated and shown above.

For analyzing the short run price performance of IPOs, a cross sectional regression is done on the variables mentioned in 3.2 before. This would show how significant the different factors are on in affecting the initial returns of the shares. Firstly, a

simple cross sectional regression is done and then the step-wise regression showing the overall significant factors and the factors based on market, firm and issue related characteristics is done separately.

(I) The cross sectional regression results are presented in Table 2 below. The adjusted R² was found to be 24.78 percent, which implies that the model softly explains the variability of under-pricing of IPOs.

Table 2: Cross sectional regression results

VARIABLE	Coef.	Std. Err.	P>T
LNAGE	0.028424	0.042414	0.503
LNASSET	-0.01647	0.019351	0.395
MKTVOLA	0.00056	0.000277	0.044
YEAR	0.003246	0.06001	0.957
HOT_COLD	-0.03161	0.05022	0.530
LNSIZE	-0.03786	0.032176	0.240
LNSUBR	0.164447	0.017748	0.000
UNDERWR_NUM	0.001818	0.013267	0.891
LNPRICE	-0.0363	0.042604	0.395
BAND	-0.00037	0.001464	0.800

The results show a positive relationship between age of the firm and the underpricing. Better established the firm is considered to be, more the firm can maintain itself in the long run after underpricing its issues. This acts as a signaling effect for the firm. More well established firms are less risky and hence the relationship should be negative. But the regression results are not significant for this variable and hence are not a hindrance to our study.

The results of the regression model also show that there is a negative relationship between asset of the firm and underpricing. Larger firms, as compared to smaller firms, present less uncertainty for potential investors. Smaller firms may also be perceived as offering lower performance potential, leading prestigious underwriters to avoid these issues so that they do not directly bear any loss through undersubscribed issues. This implies that the more assets the firm has, the less underpriced it will be. But this factor is not found to be significant.

There is positive relationship between the level of underpricing and market volatility and also it is significant (at 95%). The regulatory authorities try to minimize the probability of unsuccessful issues by lowering prices as long as market volatility is high. Hence, high market volatility will lead to greater underpricing. It seems plausible that both underwriters and investors would have greater difficulty valuing IPO firms when the level of market-wide uncertainty about prices and value is especially high. This might lead us to conclude that another significant reason for underpricing must be the high market volatility which leads to greater uncertainty and higher risk.

The results show that, there is an insignificant relationship between size and the level of underpricing. They show a negative relationship, premising that larger the issue size less will be underpricing because larger issues will be less risky as they are followed and analyzed by a large set of prestigious analysts.

The results of the regression show a positive and very high significance of subscription rate (99%) on the underpricing. The reason behind this is that more the issue is underpriced, the informed investors knowing the true value of the firm will invest on it. The uninformed follow the informed and buy the shares leading to high level of subscription. Hence, this is consistent with both the absorption capacity of the market and the winners curse model discussed in Rock's (1986).

Table also shows that there is a positive relationship between the number of underwriters underwriting the issue and the underpricing. It is because increased number of underwriters will increase the agency cost incurred. More number of underwriters will also reduce the uncertainty and risk and hence should have a negative relationship. But this factor is insignificant and therefore is not important.

Issue price show a negative relation. Low offer prices experience very high levels of underpricing. In the early stages of an IPO, the lead investment bank is responsible for assessing the premarket demand for its client's prospective IPO in an effort to set the offer price. Presumably, a very modest offer price will signal little demand, little value, or both. This factor is found to be insignificant.

The relationship between price band and the underpricing is found to be insignificant. The relationship is found negative in the study. When valuation uncertainty is greater, it is usually marked with wider price range.

Analysis and Interpretation of Results

Oversubscription was found to be highly significant. The probable reason could be that underwriters deliberately cause oversubscription which results in under pricing of the issue. As a result they don't lose the ownership and control of the firm. This is consistent with the theory that underpricing induces oversubscription, which allows the firm to discriminate against large block-holders in the allocation of shares (Field and Sheehan (2004)).

Moreover, there might be over reaction to avoid legal liability. The over-reaction hypothesis asserts that the excess demand results from the attention that group-affiliated firms attract in relation to stand-alone firms (e.g., perhaps due to their respective reputations), and creates uncertainty about the allocation that investors will obtain from the IPO. This holds true when the allocation process is rationed accordingly to a well-publicized formula, as in the case of Indian market. The higher the extent of over-subscription, the more severe will be the shortage in the investors' allocation. In order to reach their desired allocation, investors will be forced to buy the stock after listing in the stock market, thus driving up the price. This results in greater underpricing of the IPO, as measured by its initial return. Underwriters might also deliberately under-price to reduce the litigation risk. The probability of adverse judgment and the amount of damages if litigation occurs is lowered by underpricing (Hughes and Thakor (1992)).

High market volatility causes the firms to scale back on their IPOs or price them below the expectations. Market volatility has been high in the past few years in India (Table 3.8). The significance of market volatility in Indian market must be the cause of the underpricing.

(II) A stepwise regression is done as the next part of the analysis for gaining much clear results. A step wise regression is the step-by-step iterative construction of a regression model that involves automatic selection of independent variables. Stepwise regression can be achieved either by trying out one independent variable at a time and including it in the regression model if it is statistically significant, or by including all potential independent variables in the model and eliminating those that are not statistically significant, or by a combination of both methods. The Table 3 and 4 present the regression results.

Table 3: Stepwise regression results: overall model

ER	Coef.	Std. Err.	P>t
LNSIZE	-0.06248	0.017687	0
LNSUBR	0.15792	0.015891	0
MKTVOLA	0.000528	0.00025	0.036

The analysis yielded market volatility, size of the offering and the subscription rate significant. The oversubscription and market volatility are positively related to the excess return. They indicate the need for underpricing by means of ownership and control theory, which states that issuers deliberately under price to prevent large holdings by outside shareholders and the investors over reaction to the market. The size of the offering unlike in the cross sectional regression if found to be significant. The relation is positive which point out that larger the number of issues, the less will be the underpricing. We premise that larger the issue size will reduce underpricing because larger issues will be less risky as they are followed and analyzed by a large set of analysts.

The market related characteristics, issue related characteristics and firm related characteristics were separately regressed to find the significance of each on the underpricing.

(i) *Market Related:* Market related characteristics include the market volatility, the year before and after 2007 and the hot and cold market years.

Table 4: Stepwise regression: market related characteristics

ER	Coef.	Std. Err.	P> t
MKTVOLA	0.00052	0.000309	0.093
YEAR	0.178386	0.056927	0.002
_cons	0.020901	0.076299	0.784

The adjusted R² is found to be to be 2.74 percent. Hence, very less underpricing is explained by the market related characteristics. The year and market volatility were found to be significant (Table 4.5). The year on and after 2007, saw a decrease in the underpricing level. These years seems to have a noteworthy effect on the underpricing, which might be because only the investment bankers have been very careful about the pricing of the issue and the investors, fearing a loss might have invested in only safe issues. The market volatility is seen to be significant throughout. This shows that the volatility has considerable effect on the pricing of the issues.

(ii) *Issuing Firm Characteristics:* It was found that Firm related characteristics do not have any significant effect on the underpricing of IPOs. The age and asset of the firm, which were taken as a proxy for issuing firm characteristics, were found insignificant through stepwise regression.

(iii) *Issue Related Characteristics:* the variables grouped under this are: offering size, subscription rate, number of subscribers, offer price and price band. The stepwise regression results are depicted in the Table 5 presented below.

Table 5: Stepwise regression: issue related characteristics

ER	Coef.	Std. Err.	P> t
LNSIZE	-0.05982	0.017749	0.001
LNSUBR	0.152841	0.015803	0
_cons	0.465664	0.171227	0.007

The size of the offering and the subscription rate are found to be significant under this category. It was found that 24.86% (R²) of the returns are explained by the issue related characteristics.

Conclusion

(i) The IPO underpricing: The result shows that the issues are underpriced in India. The rate of underpricing from the year 2004-2010 was found to be 22.44%. The excess return in this period was found to be 21.73%, which implies underpricing.

(ii) The factors significantly influencing IPO underpricing are found to be subscription rate and market volatility though the cross sectional regression. Market volatility, subscription rate and the offering size are significant according to the results

of step wise regression. Once the firms under study were categorized based on market characteristics, issuing firm factors and issue related variables, issue related factors seemed to be highly significant in the step wise regression model. Upon introducing market related factors, market volatility and the year dummy were found to be significant. Once the issue related variables were included in the model, offering size and subscription rate were found to be highly significant.

The main purpose of the study was to examine the level of underpricing in the past seven years (2004-2010) for the IPOs issued through book building. Upon listing the IPOs on an average offered positive returns (after adjusting for market movements), which follows the general theory exhibited across countries across time periods. Results show that the subscription rate (which confirms the informed demand hypothesis) and market volatility influence the excess returns the most at the time of IPO, irrespective of the number of underwriters, the value and the characteristics of the firm. One can conclude that in India, underpricing might be because of the ownership structure of the firm which promotes large block holdings or because of the investors' over reaction.

The performance of IPOs is of importance to investors, issuers, investment banks, policy-makers and academicians. This paper helps the firms to decide whether or not to launch an initial public offering (IPO) in the current scenario and the factors which might have an impact on the investors' reactions towards a particular IPO.

The study has following limitations: (i) Theories on underpricing detail about the litigation risk and the internal management of the firm which can affect the returns. These factors were not taken due to the complexity of collecting the data necessary for such a huge group of firms and relying on their authenticity.

(ii)The grading system started by the SEBI on 2007 which value the firm based on their fundamentals is another factor which might play a major role in investor decisions. As the grading started at a later time, this variable was not included. In this study.

In the future course of action, IPO under pricing effect can be studied in detail in the short and the long run. As we can see from the current literature that long run the returns tend to be negative and firms underperform after the initial period is still valid for Indian scenario, future studies can be extended to examine the long run performance of IPO firms and the underlying theories. Further studies can elaborate on the pricing efficiency of book-building process by comparing the excess returns from the fixed price offerings during the same period. The effect of PO grading can be seen on the pricing of an issue which can bring new insights into the study.

APPENDIX

Table A.1: Annual average excess return and offering size in India: 2004-2010

year	no. of offerings	excess return			
		mean	median	minimum	maximum
2010	57	0.151364	0.086317	-0.39323	1.109995
2009	20	0.090623	0.036217	-0.31053	1.37901
2008	28	0.110325	0.022691	-0.36263	1.015943
2007	82	0.291183	0.147287	-0.90783	2.419057
2006	55	0.187409	0.056953	-0.71998	2.3553
2005	34	0.312154	0.27561	-0.09925	1.267004
2004	10	0.384899	0.322028	0.02626	0.897255

Fig A.1: The distribution of the number of subscribers for the issue for the sample period

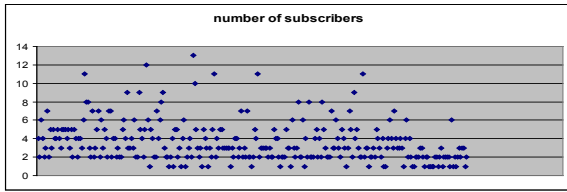


Fig A.2: The distribution of the price range for the issue for the sample period

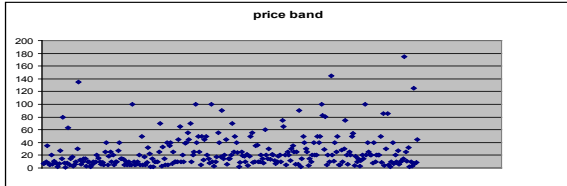


Fig A.3: The distribution of the subscription rate per issue for the sample period

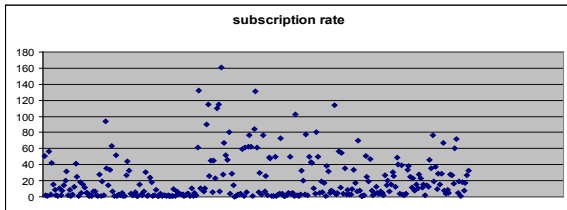


Fig A.4: The distribution of the size of the offering for the sample period

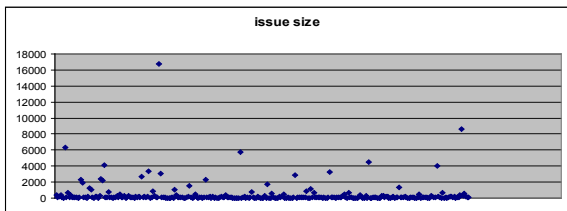


Fig A.5: The distribution of the offering price of the issue for the sample period



Fig A.6: The distribution of the ages of the firms which made IPOs for the sample period

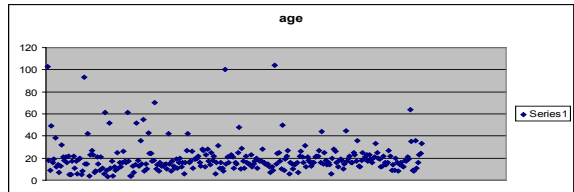


Fig A.7: The distribution of the assets of the issuing firms for the sample period

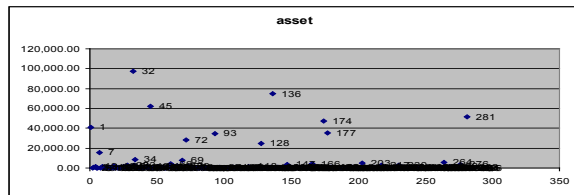
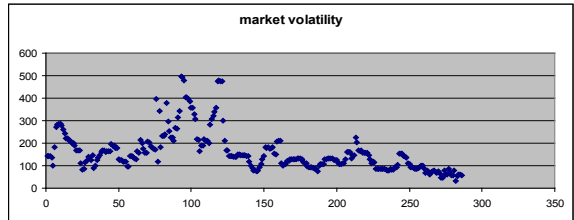


Fig A.8: The distribution of the market volatility for the sample period (NIFTY)



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Poignant Attachment of Consumers With Green Products; How Big Data Helps to Accomplish it?

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ABSTRACT

The marketer mainly depends on their consumers who decide the providence of their products. Protecting the environment and consumers interest is the challenging role for the marketers. In order to achieve this goal "BIG DATA SOLUTION" will act as a secret ingredient. Marketers work hard to create an emotional link between consumers and the brands they promote. But that kind of attachment is not easily won and must be nurtured over time. Environmental education must be part of marketing campaigns to help customer become more eco- conscious and more likely to identify with green products. The three factors that strongly influence these emotion attachments: product involvement, self-esteem and public self- esteem. Green marketers should take the advantages of these factors by providing ways for consumers to receive public accolades for eco- friendly behaviour. At the same time this concept should not get into green wash because it will scratch company's credibility. "Green wash" phenomenon threatens the green- marketing revolution. By combining big data with an integrated marketing management strategy, marketing organization can make substantial impact on customer engagement, customer retention and loyalty and marketing optimization/performance.

KEYWORDS

green marketing, green wash, big data

INTRODUCTION:

Marketers are the one who has to satisfy both customer and environment. Many decades before there was the concept called five force models. But current market condition added up one more challenge that is ENVIRONMENTAL CHALLENGE. Marketers have to keep their track on current market situation and they have to keep on assessing consumer's behaviour and their change of taste. Change in taste of consumers has direct impact on market strategy that marketers framed.

According to the mindset of the consumers, marketers have to make many researches to identify their consumers taste and preference to make them emotionally attached to their products. It is not that so easy to retain and create loyal customer. In order to attain this marketers are mainly depend on BIG DATA SOLUTION. It helps to scrutinise their customer base. And it enables marketers to frame a strategy in accordance to their customer base. We are not saying that it big data alone would help the marketers to create emotional attachment with their consumers. It act as act as a raw material.

By identifying the changes in the consumer behaviour, businesses can modify their offering to their consumers. Now a day's consumers are mainly concerned about green products with view of protecting the environment. Main reason behind this, consumers are now aware about environmental degradation and negative impact of their uses of product and services on environment. This is because of environmental changes like air and water pollution, climatic changes. Addressing consumer's expectation and environment concerns will automatically helps to create strong consumer base.

In a recent survey conducted by National Geographic Society and the international pooling firm Globescan (2010) to determine consumers were in the developing economies of India, Brazil and China while industrialized countries ranked at the bottom. At the same time there are few customer who are all against to this green products because they are not interested to pay high price and also because of "Greenwash". Few marketers are using this green product concept in wrong way and trying to exploit consumer. That would lead to damage their credibility.

WHAT IS THE USE OF GREEN MARKETING?

It is really scary to read the fact that "Air pollution damage to people, crops and wildlife. "More than 12 other studies in the US, Brazil Europe, Mexico, South Korea and Twain have established links between air pollutants and low birth weight premature birth still birth and infant death

This triggered the interest among the consumer all over the world regarding protection of environment. Worldwide evidence indicates people are alarmed about the environment and are changing their behaviour. In order to understand the behaviour of customer "BIG DATA" enables the marketer to understand the preferences and behaviour of the consumers. Social media platform can capture comments that reflects likes and dislikes, but most Big Data measures behaviours (e.g. views, downloads, shares, purchases, etc.). It's tempting to interrupt behaviours as an expression of preferences.

GREEN MARKETERS BETTER ENGAGE CONSUMERS:

There are few characteristics which enable the green marketers better engage with consumers.

Commitments to the Products:

Product involvement helps the marketers to understand that how far the consumers are attached to their products. That highly engaged consumers have a positive emotional attachment with brands that align to their actual sense of self, while less engaged consumers have a positive emotional attachment with the brands that align to their actual sense that align to their actual sense of self, while less engaged consumers have positive attachment with brands that focus on consumer's ideal sense of self.

At the same time it's not necessarily true. Eco – engaged consumers will come out with the positive sign for the brands aligned to their ideal self. While consumers may be inspirationally green, they simply may not be familiar with the products that can help them achieve their aspiration. Green marketers might first need to educate consumers about green brands before those brands can become relevant in their lives. One powerful tool is to communicate a goal- driven message around green products, while show casing their actual use by people that consumers can readily identify with. That's what

Mitsubishi when it creates a demonstration program for electric car technology in the town.

Sense of worth:

Consumer self- esteem is an essential part of emotional brand attachment- as consumers seek out brands that reinforce or enhance their own perception of self worth. Given the relative newness of green as a branding category, it may make sense for green marketers to interpret self- esteem as a consumer's confidence in their ability to make greener choices that are right for them. When engaging green- confident consumers, brand might therefore want to emphasize evidence that confirm the consumer's self view. For example, green brands should praise consumers for taking eco-friendly actions.

Public self- consciousness:

Perception plays key role in the purchase of products. Green marketers should take advantages of these factors by providing ways for consumers to receive public accolades for eco- friendly behaviour. One way might be to embed gaming elements such as badges, points and leader boards into networked products. It's interesting to note that, while Malär et al. address emotional brand attachment, they do not tackle *rational* brand attachment. But such an attachment can be an important brand driver for consumers -especially when products have a direct and measurable impact on the environment. As such, when it comes to green products, rational brand attachment has the potential to amplify the emotional.

COMPANIES CAN BE CLASSIFIED INTO:

1. Lean Green- These companies adopt the green practices but they do not focus to publicise these initiatives.
2. Defensive Green-This kind of marketer use green marketing as a precaution to avoid the crisis situation or to counter the competition..
3. Shaded Green- The companies those adopt shaded green strategy invest in long-term, environmentally friendly processes that require a significant financial and nonfinancial dedication.
4. Extreme Green- Extreme green adopt green marketing mix in the holistic manner.

ROLE OF BIG DATA IN GREEN PRODUCTS:

A solid information system is essential to obtain relevant data for the decision making process in marketing. The more correct and relevant the information is, the greater the profitability of success is.

In addition to the critical data, there is a great volume of less structured information that can be analyzed in order to find useful information.

The growth of generation, storage capacity, processing power and data analysis provided a technological. This phenomenon would cause great impacts on studies and lead to the development of solutions in different areas.

In marketing, big data research ca represent the possibility of a deep understanding of the consumer behaviour, through their profile monitoring(geo- demographic, attitudinal, behavioural)

The triangulation of the available data in real time with information previously stored and analyzed would enable the generation of insights that would not be possible through other techniques.

PRODUCTS GENERALLY ACCEPTED AS GREEN:

1. Energy efficient
2. Water efficient
3. Low emitting (low on hazardous emissions)
4. Safe and/or healthy products
5. Recyclable and/or with recycled content
6. Durable (long-lasting)
7. Biodegradable
8. Renewable
9. Reused products
10. Third party certified to public or transport standard (e.g., organic, certified wood)
11. Locally produced

EXAMPLES OF GREEN PRODUCTS

Digital signals by India railways - recently IRCTC has allowed its customer to carry PNR NO of their e-tickets on their laptop and mobiles. Customers do not need to carry the printed version of their tickets anymore. In this busy word it helps the passenger to make trip very easy.

No polythene bags for free- forest and environment ministry of India has ordered to retail outlets like Bigbazar, Max, Lifestyle, Reliance trends etc that they could provide polythene carry bags to customers only if customers are ready to pay for it.

Green IT projects -SBI- by using eco and power friendly equipment in its 10000 new ATM's, the banking giants has not only saved power costs and earned carbon credits, but also set the right example for others to follows.

A lead free paint from Kansai Nerolac- Kansai Nerolac has worked on removing hazardous heavy metals from their paints.

Wipro's green machine- Wipro's InfoTech was India's first company to launch environmental friendly computer peripherals. For the Indian market, Wipro has launched a new range of desktops and laptops called Wipro Greenware. These products are ROH's (restriction of hazardous substances) complaint thus reducing e-waste in the environment.

GREENWASH:

Greenwashing takes its toll on all involved. When greenwashing goes unnoticed, consumers are duped into buying products they think are environmentally sound. They unwittingly support the ecological offenses of businesses. However, when greenwashing is exposed, the offending businesses also suffer from lowered consumer confidence.

But as people become more aware of greenwashing, advocacy groups and government regulators take a greater interest in investigating environmental claims. Regulation, be it from civilians or government bodies, leads to greater responsibility in environmental marketing.

CONCLUSION:

Green marketing is the one which helps to protect our environment. It's our duty to contribute in the protection of our environment. Now this is the right time to select "Green Marketing" globally. It will come with drastic change in the world of business if all nations will make strict rules because green marketing is essential to save the world from pollution. From the business point of view because a clever marketer is one who not only convinces the consumer, but also involves the consumer in marketing his product. With the threat of global warming looming large, it is extremely important that green marketing becomes the norm. Finally, consumers, industrial buyers and suppliers need to pressurize effects on minimizing the negative effects on the environment. Green marketing assumes even more importance and relevance in developing countries like India.

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In-silico modeling of EDNRB Protein Structure and its mutational analysis in Hirschsprung Disease

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ABSTRACT

Hirschsprung's disease is a developmental disorder characterized by an absence of enteric ganglia in the distal colon leading to a failure of innervation in the gastrointestinal tract. The endothelin-B receptor-mediated signaling pathway participate in the migration and differentiation of enteric ganglion cells. Mutation in endothelin receptor B gene (EDNRB), that encode a G protein-coupled transmembranous receptor protein causes Hirschsprung's disease. Different in-silico techniques were used to determine functional properties of EDNRB gene.

The structure of EDNRB protein was modeled and validated. Protein structures with known missense mutation Trp276Cys, was modeled and submitted in PMDB. Changes in the interaction between EDNRB and EDN3 were determined with wild type protein structure and mutated structure. A decrease in the protein stability and loss of interaction between the subunits was observed. This could have a significant impact on the disease progression.

KEYWORDS

EDNRB, EDN3, Hirschsprung's disease, W276C

INTRODUCTION

Hirschsprung's disease is a congenital developmental disorder characterized by the absence of enteric ganglia in the distal colon that leads to a failure of innervations in the gastrointestinal tract, with a heritability of roughly 100% and multifactorial inheritance in most cases (Puffenberger EG. et al, 1994). Families with apparent monogenic inheritance, there is incomplete penetrance of disease-causing mutations and intra and inter-family variation of phenotype severity, suggesting that modifying genetic, stochastic or environmental factors are involved (Amiel J. et al, 1996). The length of the aganglionic intestinal segment is highly correlated to risk in siblings and to the ratio of affected females to males (Amiel J. et al, 2008). The incidence of Hirschsprung's disease is estimated to be 1 in 5000 live births (Bodian and Carter CO M. 1963).

Many genetic studies have demonstrated that HSCR is associated with mutations in eight different genes (*EDNRB*, *EDN3*, *ECE1*, *SOX10*, *RET*, *GDNF*, *NRTN* and *ZFHX1B*) (Chakravarti, A. & Lyonnet, S. 2001)

(Amiel, J. et al, 2001). Recent studies have suggested that *RET* and *EDNRB* are the primary genes implicated in the etiology of Hirschsprung's disease (Badner JA. et al, 1990). All eight genes participate in the early development of the enteric nervous system, and most act through two different biochemical pathways mediated by RET and EDNRB (Chakravarti, A. 1996). (Paul

K. et al, 2009).

The *EDNRB* gene encodes a 442 amino acid heptahelical G protein-coupled receptor (Arai H et al, 1993) that equally binds EDN 1, 2 and 3 and is involved in the intracellular signaling pathway. (Edery P. et al. 1996) Binding of EDNRB with its ligands, endothelin 1, 2 and 3 (EDN 1, 2 and 3) (Bidaud et al, 1997) (Sakurai T. et al, 1992) C triggers intracellular signal transduction events which lead to the activation of phospholipase C β , plasma membrane calcium channels, and non-receptor tyrosine kinases (Baynash AG. et al, 1994).

A known G T missense mutation (W276C) in exon 4 of *EDNRB* gene located to 13q22 that substitutes the highly conserved Trp-276 residue in the fifth trans membrane helix of the G protein-coupled receptor with a Cys residue (W276C). The penetrance of the Trp276Cys mutation is 74% in homozygotes and 21% in heterozygotes (Puffenberger EG. et al, 1994).

Hence, it was found fit to evaluate the influence of the mutation (Trp276Cys) in the disease progression by predicting the molecular changes in the protein structure through in silico models generated with the help of standard bioinformatics tools. These mutations could be predicted to affect the disease progression due to protein instability in combination with allelic heterogeneity.

Materials and Methods:

Sequence analysis, phylogenetic study and motif identification:

Protein sequences of EDNRB genes were retrieved from NCBI database (PruittKD.et al, 2007) Basic local alignment search tool (BLAST;http://blast.ncbi.nlm.nih.gov/Blast.cgi) was used for similarity search against various organism deposited in NCBI database. Phylogenetic classification was done using MEGA5.05 (KumarS. et al).The sequenced EDNRB domains were subjected to phylogenetic tree construction with NJ Method at 1000 bootstrap replication value. The conserved motifs present EDNRB gene was analyzed using MEME (Multiple EM forElicitation) (Bailey TimothyL. et al.2009) that was used to identify core-conserved motifs. Parameters have been set manually with number of 30 motifs, minimum motif width was 10 and maximum motif width was 100.

Molecular modeling and verification:

For three dimensional structure predictions, target proteins were taken for PDB BLAST search to select corresponding template structures. Discovery studio version 3.1 (http://www.accelrys.com, Discovery Studio 3.1, 2011, Accelrys-inc, San Diego, CA, USA) (JoshiRS. et al, 2013) was used for homology modeling of target proteins. Structure of EDNRB was modeled using Discovery Studio 3.1. The modeled structures were submitted in PMDB with PMDB ID PM0079229. The secondary elements of predicted structure were determined using UCSF chimera and PDBSum server (PettersenEF.et al,2004). Finally, predicted 3D model was subjected to a series of tests for testing its internal consistency and reliability.The Quality of the model was checked with verify3D (Roland Luthy. et al, 1992), and Errat server (Colovos C. and YeatesTO.1993)

The stereo chemical properties based on backbone conformation were evaluated by inspection of Psi/Phi/Chi/Omega

angle using Ramachandran plot of PDBSum database using PROCHECK server (MorrisAL. et al,1992).Structure refinement was done using RAMPAGE(LovellSC. et al, 2003).

Protein- Protein interaction:

Hex 6.3(Ritchie DWandVenkatraman V. et al, 2010) was used to determine the protein-protein interaction. Docking was done between the modeled structure of EDNRB and its ligand ET-3.Hex 6.3 tools were used for protein interaction study.Interaction obtained through docking study were visualized using Discovery studio version 3.1.



Fig1-3 D structure of EDNRB protein modeled by Esyprod and swissmodel software With PMDB ID PM0079229

Result and Discussion:

Structure modeling-

Modeled Protein structure of EDNRB shows 2 sheets, 2 beta hair pins, 4 strands, 14 helices, 31 helix-helix interacts, 28 beta turns,7 gamma turns.(fig1)

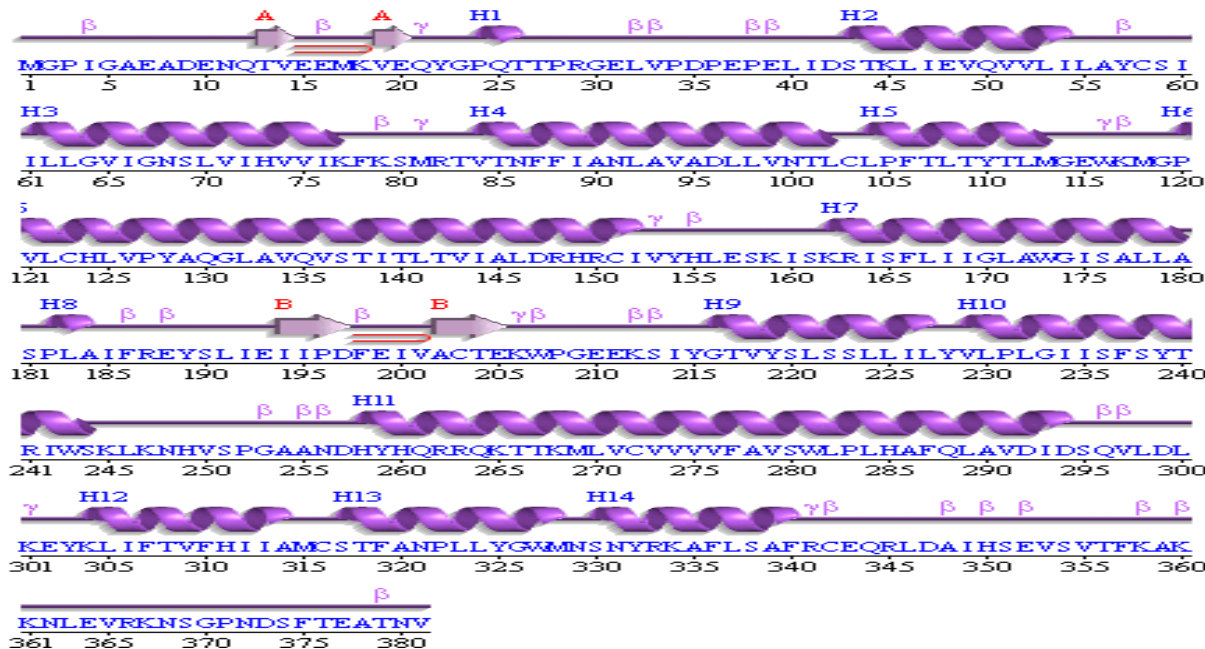


Fig2- Secondary structure of of EDNRB protein

Sequence analysis, phylogenetic study and motif identification:

Two major clusters were obtained from phylogenetic tree based on EDNRB sequences from selected species. *Homo*

sapiens(NP852122.1) showing maximum similarity with *Gorilla gorilla*(XP004024824.1) Motif 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 16, 18 and 19 were conserved in all the species.

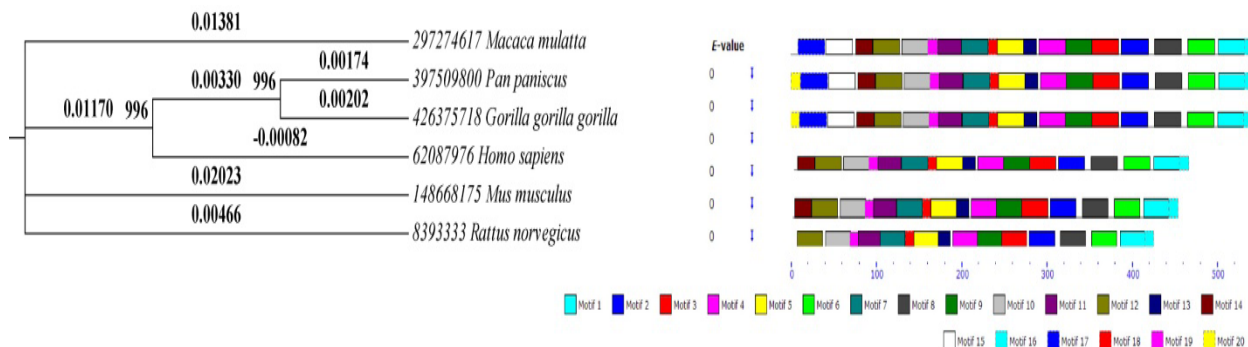


Figure 3: Phylo genetics tree based on EDNRB sequences from different species along with schematic distribution of respective conserved motifs; identified by means of MEME software.

Motif	With	Best possible match
1	30	CWCQSFEKQSLKQSLKFKANDHGVDN
2	30	FYTLMTCEMLRKKSGMQIALNDHLKQRREV
3	30	HPVQKTAFMQFYKTAKDWWLFSFYFCLPLA
4	30	DRYRAVASWSRIKIGIVPKWTAVEVLIWV
5	30	HIVIDIPINVYKLLAEDWFFGAEMCKLVPF
6	30	DYIGINMASLNSCINPIALYLVSKRFKNCF
7	30	CLVFLVLIIGNSTLLRIYKMKCMRNGPNI
8	30	LVFALCWLPHLHSLRILKLTLYNQNDPNRCE
9	30	VSVLAPEAIGFDIITMDYKGSYLKICML
10	30	QTAEIMTPPTKTLWPKGSNASLARSLAPAE
11	26	PRTISPPPCQGPPIEKETFKYINTVV
12	30	CGRALVALVLACGLSRIWGERGFPPDRAT
13	14	IQKASVGITVLSLC
14	19	RSGRHRTPSGAGSSMQPPPS
15	30	PRAGWNPAGFRVPGRWSPFVALHLVCQIRE
16	10	FRSSNKYSSS
17	30	TPSKRWRLHCLAFSQRFVRRPACSSREAC
18	10	IASLALGDDL
19	10	VPKGDRTAGS
20	10	MNKSTCLMAA

Table1: Multilevel consensus sequences of EDNRB for motifs among different species.

Physiochemical analysis

Analysis of physiochemical properties of the EDNRB protein showed that it is rich in Leucine (12.9%), Serine (8.1%), and Alanine (7.2%). EDNRB protein is mainly hydrophobic in nature. The instability index was above 40 for EDNRB protein indicating that it is highly unstable. This hydrophobic nature facilitate in determination of the structural properties of EDNRB protein.

Molecular modeling and verification:

RAMPAGE(Fig 4) study of predicted model of EDNRB showed that 88.6% of total residues in the most favored regions and 7.5% of residues in additional allowed regions. 3.9% residues were found in generously allowed regions and no residues were found in disallowed region for EDNRB protein. The model having more than 90% in favored region is best model; based on these findings we have predicted that the used method in present study is reliable. In Fig 5. The quality factor checked by Errat server was 52.125% for EDNRB and

suggests that the models having good quality. In Fig 6 plot show, Verify 3D score lied between 0.55 –(0.47) for EDNRB protein. The amino acids exist in between the marked region. Hence we can say that the modeled structure is good

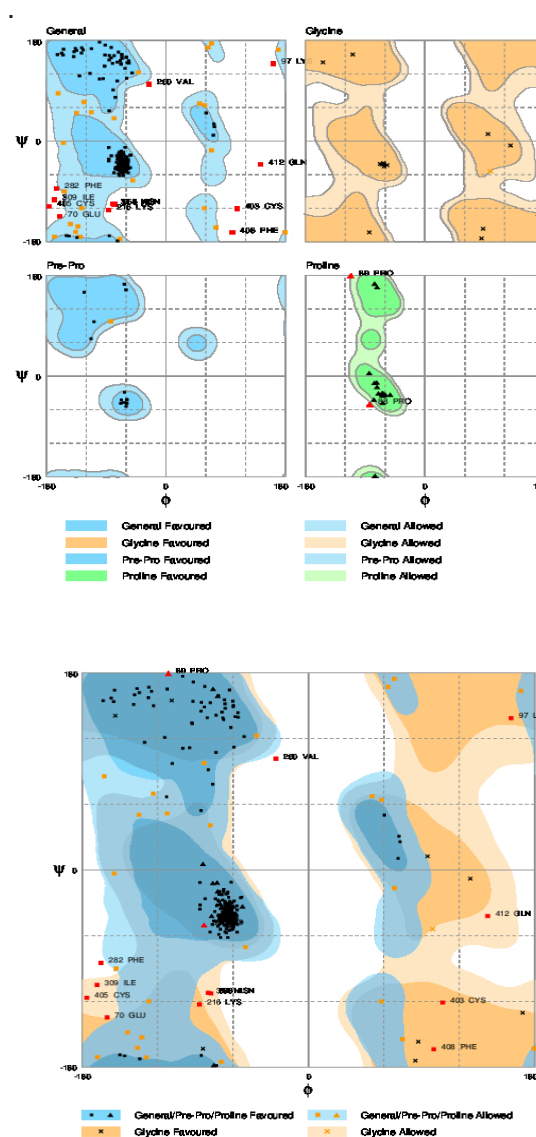


Figure 4: Rmchandran plot of modeled structure of EDNRB Protein

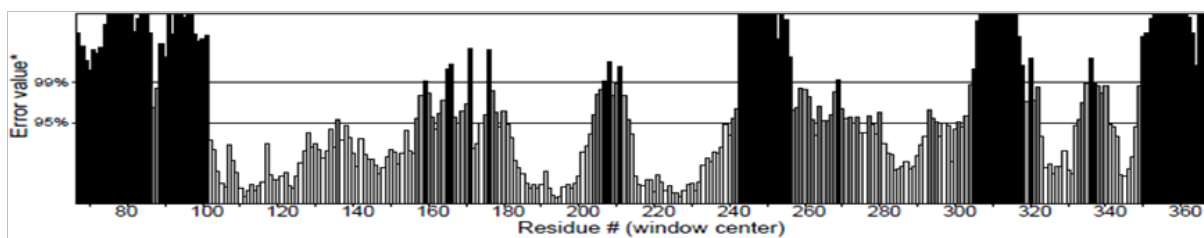


Figure 5: The quality factor of EDNRB Protein structure checked by Errat server

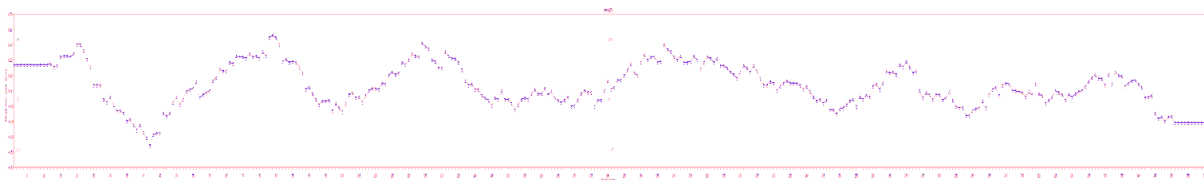


Figure 6: EDNRB Protein structure checked by Verify 3D

Protein-Protein interaction

EDNRB normal interaction	EDNRB mutated (W276C) interactions
LEU190, SER191, CYS193, ALA194, LEU195, ILE197, ASP198, ARG201, ILE212, TRP217, VAL220, GLU221, LEU224, ILE225, ILE288	LEU190, ALA194, GLU221, ILE222, LEU224, ILE225, VAL227, VAL228, LEU284, PRO285, VAL231, ILE288

Table2: Docking interactions of normal EDNRB and EDNRB mutated (w276c) withEDN3.

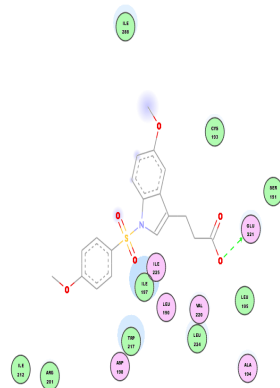
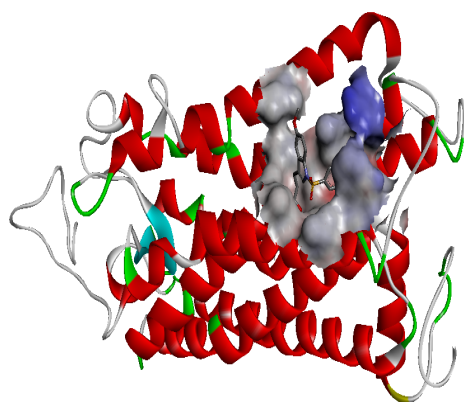
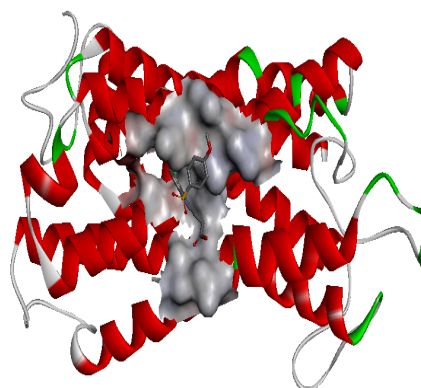


Figure 8: Interaction of mutated EDNRB (W276C) with EDN3

Figure 7: Interaction of Wild type EDNRB with EDN3

Discussion

The study was done to determine the sequential and structural aspect of EDNRB gene in Homo sapiens using computational tools. Phylogenetic tree results outlined the clustering of EDNRB gene of *Homo sapiens* alongwith different member of mammalian family. Phylogenetic study and meme analysis revealed that motif 15, 17 and 20 were absent in Homo sapiens and Mus musculus revealing that Homo sapiens show maximum similarity with Mus musculus. In HSCR patients a G>T missense mutation in EDNRB exon 4 that substitutes the highly conserved Trp-276 residue in the fifth trans-membrane helix of the G protein-coupled receptor with a Cys residue (W276C) (Puffenberger EG. et al, 1994). The change at residue 276 Tryptophan to cysteine due to missense mutation does not affect the overall confirmation of the protein. The missense mutation occur in 8 helix but does not disturb the stability the helical secondary structure, however the two residues trp, cys differ in both size and nature, as trp is non polar in nature and contain OH side group, and cys is polar in nature and contain sulphur side group and results in change in protein confirmation. This interaction study helps us in determining that in normal interaction of EDNRB with EDN3 interaction are observed at positions LEU190, SER191, CYS193, ALA194, LEU195, ILE197, ASP198, ARG201, ILE212, TRP217, VAL220, GLU221, LEU224, ILE225, ILE288. However interaction study of ET3 with mutated EDNRB (W276C) results in interaction at positions LEU190, ALA194, GLU221, ILE222,

LEU224, ILE225, VAL227, VAL228, LEU284, PRO285, VAL231, ILE288. The mutation at W276C is intolerant. Trp is a non polar amino acid and cysteine is polar in nature. The change of amino acid from non-polar to polar would affect the interaction of EDNRB with ET3 ligand. The mutant protein has a different binding site than those of normal protein structure. During the study less interactions were observed in mutant protein structure. The interactions were in hydrophobic amino acids. EDNRB is hydrophobic in nature and in native protein ET3 binds at **LEU195, ILE197, ASP198, ARG201, ILE212, TRP217, VAL220 in which ASP198 is acidic amino acid and ARG201 is basic amino acid. However in mutant structure the interaction was observed at positions VAL227, VAL228, LEU284, PRO285, VAL231** and all are hydrophobic in nature. Also the interaction observed was at different position than in native protein.

We can conclude that change in position of interaction would not lead to normal interaction of protein (EDNRB) with ligand (EDN3). Hence, we can predict that distorted interaction would lead to Hirschsprung disease.

Further functional studies need to be done to establish protein turnover in wild type and mutant cell lines in order to validate the hypothesis that the protein instability induced due to the mutations and allelic heterogeneity are responsible for the disease progression and severity.

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