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Editorial

Dr Abdul Abyad
Chief Editor



This is the third issue this year with variable papers covering different aspects of elderly care. A paper from Turkey looked at obesity as a cause of metabolic syndrome. A Consecutive check up of patients between the ages of 35 and 70 years was studied to be able to see possible consequences of overweight and obesity on health and to avoid debility induced weight loss in the elderly. Metabolic syndrome is a reversible progression step between physical health and irreversible final diseases terminating with increased morbidity and mortality. Thus definition of the syndrome should include reversible metabolic risk factors such as overweight, hypertriglyceridemia, hyperbetalipoproteinemia, impaired glucose tolerance, and WCH, instead of the already developed irreversible diseases, including DM, hypertension, CHD, and stroke, and obesity should be included among the irreversible final diseases. According to the authors, after development of obesity, the term of metabolic syndrome probably loses most of its significance, since from now on, nonpharmaceutical approaches such as lifestyle changes, diet, and exercise will provide little benefit to heal obesity and to prevent development of its complications.

A paper from Bangladesh looked at the effect of disability and poverty. People with disabilities are the most vulnerable and disadvantaged section of our society and often they are subjected to discrimination and negative attitudes. They are deprived of their basic needs and human rights. Among them the most important one is the employment opportunity as well as better income, suitable environment of the workplace, and extra facilities for inability. The process of social exclusion leads to more poverty, and lower classes. They have to face humiliation and negative attitudes at their workplace. Overall the working environment is not friendly to the disabled person. In Bangladesh, this negligence is compounded by the lack of availability of quality services for people with disabilities and to ensure that they can participate in the mainstream development activities. Considering the above discussion, the present study aims to explore the relationship between disability and poverty. The negative influence of disability and social exclusion leads the disabled to poverty.

A paper from KSA looked at a case of sudden Statins withdrawal. Statins is a group of drugs used to lower blood cholesterol. This group of medication has a different mode of action to improve the blood vessels function.

Acute withdrawal of this medication may cause serious hazards. This phenomenon was scarcely discussed in the literature. The authors report a case with the effect of acute statins withdrawal and discussed briefly this phenomenon.

A paper from Bangladesh looked at Age at First Marriage in Bangladesh. In this study attempt has been made to investigate the differentials of socio-economic factors that provide a strong picture of age at marriage and also identify the factors that influence age at first marriage of the female population. This paper utilized the Bangladesh Demographic and Health Survey (BDHS) 2007 data that covered a national representative survey of 10,996 ever married women. Among the women 91.4 percent were married before age 20 years, with most of the marriages taking place at the ages 13-16 years. Only 8.6 percent marriages occurred at ages 20 or older. Differential analysis shows that most of the married females have a rural background, currently not working, they had no formal education, their husbands were also illiterate and Islam is the most dominant religion. Logistic regression analysis indicates that respondent's education, place of residence, wealth index, partner's education and religion were the most important significant covariates of age at first marriage. This study will help to policy makers to develop suitable programs addressing the case of age at first marriage in the developing countries as well as in Bangladesh.

A Case control study from Cairo was designed to assess changes in abdominal aorta measurements and echo-cardiographic findings among elderly diabetics. The study group were divided into two groups; 60 diabetic patients, and 60 elderly subjects matched for age and sex as their controls, were recruited for the study. On analysis of data, a statistically significant difference was found between cases and controls for abdominal aorta diameter with the measures higher for the diabetic patients. A Statistical significant negative correlation was found between abdominal aorta diameter and ejection fraction. Smokers were found to have higher measures. The authors concluded that diabetes among the elderly is associated with initial increase in the abdominal aorta diameter with smoking increasing the risk.

A prospective study that was conducted at two military hospitals located in Amman city in Jordan looked at dislocation following total hip replacement. The mean age of patients was 62.3 years with females slightly outnumbering males 1.1 to 1. Dislocation occurred in 4 patients (3.03%). Dislocation was not related to surgical technique or original pathology. The most common etiological factors were placing the acetabular cup too vertically or anteverted (3 patients). The last patient had limb shortening. The authors concluded that dislocation is not uncommon following total hip replacement surgery. Placing the acetabular cup in correct position will minimize its occurrence.

Disability, Employment and Poverty: A Study of the Physically Handicapped People in Dhaka City

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ABSTRACT

The combination of disability and poverty has a tremendous capacity to destroy the lives of people with disabilities and impose burdens on their families that are too crushing to bear. People with disabilities are the most vulnerable and disadvantageous section of our society and often they are subjected to discrimination and negative attitudes. It is a matter of great regret that they are deprived of their basic needs and human rights. Among them the most important one is employment opportunity as well as better income, suitable environment of the workplace, and extra facilities for inability. These issues tend people with disabilities to be poor. The process of social exclusion regenerates poverty and people with disabilities remain members of the lower class and are not able to cross the poverty line. Although some people with disabilities are getting jobs nowadays, their income is very low compared to their needs and often they don't get equal salary to the non-disabled person. They have to face humiliation and negative attitudes at their workplace. Overall the working environment is not friendly to the disabled person. In our country, this negligence is compounded by the lack of availability of quality services for people with disabilities and to ensure that they can participate in the mainstream development activities. Considering the above discussion, the present study aims to explore the relationship between disability and poverty. The negative influence of disability and social exclusion lead them to poverty.

Key words: PRSP, PWD (People with Disability), Bangladesh Protibandhi Kallayan Samity (BPKS), Handicapped, Centre for Services and Information on Disability CSID)

STATEMENT OF THE PROBLEM

“Poverty is not simply the consequence of a lack of resources. Some people are unable to access existing resources because of who they are, what they believe or where they live. Such discrimination is a form of exclusion and cause of poverty”. (DFID,2000)

Poverty is a consistent feature of disabled people’s livelihood worldwide. Disabled people are more likely to be poorer than non-disabled people living below the poverty line. People with disabilities experience a particularly high level of poverty, leading to chronic malnutrition and difficulty in resisting debilitating sickness, less access to basic medical services, employment, education and rehabilitation. The marginalization experienced by disabled people living in isolated areas of rural and urban slums across Africa, Asia and Latin American is often overlooked. Everywhere disabled people are disproportionately unemployed, underemployed and underpaid.

In developed and developing countries, the disability support system such as personal assistance schemes, assistive technologies, transportation and education system etc. are severely under resourced or nonexistent. Where basic services are available, the most disabled people can’t afford to pay for them. For example, in India 60 million disabled people live in areas where public amenities such as clean water, electricity, and sanitation is almost nonexistent. When juxtaposed with the lack of the most basic medical treatment and services, the problems of inequality and injustice are so massive as to appear unmanageable (Ghai, 2007)

Bangladesh is a South Asian country and one of the underdeveloped countries in the world because of overpopulation, hard core poverty, illiteracy, unemployment, lack of medical, care and services. Nowadays disability is a major social and economic phenomena in Bangladesh because the prevalence of disabled people is believed to be high compared to other countries of the world. The WHO’s global estimates stated that 10% of all people have a disability of one kind or another. Bangladesh Protibandhi Kalayan Samiti records 7.8%. Amongst 14 million disabled people around 50% are hard core poor. 1.5 million people are severely disabled, have no work to do and are living in the worst conditions. (The Daily Star, 3 December, 2006, p.8) The disabled people in Bangladesh have little access to any kind of health or disability related support which shows that disabled people are totally ignored by the government and other communities. These problems are exacerbated by inaccessible transport system,s working environments, housing, sanitation, medical facilities, education and overall low standard of living. Overall these factors ultimately bind them to a lower class and below the poverty line.

Review of the relevant literature:

There are very few studies and works which focus on the disabled people and their overall status in our society. Relevant works and literature found on this issue are briefly reviewed as follows-

Disability situation in Bangladesh: A problem analysis:

“The people with disabilities in any society are grossly over-represented amongst poor people”. (Beresford 1996, p.53.) Disability has been globally recognized as a development issue and has created a very positive impact on development initiatives in Bangladesh. During the last couple of years, disability, as a development issue is gradually gaining recognition in the development context. The employment situation of skilled and educated people with disabilities in Bangladesh is not encouraging. In Bangladesh disabled people live in an unfriendly and hostile environment. They are deprived of not only social and political needs but also basic human needs.

Statistics on the prevalence of disability in the country has always been a matter of debate. There is no data on disability matters that is widely accepted by all concerned. Government findings based on surveys conducted in 1982, 1986 and 1998 estimated a national prevalence rate of 0.64%, 0.5% and 1.60%.

Incidentally, sample surveys conducted by national and international NGOs in the country found prevalence rates to be much higher than Government findings.

Bangladesh Protibandhi Kallayan Samity (BPKS) records disability prevalence rate at 7.8%. Action-Aid Bangladesh and Social Assistance and Rehabilitation for the Physically Vulnerable put the figure at 8.8%.

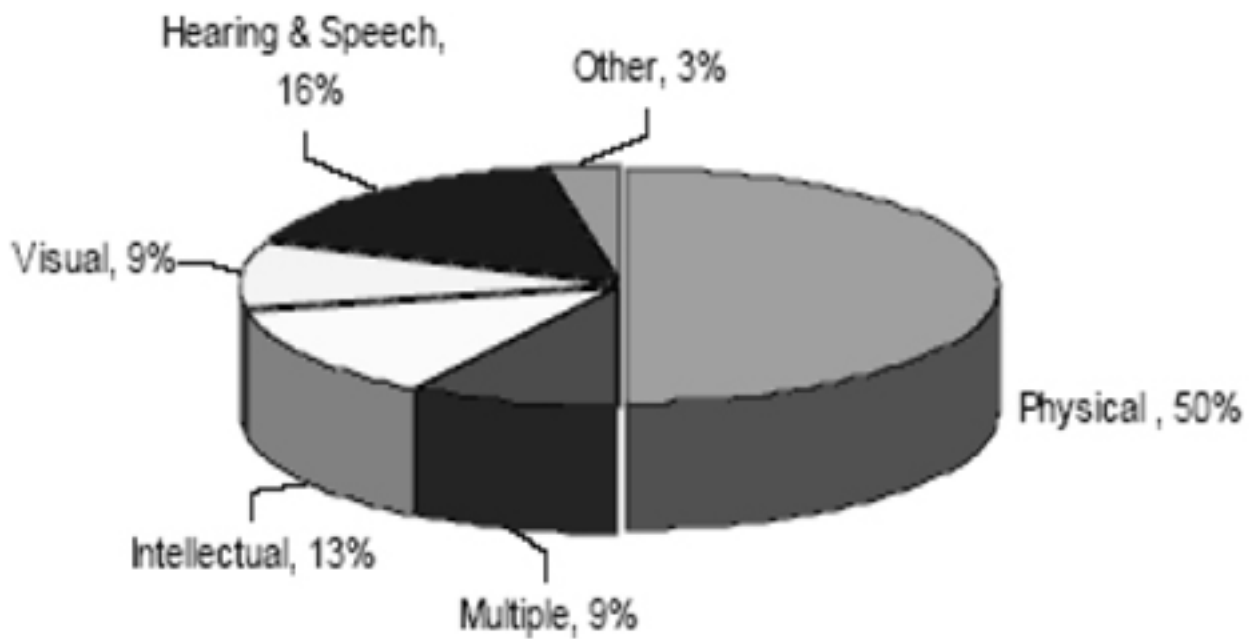
A recently conducted Prevalence study of Handicap International (HI) and NFOWD on a sample population of 13,205 people all over Bangladesh found 5.6% as prevalence rate of disability.

Some international organizations calculating the prevalence rate of disability are the UN which estimates 5% of the world population is people with disabilities and WHO estimates this figure is 10%. If these figures are calculated for Bangladesh, the number of people with disabilities should range from a minimum of 7 million to a maximum of 14 million, based on the country population of 140 million. The types and percentages of different kinds of disability in Bangladesh are given in Figure 1 (opposite page).

Causes of disability in Bangladesh

Excluded from mainstream social, economic and political opportunities throughout their lives, disabled people frequently fall further into chronic poverty and have little opportunity to come out of this cycle. In Bangladesh disability occurs for many reasons, such as:

Poverty, Limited access to healthcare, healthy food, Working in hazardous working conditions, Malnutrition and poor sanitation, Accident, Wrong pathological diagnosis, Malnutrition of pregnant women, Lack of trained birth attendants and nurses, Polio, Typhoid, Paralysis, Crime and violence, Acid burn, Child marriage, Marriage between close relations, Babies not being vaccinated, Lack of knowledge, Lack of



Source: Action Aid Survey 2000

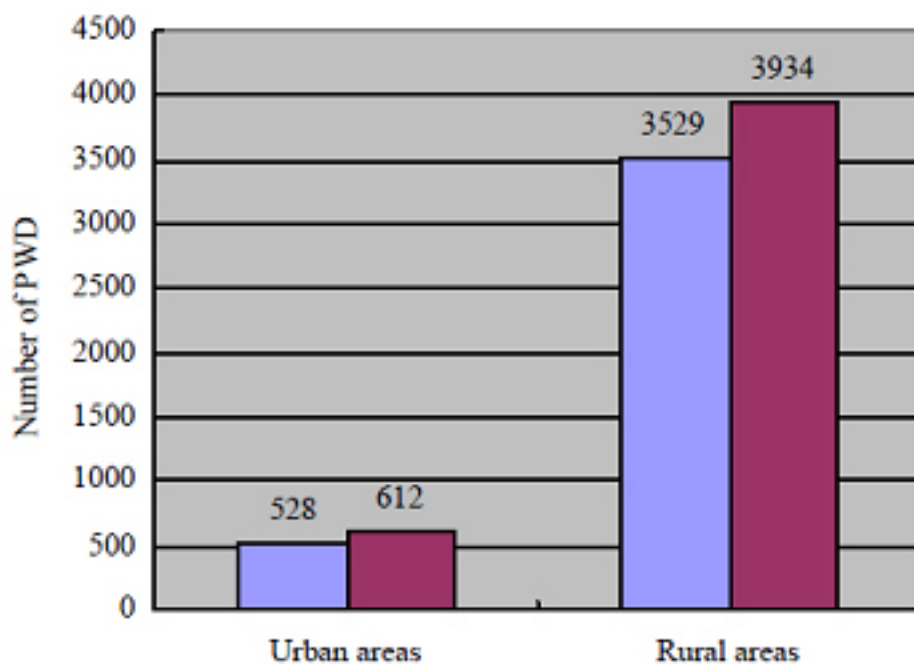
Figure 1: Types and percentage of disability in Bangladesh

Distribution of number and percentage of physically handicapped people by different categories:

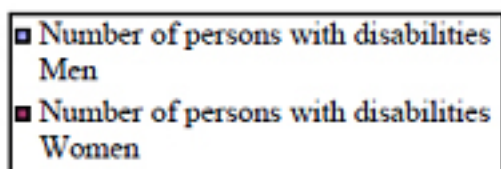
Age Group	Male	Female	Total
0-4	5.9	4.1	5.2
5-9	9.7	9.8	9.8
10-14	10.2	9.5	9.9
15-19	5.4	6.6	5.9
20-24	6.6	6.5	6.6
25-29	5.4	6.2	5.8
30-34	5.9	3.1	4.8
35-39	4.9	4.9	4.9
40-44	5.4	4.5	5
45-49	5.3	4.4	5
50-54	5.6	4.5	5.2
55-59	5	4	4.6
60-64	6.8	6.9	6.8
65 +	18	24.9	20.8
Total	100	100	100

Source: Bangladesh Bureau of Statistics 1991

Table 1: Percentages of people with disability (PWDs) by age (1991 census)



Area Specific Data



Source: VHSS Country profile on persons with Disabilities in Bangladesh 2000

Figure 2: Distribution of persons with disabilities in Urban and Rural areas

awareness among care providers, besides a huge number of citizens became disabled during the liberation war in 1971.

Obstacles behind the development of disabled persons in Bangladesh

Persons with disabilities are amongst the most vulnerable of the disadvantaged groups of people in Bangladesh. In fact, they are still granted lowest priority in service provision in Bangladesh. As a result they have to face many obstacles to develop themselves as a capable member of the mainstream society. The following are issues associated with handicaps, impairment and disability in Bangladesh:

Awareness and Education, Social Embarrassment, Rehabilitation, Limited Employment Opportunities, Limited Service Facilities, Training Facilities, Co-ordination, Improving access to services for rural Persons with Disabilities, Improving the status of Persons with Disabilities. At the same time, rehabilitation and employment-promotion activities should be implemented and supported to enable persons with disabilities to exert their abilities and achieve their full potential. (Kabir et al.1996)

Why employment is important for disabled persons?

It is frequently assumed that persons with disabilities cannot or do not want to work. But this is incorrect. Disabled persons, like non-disabled persons want to work and if they are given the opportunity, can and do work.

Disabled persons want and need to work to:

- o Earn a livelihood.
- o Enjoy social contacts.
- o Gain self-esteem.

Barriers to employment:

Work is central to the well-being of people with disabilities, but they face obstacles in finding and holding jobs. The barriers which exclude disabled persons from employment-related services and opportunities are social, economic, cultural and political. These obstacles may be:

1. Negative attitudes
2. Unequal access to education and training
3. Inaccessible buildings
4. Lack of accessible information
5. Inaccessible transport
6. Lack of assistive devices and support services
7. Low self-esteem and overprotective families
8. Lack of a supportive legal environment
9. Lack of policy support.

Problems of disabled persons in the workplace:

Centre for Services and Information on Disability (CSID) carried out a study on 'Employment Situation of People with Disabilities in Bangladesh in 2002'. The study objective was to provide feedback to development planners on the prevailing employment situation of people with disabilities in

Bangladesh, which helps as input for development of need based programs to improve the employment opportunities of the people with disabilities. The target group of the study was the people with disabilities in employment or with suitable skills.

They identified some major problems faced by people with disability. These are given below-

Comparatively lower level of salary, Negative attitude of the employers, Disability unfriendly working environment, Rigid organizational rules, Accessibility problems out-side and inside the organization, Lack of cooperation, Non-availability of loan or any kind of help, Lack of accessibility and adaptability, Not get rewarded or inspired by promotion, Lack of initiatives in the further development of skills, Lack of proper training skills, Education, health care. Their mobility is also seriously limited by the traditional pattern of building and road construction, Limitation of resources, Assistive devices are not available, Lack of practical experiences and vocational skills, Rapidly changing labor markets, Lack of access to self-employment opportunities, Unfair terms of employment, Higher work-related costs.

The Path from Disability to Poverty:

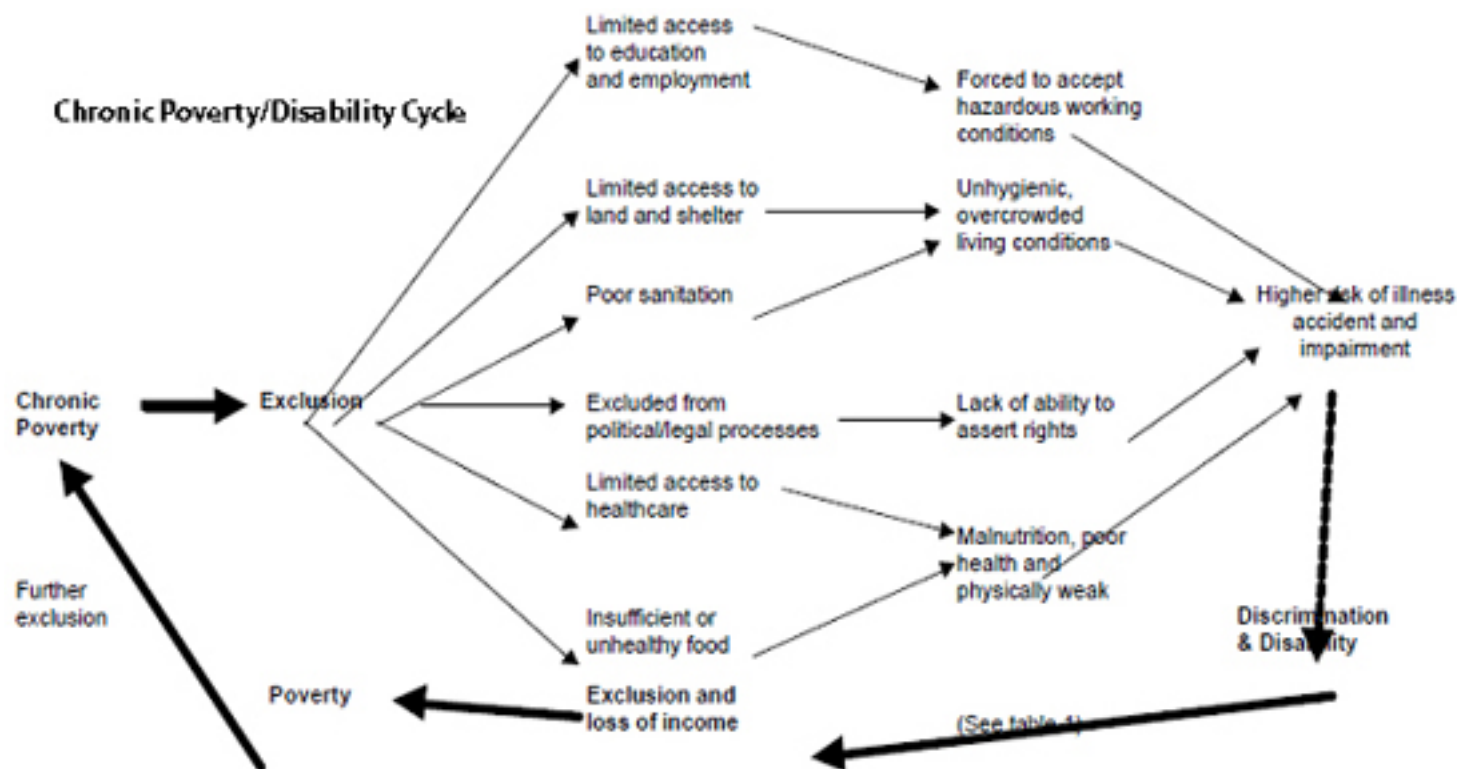
Rebecca Yeo on August 2001, published a research report on behalf of the Action on Disability and Development named “chronic poverty and disability”. This report deals with the social economic, political and other causes of chronic poverty among disabled people. Another paper named

“Poverty and Disability” was prepared by the Ann Elwan in 1999 as a part of the social protection units research on the economic consequences of disability. Both papers are concerned with the relationship between disability and poverty, including education, employment, income and access to basic social services in developing countries. The disabled and their families are more likely than the rest of the population to live in poverty. The inter relationships between disability and poverty are given below-

Studies have identified three types of factors which can make disabled people or families with disabled people worse off:

- (i) Loss of income.
- (ii) Additional costs resulting from the disability.
- (iii) Marginalization or exclusion from services of social and community activities etc.

There is a broad relationship between disability and income, particularly the income of the disabled person. It is sometimes for the costs incurred by a disability, including indirect costs to other family members. The relationship between disability and chronic poverty varies within and between cultures. Although disabled people are disproportionately amongst those living in chronic poverty and all disabled people experience discrimination, not all disabled people are poor in economic terms. Poverty is not only about rates of income but also about social exclusion and powerlessness. Simon Maxwell (1998) writes that people become poor because they are excluded from social institutions where access is based on status, privilege, race and gender. Exclusion leads to lack of resources, lower



(Elwan 1999, 32)

Figure 3: The creation of poverty by disability

expectations, poor health and poor education. For these purposes, we are looking at those disabled people who experience chronic poverty in terms of income, as well as wider social exclusion.

Chronic poverty often leads to higher risk of disability. The disability can then lead to more marginalization and exclusion, resulting in disability, more exclusion, loss of income and further poverty. Many elements of this cycle are inevitably inter-linked. The International labor office published a practical guide named "Assisting disabled persons in findings employment" in October 2003. It contributes to the improvement of decent work opportunities for people with disabilities throughout Asia and specific regions.

The type of job for which a disabled person is suited may be influenced by-

1. What type of disability the person has?
2. The ability of disabled person to work.
3. When the disabled work, whether the disability is from birth or acquired later in life.

There are many measures taken by the Government of Bangladesh. The following are Bangladesh Policy and Developments (Table 2 below):

Theoretical Framework:

On the basis of Human rights based approach the increasing focus on the definition of poverty is not from the narrow perspective of material needs, rather it lights toward human development and rights of the individual which refer to a mutually reinforcing relationship between poverty and disability. An understanding of poverty from this perspective is located firmly at relational /symbolic rim of the poverty wheel.

Disabled people living in poverty are often treated as less than human which results in a deepening cycle of poverty. So the relationship between disability, poverty and human rights is easily explained. The international human rights framework states that all people have human rights for standard of living that is adequate for their health and well being, to food, clothing, housing, medical care, social services, civil and political freedoms. Disabled people living in poverty experience a disproportionate enjoyment of their human rights. The human rights based approach to poverty eradication and development is thus best explained as having disabled people fulfill their individual needs by claiming or securing their human rights. The minority group theory can be coined to represent attempts in those studies to identify the characteristics of certain groups of poor people. Seebhom Rowntree, the prominent scholar, listed the immediate causes of primary poverty or earning insufficient to obtain the minimum necessities for the maintenance of merely physical efficiency. These factors are:

1. Incapacity of chief wage earner through accident, illness or old age.
2. Chief wage earner out of work.
3. Chronic irregularity of work.
4. Lowness of wage.

Rowntree carefully identified these kinds of people and their differential wage system, their sources of support and systems compensating these people unable to work and excluded from earning a living. The classification done by Rowntree represented a significant advance and influenced political thought away from conditional welfare for the few and towards a minimum income for certain identifiable minorities, which is applicable in the case of disabled people.

1993, National Coordination Committee on Disability established under the Ministry of Social Welfare
1995, National Policy on Disability approved outlining guidelines for prevention, identification, education, rehabilitation, research and management of the national program
1996, Action Plan on Disability approved outlining the plan for the implementation of the National Policy - this plan has not yet been fully implemented
2000, National Foundation for the Development of Disabled Persons (NFDDP) established under the Ministry of Social Welfare
2001, Disability Welfare Act passed by Bangladesh Parliament

Source: Bangladesh Protibandhi Kallyan Somity.

Table 2: Policy and development of Bangladesh for physically disabled persons

According to the theory of Social exclusion, exclusion is the critical element that binds poverty and disability. People with disabilities tend to face social stigma and discrimination. The more they are poor and destitute, the more they are socially excluded and vice-versa. The process is following-



Figure 4: Poverty as a consequence of social exclusion

This initial exclusion and stigma creates a cycle of exclusion that can follow disabled people throughout their lives. Exclusion from public infrastructure tends to limit the availability of sanitation, clean water, and electricity and health care services. These limitations tend to increase the risk of disability, creating a mutually reinforcing cycle. For example, income affects whether one has enough money, food to prevent malnutrition and access to health care which in turn affects the other chronic disease, risk of impairment and disability. Disability related expenses must be substantial enough to force the disabled person into poverty. Only if poverty occurs can disability create cycles of cumulative causation. Exclusion dominates the system because it is reinforced many more times and the direct link between impairment and income which reveals the following model (page 10):

The capability approach developed by Amartya Sen describes the notion that income is an adequate measure of welfare, advancing instead the idea that income is simply a means to an end, only valuable insofar as it increases the person's ability to do valuable acts or reach valuable states of being (Sen 1993,p.30). In the case of disability, the capability approach can offer opportunities for reconceptualising both disability and poverty as the deprivation of capabilities, hence drawing the two closer together and reorient the focus on opportunities a person has (Welch 2002). Sen uses the example of a disabled person to illustrate the point-

“A person with disability has special needs and thus requires more resources to escape from a poor life; such disparities in personal characteristics and circumstances are not just “exceptional cases”, as they are sometimes made out to be. On the contrary, interpersonal variations are pervasive, relate both to disparities in personal characteristics such as gender, age and proneness to illness, as well as social factors such as epidemiological surroundings and other environmental determinants that influence the conversion of personal resources into the freedom to lead lives without unacceptable deprivations” (Sen. 1994, 334).

Conceptual framework

In this study, disability is an independent variable though there are various indicators that would determine the influence of disability and situation of their work place and their poverty is considered as a dependent variable. In addition, we added some variables such as disability and poverty related factors from the literature that were deemed pertinent to balance their inability and the economic status in the society. Exclusion from family and society also included to test the condition moderating effects on the economic status of disabled person in the society, is considered as mediating variables.

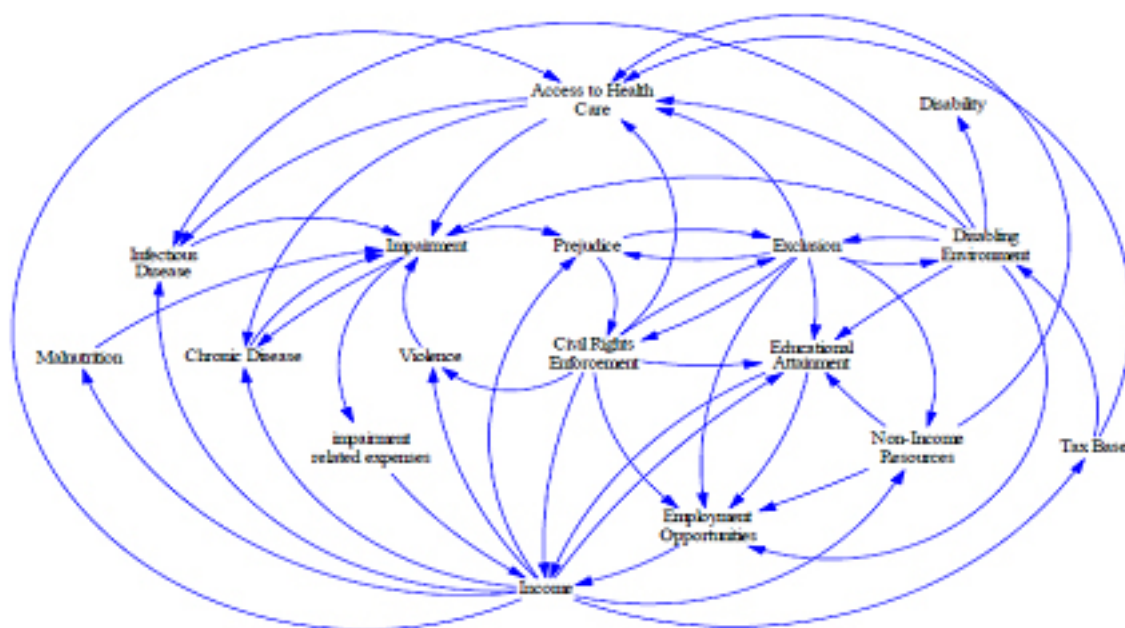
Methodology

In this study of poverty and disability, a quantitative approach is used because this method rests on measurement and samples are larger and generalization through sampling is important. The study was conducted in Dhaka, with an objective to organize the work in a representative manner, the cluster sampling was used and different areas were selected. The following table (Table 3 - next page) shows the distribution of the samples taken for the study:

As the research is about “Disability, employment and poverty” so the study unit is disabled people. The sample size is 100. Data for this study was collected from the respondents by using interviewer administrative questionnaire. In these study open and close ended questions were used in the questionnaire. So it is easy for the respondents to answer and the information is clear to analyze. Since the study dealt with a problem requiring sensitive information and so for the questionnaire containing sensitive information, a pretest was conducted.

Discussion

In Bangladesh, disabled people live in an unfriendly and hostile environment. They encounter non-cooperation, ill-treatment, negligence and hostility at family, community, society and government level. This negligence bars persons



(Elwan 1999,40)

Figure 5: The cycle of poverty and social exclusion

Study area	Frequency	Percent
Center For Services and Information on Disability	20	20.0
Centre for Rehabilitation of the Paralysed	15	15.0
Action on Disability Development	55	55.0
Pongu Hospital	10	10.0
Total	100	100.0

Table 3

with disabilities from normal economic, social and political activities in their families, communities, essential services and education.

Many people in Bangladesh view disability as a curse and a cause of embarrassment to the family. There are many superstitious beliefs surrounding disability, compounded with a negative and derogatory attitude of the community and family members have contributed to the marginal development in the disability sector in Bangladesh. But the causal factors behind disability include malnutrition, dangerous working and living conditions, limited access to health care, poor hygiene, bad sanitation, and lack of information about causes of disability. The present study shows, the majority of the people described their disability as a result of illness, besides accidents, wrong treatment and malnourishment were the reasons. Poverty has a strong influence on the disability situation in our country. About 80% of PWDs are living in intense poverty. DFID estimates that more than 50% of the total disabilities are preventable and directly linked to poverty. (DFID 2000, p.46)

So a close interrelation has been seen between disability and poverty. But PWDs were the most neglected group in the PRSP process. At the beginning of the formulation process of PRSP in Bangladesh, people with Disabilities were also excluded. The people with Disabilities in Bangladesh had to struggle a lot

to involve them in the process. But when a different disability related organizations published a paper it added a section on human rights. The paper received considerable attention from the Planning Commission representative, who wanted to pay more attention to the concerns of people with disabilities in future. Here they highlighted that PRSP could not exclude disabled persons because the prevalence for disabled persons is very high and it is an important factor that causes poverty for them and without including the high percentages of PWDs, it is not possible to reduce poverty as a whole. They also described that disability, particularly of the head of a poor household, exacerbates the family's poverty due to increased expenses, lack of income and lack of opportunities because of social exclusion.

In Bangladesh the disabled are mostly poor and are subject to gross deprivation and acute vulnerabilities. The ill-being of the disabled is mainly determined by:

- (i) Lack of human development and capacity building such as education opportunities
- (ii) Practice of discrimination, such as the negligence of families and society
- (iii) Demographic factors such as physical inability, death of parents etc.

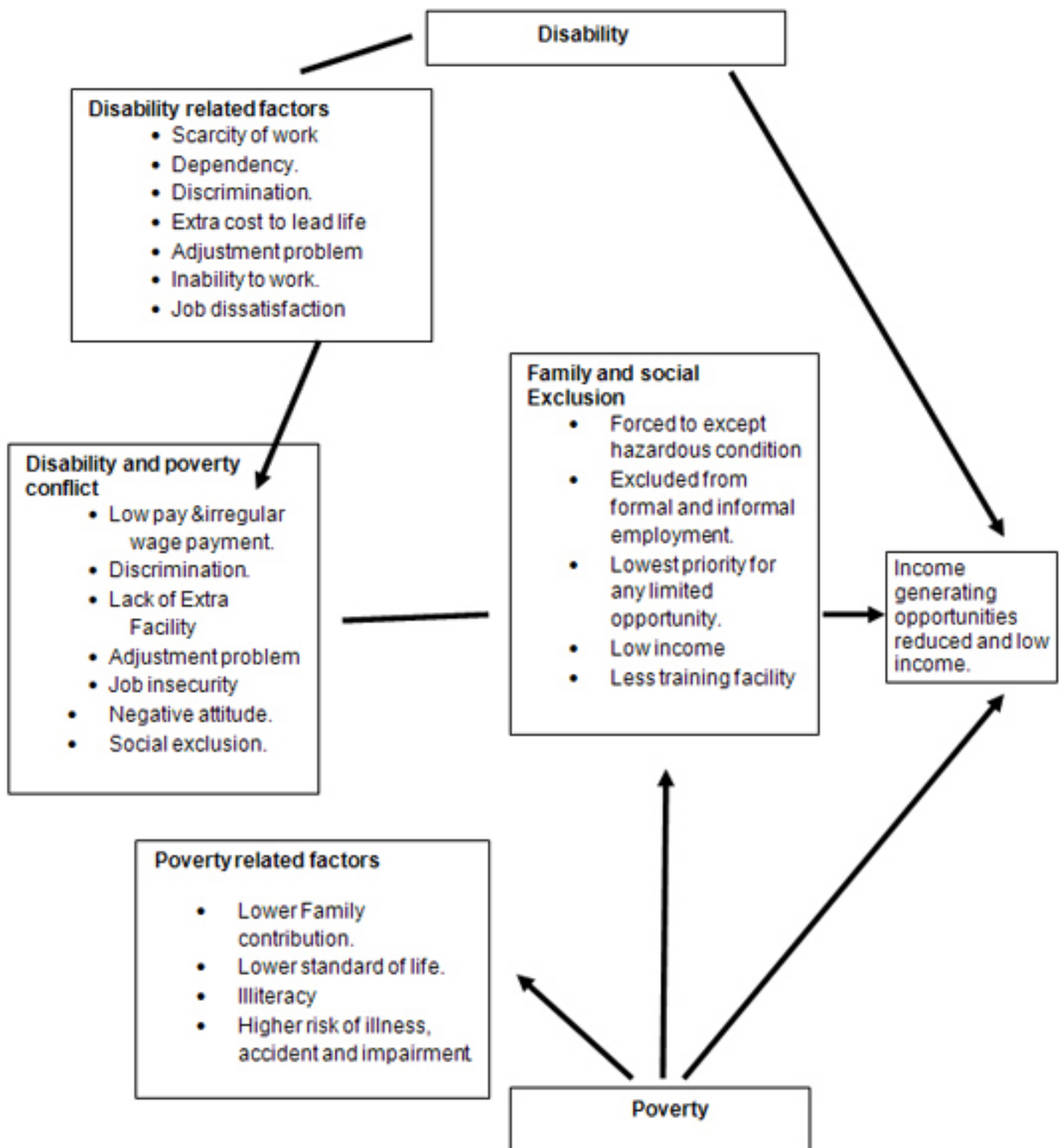


Figure 6: Conceptual framework of the study

- (iv) Lack of employment opportunities
- (v) High medical expenses
- (vi) Denial of participation in social affairs
- (vii) Obstacles to mobility, lack of appliances
- (viii) Lack of opportunities to get organized
- (ix) Lack of housing and shelter etc.

The population of Bangladesh is fast approaching 150 million people out of which almost half currently live below the poverty line. Department for International Development

(DFID) and Alam et al. (2000) have confirmed that a strong relationship exists between poverty and disability, with each being both a cause and a consequence of the other.

DFID also estimates that “as many as 50% of disabilities are preventable and directly linked to poverty”. It is evident that the absolute number of people living with a disability is extremely large. The Population has excess of 7 million people who are disabled and most of whom are presumed to live below the poverty line.

Employment opportunities for the physically handicapped people are very low in our country. They continuously face tough challenges like rapid change in nature of work, growing competition in job market, low professional skills, low capacity and physical inability and social exclusion. One of the reasons is that a limited number of people with disabilities have the essential professional skills to be involved in economic activities. Vocational training centers hardly provide any adapted skill training to the PWDs. The development organizations also lack the knowledge or skills to include PWDs in their skill development training and initiatives.

There is a lack of self organization amongst PWDs. Different factors are responsible for this situation. The majority of PWDs are unaware of their fundamental rights. They are not empowered partially due to their low self-confidence and esteem, lack of education and other inclusion opportunities. Most of them have limited communication, advocacy and leadership skills.

Many employers are also reluctant to employ people with disabilities into their work force, mostly due to their ignorance about the potentialities of PWDs, negative attitude, the work environment not being accessible, and their lack of interest to renovate or adapt the working environment befitting to PWDs. Very few people with disabilities are involved in mainstream employment activities. The number of employed person with disabilities is assumed to be less than 1%.

The employment situation for disabled people in Bangladesh has been demonstrated to be extremely poor. The condition of disabled person is measurable at their workplace. They have to face negative attitudes at the workplace by everyone, such as senior officials, junior officials and also by colleagues. In the present study, around 40% of respondents described the negative attitude of the officers at the workplace. They did not get dignity and security at the workplace because of their inability and they did not get the freedom to show their potential to work.

Among the total respondents, 92% described unequal treatment to them and 71% described the adjustment problem at the workplace. Overall, 76% of respondents said the unfriendly working environment increases the probability of becoming unemployed and the chance to change the existing job.

Financial struggles are brought on by the low income of the disabled person. They get proportionately lower salaries from the workplace. The present study shows, 42% of respondents earned less than 5000 taka, which was absolutely low for the disabled person and their family. 30% of respondent argued that they could not contribute to the family with their income. They had to face inequality in the case of salary and promotion. 80% of respondents illustrated unequal salary and 75% face hierarchy problems at the workplace. Because of the low wage payment, 84% of respondents cannot save at all from their salary. Lastly, 96% of respondents believed that exclusion and negative attitude from family members, relatives, and colleagues regenerate the poverty because they have to face exclusion each and every step of their life ultimately. 92% of respondents believed that disability is a cause of their present economic crisis, discriminatory social status and poverty.

Conclusion and Recommendations

“Because disability and poverty are inextricably linked, poverty can never be eradicated until disabled people enjoy equal rights with non-disabled people”
(Lee, 1999)

Disabled people are hidden and silent; their concerns are unknown and their voices are unheard. They are struggling to maintain even bare minimum living conditions. They don't get social security and suffer from lack of medical attention, malnutrition, social isolation and poverty.

The voiceless physically handicapped people are an inseparable part of the growing population of marginal, weaker and vulnerable sections of society. So, a generalizable statement can be made that physically handicapped people in Bangladesh have great hardship in which to pass their days due to their physical inability and inadequate income, and unequal treatment at the workplace which results in social exclusion and the process of social exclusion ultimately makes them vulnerable to poverty. But the distress of the physically handicapped people is going unnoticed. Although, the government had declared about two decades back a 10 % employment quota for persons with disabilities, this quota has never been properly implemented due to the lack of sensitivity of employers about the potentialities of persons with disabilities, contradictory employment policies, loopholes in the system, and a lack of a proper monitoring system. In 1998, the Prime Minister of Bangladesh declared a 1% employment quota for persons with disabilities in all cadre service (government) jobs. In Bangladesh, there have been only a few systematic interventions to raise awareness among PWDs and the concerned authority at all levels.

On the basis of the present study findings and discussion, there are some recommendations given below:

1. Different ministries and divisions should concentrate on the rights of the disabled and work together.
2. Increasing the reserve system for disabled in government and non-government jobs and the employment law for disabled people should be implemented. It is necessary to monitor the implementation of the current 10 percent quota system for the employment of disabled people in the public sector.
3. Making of a separate budget for persons with disability and for providing necessary infrastructure which is essential.
4. Reserve seats shall be allocated for the disabled in the Parliament. They should be involved in a policymaking body for alleviation of poverty and development of the poor.
5. It is important to ensure mobility of the disabled people so that they have access to all sorts of public services. In this respect attention must be given to access to transport vehicles, infrastructure, water and sanitation etc. Building ramps in public buildings and in large housing facilities and in cinema halls and other entertainment facilities should be made mandatory. Special toilet facilities should be built in buses, waterways, rail stations, schools, banks, and in all

public spaces. All transport facilities must have reserved seats for the disabled.

6. Research projects on identifying the issues of the physically handicapped people at grass root level and then training the physically handicapped people to become employees in public services.
7. Awareness program on the rights of the physically handicapped employees should be conducted for local administration on the rights of the physically handicapped employees and people.

References

1. Abberley, P. (1992). 'Counting us out: a discussion of the OPCS disability surveys' *Disability, Handicap and society*, Vol.7, No.2, Pp.139-155.
2. Alam, K.J., Bari, N. (2005). Community Based Rehabilitation Practices and Evaluation of Poverty of people with Disabilities in Bangladesh-Bangladesh Country Paper, The National Forum of Organizations Working With The Disabled, Dhaka.
3. Beresford, P. (1996) Poverty and Disabled People: Challenging Dominant Debates and Policies' *Disability and Society*, Vol.11, No.4, Pp.553-567.
4. Barnes, C. Sheldon, A. (2010) 'Disability, politics and poverty in a majority world context.' *Disability and Society*, Vol.25, No.7, Pp.771-782.
5. Burchardt, T. (2004). 'Capabilities and Disability: The capabilities framework and the social model of Disability' *Disability and Society*, Vol.19, No.7, Pp.735-751.
6. Corby, S., Woodhams, C. (2007) 'Comparing Income When Needs Differ: Equalization For the Extra Costs Of Disability' *Review of Income and wealth*, Series.51, No.1, Pp.89-113.
7. Center for Services and Information on Disability, 2002. Employment Situation of People with Disabilities in Bangladesh.
8. Department for International Development, 2000. Disability, Poverty and Development. United Kingdom.
9. Elwan, A. (1999). Poverty and Disability: A survey of the literature. The World Bank, Washington DC.
10. Fox, M.H. (2004) 'Understanding emerging disabilities' *Disability and Society*, Vol.19, No.4, Pp. 323-337.
11. Fry, E. (1986). A Equal Chance For Disabled People? A Study of Discrimination in Employment .London: Spastics society.
12. Gill, M. (2005) 'The myth of transition: contractualizing disability in the sheltered workplace' *Disability and Society*, Vol.20, No.6, Pp. 613-623.
13. Grech, S. (2009) 'Disability, Poverty and Development: critical reflections on the majority world debate' *Disability and Society*, Vol.24, No.6, Pp. 771-784.
14. Giddens, A (2006) *Sociology*. (5th Edition) Cambridge: Polity Press.
15. Heron, R. Murray, B., 1997. Assisting Disabled Persons in Finding Employment. International Labor Office, Bangkok.
16. Japan International Cooperation Agency, 2002. Country profile on Disability, Peoples Republic of Bangladesh, Planning and Evaluation Department, Dhaka.
17. Kabir, N., Rehman, N. 1996. Four Baseline Surveys on Prevalence of Disabilities. Action Aid Bangladesh, Dhaka.
18. Lister, R. (2004). *Poverty*. Cambridge: Polity Press.
19. Lee, H. 1999. *Disability as a Development Issue*, Oxford: Oxfam.
20. Mont, D. (2010). 'Exploring the relationship between disability and poverty' *Disability and Society*, Vol.14, No.6, Pp. 371-384.
21. Mont, D. Braithwaite, J. 2008. *Disability and Poverty: A Survey of World Bank Assessment and Implication*. The World Bank. Washington DC.
22. Ryan, M.K. Haslam, S.A. (2008). 'Just because you can get a wheelchair in the building does not necessarily mean than you can still participate: barriers to the career advancement of disabled professionals' *Disability and Society*, Vol.17, No.2, Pp. 117-135.
23. Russell, M. (2002). 'What disability civil rights cannot do: employment and political economy' *Disability and Society*, Vol.14, No.6, Pp. 371-384.
24. Rust, T., Metts, R. (2008) 'Poverty and Disability: draped in a Web of Causation' *Disability and Society*, Vol.22, No.7, Pp. 321-334.
25. Singal, N. (2010) 'Doing disability research in a southern context: challenges and possibilities' *Disability and Society*, Vol.25, No.4, Pp. 415-426.
26. Sultana, Z. (2010) 'Agony of Persons With Disability-A Comparative Study of Bangladesh' *Journal of politics and law*, Vol.3, No.2, Pp. 212-221.
27. Victoria, S. 1990. *Understanding Disability: Causes, Characteristics and Coping*. London: Edward Arnold Press.
28. Voluntary Health Services Society, 2000. *Country Profile Study on Persons with Disabilities in Bangladesh*. Dhaka.
29. Yeo, R. 2001. *Chronic poverty and Disability*. Action on Disability and Development, Somerset.

Abdominal Aorta Diameter among Elderly Diabetic Patients

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ABSTRACT

Background and Objective: Diabetes mellitus is a disease with preponderance of atherosclerotic manifestations and arterial changes. The current study was designed to assess changes in abdominal aorta measurements and echo-cardiographic findings among elderly diabetics.

Method: The Case control study was designed where two groups, 60 diabetic patients, and 60 elderly subjects matched for age and sex as their controls, were recruited for the study. All participants were subjected to: comprehensive geriatric assessment, laboratory measurements including: fasting blood sugar, lipid profile, and C-reactive protein, Abdominal ultrasound to assess abdominal aorta diameter at the level of iliac bifurcation, and trans-thoracic echocardiography.

Results: On analysis of data, statistical significant difference was found between cases and controls for abdominal aorta diameter with the measures higher for the diabetic patients ($t=5.488$, $p=0.000$). Statistical significant negative correlation was found between abdominal aorta diameter and ejection fraction ($r=-0.259$, $p=0.045$). Smokers were found to have higher measures ($t=2.644$, $p=0.011$).

Conclusion: Diabetes among the elderly is associated with initial increase in the abdominal aorta diameter with smoking increasing the risk.

Introduction

Diabetes mellitus is an important public health problem worldwide because of its high prevalence and complications(1). Diabetes is associated with high mortality and morbidity as a result of coronary artery disease (CAD) and other atherosclerotic disease(2).

Diabetes is the seventh leading cause of death, and heart disease is the leading cause of diabetes-related deaths; adults with diabetes have heart disease death rates about 2 to 4 times as high as that of adults without diabetes. Reports from Framingham and other studies have established diabetes mellitus as a strong risk factor for cardiovascular morbidity and mortality especially in women. In addition, several studies suggest that DM has direct adverse effects on the heart, independent of obstructive coronary artery disease(3).

Among the vascular changes associated with diabetes, abdominal aorta in diabetic patients might be affected by a changed remodeling response, and thus changed arterial wall stress compared to healthy subjects(4).

As for the effect of aging, arterial diameters increase with age(5). The prevalence of abdominal aortic aneurysm (AAA) increases with age; it is common in the elderly and more frequent in men than in women(6).

Aortic measurement by U/S is a sensitive indicator of very early cardiovascular affection(7).

The aim of this work is to assess the changes in aortic diameter and echo-cardiographic findings among elderly diabetics.

Methodology

Participant selection criteria

A case control study was conducted. The subjects of this study were recruited from Ain Shams University Hospitals in Egypt and were subdivided into:

Group (1): sixty elderly diabetic patients not having any other co-morbidity including ischemic heart disease, hypertension, renal or hepatic diseases. Cases were all previously diagnosed to be diabetics and on therapy.

Group (2): sixty elderly not suffering from any chronic disease as their controls, matched for age (± 5 years) and sex.

Diabetes was excluded among controls by fasting plasma glucose level < 110 mg/dl and 2 hours postprandial plasma glucose level < 140 mg/dl(8).

Tools of Assessment:

- All groups were subjected to: Comprehensive geriatric assessment including: Full medical history and examination: Including the calculation of weight and height and waist hip ratio,
- Laboratory investigations were done including: Fasting blood sugar, Lipid profile including: TG, Cholesterol, LDL, and HDL, and C-reactive protein.

- Abdominal ultrasound to assess aortic diameter at the level of iliac bifurcation; the maximum diameter of the aorta was measured from leading edge to leading edge. A maximum anteroposterior or transverse diameter > 30 mm was considered a diagnostic criterion for abdominal aortic aneurysm (AAA).
- Transthoracic echocardiography; using 2.5-3.5 MH transducer. All measures were taken via transapical or parasternal views, except in poorly echogenic patients, where the values were estimated from subcostal views. Measures taken included: left ventricular dimensions (EDD and ESD) and wall thickness (posterior wall and IVS), left ventricular systolic function (%FS and EF) by M-mode, left atrial size, and annular aortic root.

Statistical methods:

Data collected was revised, coded, tabulated and introduced to PC for statistical analysis. All data manipulation and analysis were performed using the 17th version of SPSS (Statistical Package for Social Sciences). Qualitative data was presented in the form of frequency tables (number and percentage). Quantitative data was presented in the form of mean \pm standard deviation and range. Independent-t test was used to compare groups with quantitative continuous variables.

P value was always set as significant at 0.05.

Results

The sample of this study included 120 participants; diabetic group (cases) including 60 patients (30 males and 30 females) together with 60 non diabetics matched for age and sex as their controls.

The mean age of the case group was 67.78 ± 5.71 compared to 66.70 ± 4.65 for the non diabetic group. Among the studied group 32.5% (n=39) were smokers, and 67.5 % (n=81) were non-smokers.

Statistical significant difference was found between cases and controls regarding FBS, 2hrsPP, total cholesterol (Table 1 - next page).

Regarding cardiac measurements with the echocardiography, statistical significant difference was found between cases and controls regarding LVEDD, LVESD, EF, FS, and LAD (Table 1). Whereas, no statistical significant difference was found between both groups as regards the measurements of the aortic root diameter, by the echocardiography (annular aortic root).

Regarding abdominal aorta, none of the subjects fit the criteria of abdominal aortic aneurysm (AAA), still, statistical significant difference was found between cases and controls for the aortic diameter at the iliac bifurcation measured by the abdominal ultrasound where the measures were higher for the diabetic patients (Table 1).

Statistical significant gender difference among diabetic patients was found regarding CRP and aortic measurements (Table 2).

	Cases	Controls	t test	
	Mean ± SD	Mean ± SD	t	p-value
Age (years)	67.783±5.714	66.700±4.647	0.900	0.371
BMI	24.350±2.755	23.870±2.022	0.846	0.400
DM Duration	11.117±4.787			
FBS	159.517±45.947	92.700±14.406	7.757	0.000
2hrs PP	240.350±57.638	136.033±35.947	9.057	0.000
T.CHOL	213.083±34.187	189.000±44.010	2.856	0.005
TG	118.250±21.644	111.267±17.286	1.538	0.128
HDL	44.750±10.662	46.300±11.765	0.628	0.532
LDL	126.083±25.393	121.033±17.649	0.976	0.332
CRP	6.903 ± 2.878	0.568 ±0.295	11.993	0.000
LVEDD	52.163±6.216	47.967±5.082	3.199	0.002
RWT	0.204±0.048	0.199±0.062	0.400	0.690
LVESD	34.918±8.116	30.117±4.972	2.969	0.004
EF	58.567±14.221	67.467±6.479	3.256	0.002
FS	33.680±8.899	37.447±5.713	2.108	0.038
LAD	43.373±7.056	35.933±4.891	5.180	0.000
Aortic-RD(echo)	30.778±4.601	30.253±3.796	0.539	0.591
Aortic-D(U/S)	19.258±4.419	14.623±1.887	5.488	0.000
IMT	3.712±1.062	2.513±0.605	5.724	0.000

BMI= body mass index,
 DM= diabetes mellitus,
 FBS= fasting blood sugar,
 2hrspp= 2 hours postprandial,
 T.CHOL= total cholesterol,
 TG= triglycerides,
 HDL= high density lipoprotein,
 LDL= low density lipoprotein,
 LVEDD= left ventricular end diastolic diameter,
 RWT= relative wall thickness,
 LVESD= left ventricular end systolic diameter,
 EF= ejection fraction, FS= fraction shortening,
 LAD= left atrial diameter,
 IMT= intimal media thickness.

Table 1: Characteristics of the studied groups

	Cases		Controls		t test	
	Male	Female	Male	Female		
	M±SD	M±SD	M±SD	M±SD	P1	P2
BMI	23.237±2.843	25.463±2.191	23.087±1.542	24.653±2.185	0.001	0.031
DM Duration	11.033±4.139	11.200±5.429			0.89	
FBS	157±44.023	162.033±48.414	91.467±16.283	93.933±12.708	0.675	0.647
2hrs PP	236.333±55.595	244.367±60.289	130.933±33.259	141.133±38.919	0.594	0.447
T.CHOL	215.5±36.04	210.667±32.662	193.667±38.659	184.333±49.709	0.588	0.571
TG	126.667±21.225	109.833±18.868	108.333±16.438	114.2±18.175	0.002	0.362
HDL	43.833±11.259	45.667±10.138	44.067±9.012	48.533±13.958	0.510	0.307
LDL	129.867±23.026	122.300±27.424	120.733±16.679	121.333±19.152	0.252	0.928
CRP	8.047± 2.474	5.76 ± 2.832	0.537 ± 0.311	0.6 ± 0.285	0.002	0.566
LVEDD	51.983±6.173	52.343±6.359	48.2±4.329	47.733±5.885	0.825	0.806
RWT	0.212±0.051	0.196±0.043	0.216±0.058	0.183±0.063	0.195	0.149
LVESD	33.893±7.700	35.943±8.518	30.2±4.296	30.033±5.721	0.332	0.929
EF	61.333±12.965	55.800±15.085	67.467±6.947	67.467±6.220	0.133	1.000
FS	35.425±7.753	31.936±9.732	37.367±6.273	37.528±5.314	0.130	0.940
LAD	42.310±5.411	44.437±8.346	34.467±5.692	37.4±3.541	0.246	0.101
Aortic-RD(echo)	32.433±5.022	29.123±3.489	30.707±3.538	29.8±4.109	0.004	0.523
Aortic-D(U/S)	18.25±4.703	20.267±3.939	13.647±1.626	15.6±1.638	0.077	0.003
IMT	3.703±1.040	3.72±1.101	2.36±0.479	2.667±0.691	0.952	0.169

Table 2: Gender difference among the studied group

	r	p
LVEDD	0.056	0.671
RWT	0.005	0.969
LVESD	0.166	0.205
EF	-0.259	0.045
LAD	0.056	0.672
Aortic annular root diameter	0.122	0.355

Table 3: Correlation between aortic diameter by U/S and echocardiography findings among diabetic patients

Also statistical significant difference was found between smokers and nonsmokers ($t=2.644$, $p=0.011$) with smokers having higher aortic diameter measures.

Statistical significant negative correlation was found between abdominal aorta diameter and ejection fraction ($r=-0.259$, $p=0.045$) but no correlation was found with any other echo findings (Table 3).

Discussion

Diabetes Mellitus and atherosclerosis are closely linked(9).

Diabetes leads to an increase in aortic stiffness due to accumulation of advanced glycation end product in the vessel wall(10).

Central aortic mechanical properties have been shown to be important for the general assessment of cardiovascular risk(6).

The objective of the current study was to assess aortic diameter at the level of iliac bifurcation and echo findings among elderly diabetic patients. Measures applied on the 120 selected participants included laboratory tests, abdominal ultrasound and echocardiography.

Higher levels of cholesterol, triglycerides, and LDL, and lower level of HDL was found among diabetics.

Goldberg (2001) reported sufficient clinical evidence of high circulating levels of LDL and low levels of HDL in diabetics(11).

American Diabetes Association, (2004) stated that the most common pattern of dyslipidemia in patients with type 2 diabetes is elevated triglyceride levels and decreased HDL cholesterol levels(12).

Statistical significant difference between diabetics and non-diabetics was found, as regards echo-findings including LVEDD, LVESD, EF, LAD, and FS.

Seyfeli et al., (2008) study showed abnormalities of the left ventricular diastolic function in patients with type 2 DM(13).

Diastolic dysfunction has been suggested to be present early in diabetic myocardial involvement(14).

End systolic dimension was found to be significantly larger and ejection fraction and FS significantly lower among diabetics(10).

Results showed statistically significant higher IMT among diabetics. In the current study, none of the participants, whether diabetics or non-diabetics, had abdominal aorta aneurysm, however, a statistically significant difference was found between both groups with higher abdominal aorta diameter among diabetics.

The susceptibility to dilatation of the abdominal aorta is in part, related to the collagen/elastin makeup of the aortic wall. While central arteries have a higher concentration of elastin than peripheral arteries, age-associated changes in the collagen

to elastin ratio occur at a greater rate in central compared to peripheral arteries(15). It has particularly been noted in the abdominal aorta that the ratio of collagen to elastin differs within its various regions making the vessel as a whole more prone to wall instability and corresponding dilatation(16). As a result of the decrease in elastic wall elements, stress is also transferred to the collagenous elements in the arterial wall. Thus, at the same time the arteries dilate, they also become stiffer, another hallmark of vascular aging. Vascular aging as evidenced by arterial stiffening, has been linked with an increased risk of clinical cardiovascular events such as stroke, coronary heart disease, and death(17).

The mechanism behind pathologic dilatation of abdominal aorta is multifactorial. AAAs are often described as atherosclerotic, despite the fact that aneurysm may develop in aortas free of atherosclerosis. AAA and atherosclerosis share several risk factors, such as high age, male gender, smoking and inflammation(18).

Despite this, patients suffering from diabetes, a disease with preponderance of atherosclerotic manifestations, seldom develop AAA.

Astrand et al., (2007) study reported smaller aortic dimension in diabetic population and negative association between diabetics and aortic root diameter arising from glycemia associated alterations in the vascular matrix which protect against formation of aortic dilatation(19).

Xiao-Feng Chen et al., (2009) also found aortic root dimension to be significantly smaller among diabetics than in patients without diabetes(20).

Down-regulation of metalloproteinases activity in arteries of diabetic patients, and high glucose levels accelerating synthesis of collagen might be the mechanism behind increased wall thickness, reduced aortic wall stress, decreased aneurysm prevalence and reduced frequency of aortic root dilatation(21).

Wall stress has been implied as a pathological factor in the development of AAA(22).

Abdominal aorta in diabetic patients might be affected by a changed remodeling response, and thus changed arterial wall stress compared to healthy subjects(19).

Xiao-Feng Chen et al., (2009) showed that wall stress was significantly reduced in the aorta of diabetic patients, mainly due to increased wall thickness(20).

Possible explanation for the increased aortic diameter among diabetics found in the current study, is that the diabetic aortic remodeling is contrasted by the vascular aging and the age-related increase in aortic diameter.

AAA is known to be more frequent in men than in women(5, 6). The current study showed higher aortic measures among females than males. Females in the current study tend to have higher BMI and also higher IMT, but less lipid measures.

A statistically significant higher level of CRP was found among diabetics.

Significant association was found between the risk of diabetes and higher plasma levels of CRP(23). Low-grade inflammation occurs in diabetic patients as well as those with CVD(24). A possible mechanism by which diabetes might induce inflammation is by increasing advanced glycation end products that may activate macrophages and increase oxidative stress and interleukin-6 synthesis, resulting in the production of CRP(25).

Yet, no significant correlation was found between aortic measurement by U/S and CRP.

Karlsson et al., (2009) found no significant correlation between levels of circulating IL-6, CRP, and the expansion of small diameter AAAs (26).

Elevation of CRP has been demonstrated in patients with symptomatic or ruptured AAA, but not in asymptomatic patients(27).

Statistically significant gender difference was found among diabetics regarding CRP.

Dehghen et al., (2007) found the association between CRP and increased risk of type 2 diabetes mellitus are increased in women(23).

Regarding the echocardiographic findings among diabetics, a statistically significant negative correlation was found between aortic measurement by U/S and ejection fraction but no correlation was found with any other echo findings.

Bekkers et al., (2005) found that EF correlates inversely with abdominal aortic aneurysm (AAA)(28).

Smoking is known to play an important role in the pathogenesis of AAA(6).

Smoking was found to be significantly correlated with aortic diameter. Oscar et al., (2006) reported that a direct correlation was found between aortic root diameter and history of smoking(7).

Smoking has both an acute and a chronic detrimental effect on aortic distensibility(29).

Smoking was found to increase the growth rate by 15-20%, but this effect is too small to provide a guideline for screening smokers and non smokers(30).

Conclusions and Recommendations

Diabetes mellitus among the elderly is associated with initial increase in the abdominal aorta diameter. Smoking carries the risk of more increase in the diameter. Further studies are needed to assess the combined effect of age and diabetes on the aortic measurements

References

1. Lyra R, Oliveira M, Lins D, Cavalcanti N: Prevention of type2 diabetes mellitus. *Arq Bras Endocrinol Metab* 2006; 50(2):239-49.
2. Henry RM, Kostense PJ, Spijkerman AM, et al.: Arterial stiffness increases with deteriorating glucose tolerance status: the Hoorn study. *Circulation* 2003; 107:2089-95.
3. Ding A and Brian R: Role of changes in cardiac metabolism in development of diabetic cardiomyopathy. *Am J Physiol Heart Circ Physiol* 2006; 291: H1489-H1506.
4. Astrand H, Ryden-Ahlgren A, Sundkvist G, et al. : Reduced aortic wall stress in Diabetes mellitus. *Eur J Vasc Endovasc Surg* 2007; 33:592-598.
5. Hakan A, Asa R, Tomas S and Toste L: Age-related increase in wall stress of the human abdominal aorta: an in vivo study. *J Vasc Surg* 2005; 42:926-31.
6. Fantin F, Bonapace BS, Cameron JD, and Rajkumar C : Is vascular stiffness associated with the diameter of the abdominal aorta. *Age and Ageing* 2009; 38:466-482.
7. Oscar AG, Veronica IV, Victor A, et al., : Detection of abdominal aortic aneurysm in a population referred for transthoracic echocardiography *J Cardiol* 2006; 74:217-223.
8. American Diabetes Association: Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. *Diabetes Care* 2003; 26:5-20
9. Lyon CJ, Law RE, Hsueh WA: Mini-review: Adiposity, inflammation, and atherogenesis. *Endocrinology* 2003;144: 2195-2200.
10. Mahfouz Badran H and Elnoamany M: Impact of type 2 diabetes mellitus on aortic elastic properties in normotensive diabetes: Doppler tissue imaging study. *J Am Soc Echocardiogr* 2006;19: 1471-1481.
11. Goldberg IJ: Diabetic Dyslipidemia. Statins versus fibrates in the treatment of diabetic dyslipidemia. Symposium, Program and abstracts of the 61st Scientific of the American Diabetes Association; 2001; June 22-26, Philadelphia, Pennsylvania.
12. American Diabetes Association: Nutrition principles and recommendations in diabetes. *Diabetes care* 2004; 27(1):S36-S46.
13. Seyfeli E, Duru M, Saglam H, et al. : Association of left ventricular diastolic function abnormalities with aortic elastic properties in asymptomatic patients with type 2 diabetes mellitus. A tissue echocardiographic study. *Int J Clin Pract* 2008; 62(9): 1358-1365.
14. Cosson S and Kevorkian JP: Left ventricular diastolic dysfunction: an early sign of diabetic cardiomyopathy? *Diabetes Metab* 2003; 29(5): 455-466
15. Lanne T, Hansen F, Mangell P, and Sonesson B : Differences in mechanical properties of the common carotid artery and abdominal aorta in healthy males. *J Vasc Surg* 1994; 20:218-25.
16. Nichols WW, O'Rourke MF: McDonald's blood flow in arteries: theoretical, experimental and clinical principles. Arnold; London; 1998.
17. Lebrun CE, van der Schouw YT, Bak AA, et al. : Arterial stiffness in postmenopausal women: determinants of pulse wave velocity. *J Hypertension* 2002; 20:2165-72.

18. Wassef M, Baxter BT, Chisholm RL, et al. : Pathogenesis of abdominal aortic aneurysm: a multidisciplinary research program supported by the National Heart, Lung, and Blood Institute. *J Vasc Surg* 2001; 34:730-738.
19. Astrand H, Ryden-Ahlgren A, Sundkvist G, et al.: Reduced aortic wall stress in diabetes mellitus. *Eur J Vasc Endovasc Surg* 2007; 33:592-598.
20. Xiao-Feng Chen, Jian-An Wang, Xian-Fang Lin et al. : Diabetes Mellitus: Is It Protective against Aortic Root Dilatation? *Cardiology* 2009;112:138-143.
21. Asbun J, Manso AM, Villarreal FJ : Profibrotic influence of high glucose concentration on cardiac fibroblast functions: effects of losartan and vitamin E. *Am J Physiol Heart Physiol* 2005; 288: H227-H234.
22. Zarins CK, XU C, Glagov S: Atherosclerotic enlargement of human abdominal aorta. *Atherosclerosis* 2001;155:157-164.
23. Dehghan A, Kardys I, de Maat MP, et al. : Genetic variation, C-reactive protein levels, and incidence of diabetes. *Diabetes* 2007; 56; 872-878.
24. Nakamura A, Shikata K, Hiramatsu M, et al., : Serum interleukin-18 levels are associated with nephropathy and atherosclerosis in Japanese patients with type 2 diabetes. *Diabetes Care* 2005; 28;2890-5.
25. Mankowska A, Pollak J, Sypniewska G: Association of C-reactive protein and other markers of inflammation with risk of complications in diabetic subjects. Disponível em: <<http://www.ifcc.org/ejifcc/voll17no1/17010320063.htm>>. Acessado em: Março de 2006.
26. Karlsson L, Bergqvist D, Lindb?ck J, P?rsson H. Expansion of small-diameter abdominal aortic aneurysms is not reflected by the release of inflammatory mediators IL-6, MMP-9 and CRP in plasma. *Eur J Vasc Endovasc Surg*, 2009; 37: 420-424.
27. Domanovits H, Schillinger M, Mullner M, et al.: Acute phase reactants in patients with abdominal aortic aneurysm. *Atherosclerosis* 2002;163:297-302.
28. Bekkers SC, Habets JH, Cheriex EC, et al. : Abdominal aortic aneurysm screening during transthoracic echocardiography in unselected population. *J Am Soc Echocardiogr* 2005;18; 389-93.
29. Valchopoulos C, Kosmopoulou F, Panagiotakos D et al.: Smoking and caffeine have a synergistic detrimental effect on aortic stiffness and wave reflections. *J Am Coll Cardiol* 2004;44:1911-1917.
30. Agmon Y, Khandheria BK, Meissner I, et al.: Is aortic dilatation an atherosclerosis-related process? *J Am Coll Cardiol* 2003;42:1076-1083.

Dislocation Following Total Hip Replacement

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ABSTRACT

Objectives: To study the incidence of dislocation following total hip replacement arthroplasty and its risk factors.

Patients and methods: A prospective study that was conducted at two military hospitals located in Amman city in Jordan: King Hussein Medical Center and Queen Alia Military Hospital during the period between January 2008 and January 2011. One hundred and thirty patients were enrolled in the study. Patients were examined by an orthopedic surgeon before and after surgery. Diagnosis was made based on clinical and radiological findings. Risk factors including original pathology, surgical technique, and presence of previous surgery and position of acetabular cup were investigated.

Results: The mean age of patients was 62.3 years with females slightly outnumbering males 1.1 to 1. Dislocation occurred in 4 patients (3.03%). Dislocation was not related to surgical technique or original pathology. The most common etiological factors were placing the acetabular cup too vertically or anteverted (3 patients). The last patient had limb shortening.

Conclusion: Dislocation is not uncommon following total hip replacement surgery. Placing the acetabular cup in the correct position will minimize its occurrence.

Keywords: Dislocation, total hip replacement, acetabular cup

Introduction

Dislocation following total hip replacements is a complication which alarms both patient and surgeon. The surgeon needs to know what to do and the chances of achieving stability. A number of factors co-operate in making a total hip arthroplasty stable, both primarily and in the long-term perspective. Except for severe medical or neurological problems other than primary hip disease, the cause of dislocation seems to be related either to joint laxity or malposition of one or both of the prosthetic components.

The aim of this article is to study the incidence of dislocation following total hip replacement arthroplasty and its risk factors.

The average incidence of dislocation after total hip arthroplasty is approximately 3%, there are several factors that may contribute to this risk including:

History of previous hip surgery, technical fault for the orientation of the components, shortening of the limb, weakness of abductor muscles, in addition to other factors.

Age, weight and height are not considered as risk factors. Hip dislocation after total hip arthroplasty is more common with those who have proximal femoral fracture or nonunion, osteonecrosis or inflammatory arthritis. Most of the dislocation occurs in the first 3 months after surgery especially when the patient has not yet recovered muscle strength.

According to the risk factors the most common cause for hip dislocation in our study is malposition of the acetabular cup vertically or anteverted position. To determine whether the acetabular component was anteverted or retroverted the ellipse was closely scrutinized: anteversion was diagnosed if the lateral arc of the ellipse was more sharply defined than the medial, and vice versa.

Excessive retroversion was less common, with dislocation of the hip after total hip arthroplasty divided into early (within five weeks duration of operation) and late occurrence. Those that didn't recur after reduction were labeled single, the others recurrent.

Patients and Methods

A prospective study that was conducted at two military hospitals located in Amman city in Jordan: King Hussein Medical Center and Queen Alia Military Hospital during the period between January 2008 and January 2011. One hundred and thirty patients were enrolled in the study. Patients were examined by orthopedic surgeon before and after surgery. Diagnosis was made based on clinical and radiological findings. Risk factors including original pathology, surgical technique, and presence of previous surgery and position of acetabular cup were investigated.

The surgical approach used in this study is an anterolateral approach (Smith Peterson approach) as the patient is in lateral position, the skin incision is made behind ASIS to the tip of the greater trochanteric, then extend the incision vertically to the anterior margin of the greater trochanter, 10 cm in length.

The interval between tensor fascia lata and gluteus medius, overlying gluteal fascia is divided allowing these muscles to be separated up to the iliac crest; dissection of the interval may be facilitated more easily by beginning separation between ASIS and the greater trochanter.

Then the upper part of gluteus medius and minimus are raised from the hip joint and retracted posteriorly, then the upper part of the capsule will be seen.

Results

The mean age of patients was 62.3 years with males slightly outnumbering females 1.1 to 1. Dislocation occurred in 4 patients (3.03%). Dislocation was not related to surgical technique or original pathology. The most common etiological factors were placing the acetabular cup too vertically or anteverted (3 patients). The last patient had limb shortening.

Discussion

Our data on the incidence of dislocation are similar to those reported by others, as mentioned, and the tendency of this complication to occur early in convalescence also has been

noted previously. Our study suggests that the position of the acetabular cup relative to the body's axis is important. This study suggests that the incidence of dislocated prosthetic hips could be reduced by greater attention to certain details of patient selection and technique of insertion. The technical faults implicated in our study have most commonly involved the acetabulum. In one study (1), half of the dislocations were associated with retroversion of the acetabular component of between 7 and 10 degrees. All of these dislocations were posterior. Acetabular-component orientation has been shown in this study to be a significant factor in avoiding dislocations.

In conclusion, dislocation is not uncommon following total hip replacement surgery. Placing the acetabular cup in the correct position will minimize its occurrence.

References

1. ARMITAGE P.: Statistical Methods in Medical Research. New York, John Wiley, 1971.
2. BERGSTR M, LINDBERG L, PERSSON BM, ONNERFALT R: Complications after Total Hip Arthroplasty According to Charnley in a Swedish Series of Cases. Clin. Orthop. ,95: 91-95. 1973.
3. CHARNLEY, John: The Long-Term Results of Low-Friction Arthroplasty of the Hip Performed as a Primary Intervention. J. Bone and Joint Surg. ,54-B: 61-76, Feb. 1972.
4. CHARNLEY, John, and Cupic, Zoran: The Nine and Ten Year Results of the Low-Friction Arthroplasty of the Hip. Clin. Orthop. ,95: 9-25, 1973.
5. Coventry MB, Beckenbaugh RD, Nolan DR, Ustrup DM. 201 2 total hip arthroplasties: a study of postoperative course and early complications. Bone J#(252)i?it Surg [Am] 1974;56-A:273-84.
6. Dandy Di, Theodorou BC. The management of local complications of total hip replacement by the McKee-Farrar technique. J Bone Joint Surg 1975;57-B:30-5.
7. Etienne A, Cupic Z, Charnley J. Postoperative dislocation after Charnley low-friction arthroplasty. Clin Orthop 1978;132:19-23.
8. Lazansky MG. Complications in total hip replacement with Charnley technic. Clin Orthop 1970;72:40-5.
9. Lewinnek GE, Lewis JL, Tarr R, Compere CL, Zimmerman JR. Dislocations after total hip-replacement arthroplasties. J Bone Joint Surg 1978;60-A:2 I 7-20.

Obesity should be accepted as one of the irreversible end points of metabolic syndrome

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ABSTRACT

Background: Position of obesity is sought in definition of metabolic syndrome.

Methods: Consecutive check up patients between the ages of 35 and 70 years were studied to be able to see possible consequences of overweight and obesity on health and to avoid debility induced weight loss in elders.

Results: The study included 935 cases (548 females), totally. There were only three males (0.3%) in the underweight group, thus this group was not taken for comparison. When we compared normal weight, overweight, and obesity groups according to the prevalence of white coat hypertension (WCH), hypertension, diabetes mellitus (DM), hyperbetalipoproteinemia, dyslipidemia, and coronary heart disease (CHD), gradual and significant increases from the normal weight towards the overweight and obesity groups were seen almost in all steps, and the obesity cases were significantly older than the overweight and normal weight cases.

Conclusion: Metabolic syndrome is a reversible progression step between physical health and irreversible final diseases terminating with increased morbidity and mortality. Thus definition of the syndrome should include reversible metabolic risk factors such as overweight, hypertriglyceridemia, hyperbetalipoproteinemia, impaired glucose tolerance, and WCH, instead of the already developed irreversible diseases, including DM, hypertension, CHD, and stroke, and obesity should be included among the irreversible final diseases. According to our opinion, after development of obesity, the term metabolic syndrome probably loses most of its significance, since from now on, nonpharmaceutical approaches such as lifestyle changes, diet, and exercise will provide little benefit to heal obesity and to prevent development of its complications.

Key words: Obesity, metabolic syndrome

Introduction

Close relationships between some reversible metabolic parameters and hypertension, type 2 diabetes mellitus (DM), coronary heart disease (CHD), stroke, and eventually an increased all-cause mortality has been known for many years, and defined as metabolic syndrome (1,2). Metabolic syndrome has become increasingly common in developed countries, for example it is estimated that 50 million Americans have it (3). Metabolic syndrome is characterized by a group of metabolic risk factors, including overweight, hypertriglyceridemia, hyperbetalipoproteinemia, white coat hypertension (WCH), insulin resistance, and a prothrombotic and proinflammatory state (4), instead of being a certain terminal disease, since it can be reversed completely with appropriate nonpharmaceutical approaches including lifestyle changes, diet, and physical and mental activities (5). So it actually contains the risk factors for development of irreversible end points which decrease duration and quality of life, such as hypertension, DM, CHD, and stroke. On the other hand, excess weight, probably, is the main structural component of the syndrome.

Obesity is simply defined as the excessive accumulation of body fat tissue. Now, it is usually defined in terms of the Body Mass Index (BMI) -weight (in kilograms) divided by the square of the height (in meters). The prevalence of obesity in developed countries is high and rising higher (3). Prevalence varies significantly by sex, age, socioeconomic status, and race. Additionally, prevalence is significantly increased by aging (6), and decreased physical activity and mental stresses may be the main cause of it. Although obesity is defined as one of the reversible components of the metabolic syndrome, we think, it is actually one of the irreversible terminal diseases rather than one of the reversible components of the syndrome. We tried to understand the significance of obesity for the metabolic syndrome in the present study.

Material and Methods

The study was performed in the Internal Medicine Polyclinic of the Dumlupinar University between August 2005 and March 2007. We took consecutive check up patients aged between 35 and 70 years to be able to see possible consequences of excess weight on health and to avoid debility induced weight loss in elders. Their medical histories including smoking habit and medications were learnt, and a routine check up procedure including fasting plasma glucose (FPG), low density lipoprotein cholesterol (LDL-C), triglyceride (TG), high density lipoprotein cholesterol (HDL-C), and an electrocardiography was performed. Current daily smokers at least for the last 12 months and cases with a smoking history of at least five pack-years were accepted as smokers, and cigar or pipe smokers were excluded. Insulin using diabetics and patients with devastating illnesses including malignancies, acute or chronic renal failure, chronic liver diseases, hyper- or hypothyroidism, and heart failure were excluded to avoid their possible effects on weight. BMI of each case was calculated. Weight in kilograms is divided by height in meters squared, and obesity is defined as a BMI of 30 or greater, overweight as 25-29.9, normal weight as 18.5-24.9, and underweight as a BMI of lower than 18.5 kg/m² (7). Office blood pressure (OBP) was checked after a 5-minute rest in a seated position with the mercury sphygmomanometer on three visits, and no

smoking was permitted during the previous 2 hours. A 10-day twice daily measurement of blood pressure at home (HBP) was obtained in all cases, even in normotensives in the office due to the risk of masked hypertension after a 10-minute education about proper BP measurement techniques (8). The education included recommendation of upper arm while discouraging wrist and finger devices, using a standard adult cuff with bladder sizes of 12 x 26 cm for arm circumferences up to 33 cm in length and a large adult cuff with bladder sizes of 12 x 40 cm for arm circumferences up to 50 cm in length, and taking a rest at least for a period of 5 minutes in the seated position before measurement. Eventually, hypertension is defined as a mean HBP value of 135/85 mmHg or greater (8). WCH is defined as OBP of 140/90 mmHg or greater, but a mean HBP value of <135/85 mmHg, sustained normotension as OBP of <140/90 mmHg together with an average HBP of <135/85 mmHg, and masked hypertension as OBP of <140/90 mmHg, but a mean HBP value of 135/85 mmHg or greater (8). Cases with an overnight FPG level of 126 mg/dL or higher on two occasions or already taking antidiabetic medications were defined as diabetics. An oral glucose tolerance test with 75-gram glucose was performed in cases with a FPG level between 110 and 125 mg/dL, and diagnosis of cases with a 2-hour plasma glucose level of 200 mg/dL or greater is DM. Additionally patients with dyslipidemia were detected, and we used the National Cholesterol Education Program Expert Panel's recommendations for defining dyslipidemic subgroups (7). Dyslipidemia is diagnosed with a LDL-C value of 160 or greater and/or a TG value of 200 or greater and/or a HDL-C value of <40 mg/dL. A stress electrocardiography was performed in suspected cases, and a coronary angiography was obtained from authorized centers only for the stress electrocardiography positive cases. Prevalence of smoking, sustained normotension, WCH, hypertension, DM, hyperbetalipoproteinemia, dyslipidemia, and CHD were detected in the underweight, normal weight, overweight, and obesity groups, and results were compared. Independent-Samples T Test and comparison of proportions were used as the methods of statistical analyses.

Results

The study included 935 cases (548 females). There were only three cases (three males) (0.32%) in the underweight group, thus this group was not taken for comparison. Prevalence of smokers was 35.0%, 32.0%, and 18.9% in the normal weight, overweight, and obesity groups, and the differences between the obesity and the other two groups were significant ($p < 0.001$ for both). But the female predominance of the obesity group was probably the cause of the difference (Table 1). Since 190 of the detected 258 smokers were male, and prevalence of smokers was 49.0% (190/387) versus 12.4% (68/548) in the males and females. There were gradual and statistically significant increases in the prevalence of WCH and hypertension beside the gradual and statistically significant decrease in the sustained normotension from the normal weight towards the overweight and obesity groups ($p < 0.001$ for all) (Table 2). Eventually, the prevalence of WCH and hypertension reached up to 52.1% (182 cases) and 21.7% (76 cases) in the obesity group, respectively. In other words, 73.9% of the obese cases have either WCH or hypertension. Seventeen of 147 cases with hypertension (11.5%) actually had masked hypertension. Additionally, when we compared the three groups according

Variables	Normal weight	p-value	Overweight	p-value	Obesity
Number	177		406		349
Prevalence	18.9%		43.4%		37.3%
<u>Mean age (year)</u>	<u>39.7 ± 7.7 (35-70)</u>	<u><0.001</u>	<u>48.1 ± 8.9 (35-70)</u>	<u><0.001</u>	<u>55.1 ± 9.0 (35-70)</u>
<u>Female ratio</u>	<u>48.0% (85)</u>	<u>ns*</u>	<u>46.7% (190)</u>	<u><0.001</u>	<u>78.2% (273)</u>
<u>Prevalence of smoking</u>	<u>35.0% (62)</u>	<u>ns</u>	<u>32.0% (130)</u>	<u><0.001</u>	<u>18.9% (66)</u>

*Nonsignificant ($p>0.05$)

Table 1: Characteristic features of the study cases

Variables	Normal weight	p-value	Overweight	p-value	Obesity
<u>Prevalence of sustained normotension</u>	<u>74.5% (132)</u>	<u><0.001</u>	<u>51.9% (211)</u>	<u><0.001</u>	<u>26.0% (91)</u>
<u>Prevalence of WCH*</u>	<u>17.5% (31)</u>	<u><0.001</u>	<u>33.9% (138)</u>	<u><0.001</u>	<u>52.1% (182)</u>
<u>Prevalence of hypertension</u>	<u>7.9% (14)</u>	<u><0.001</u>	<u>14.0% (57)</u>	<u><0.001</u>	<u>21.7% (76)</u>

*White coat hypertension

Table 2: Blood pressure variability of the study cases

Variables	Normal weight	p-value	Overweight	p-value	Obesity
<u>Prevalence of dyslipidemia</u>	<u>20.9% (37)</u>	<u><0.001</u>	<u>32.5% (132)</u>	<u>ns*</u>	<u>35.8% (145)</u>
<u>Prevalence of DM†</u>	<u>9.0% (16)</u>	<u><0.001</u>	<u>19.4% (79)</u>	<u>ns</u>	<u>21.7% (76)</u>
<u>Prevalence of hyperbetalipoproteinemia</u>	<u>11.2% (20)</u>	<u>ns</u>	<u>13.7% (56)</u>	<u><0.05</u>	<u>18.3% (64)</u>
<u>Prevalence of CHD‡</u>	<u>10.7% (19)</u>	<u>ns</u>	<u>11.0% (45)</u>	<u><0.001</u>	<u>18.3% (64)</u>

*Nonsignificant ($p>0.05$) †Diabetes mellitus ‡Coronary heart disease

Table 3: Associated disorders of the study cases

to DM, hyperbetalipoproteinemia, dyslipidemia, and CHD, the gradual and significant increase from normal weight towards overweight and obesity groups was seen in nearly all steps (Table 3).

Discussion

Although there is not any universally accepted definition for the metabolic syndrome, it basically includes five features: excess weight, high glucose and insulin levels, low HDL-C, high TG, and high BP (9). But the already used definitions as excess weight, a BP of 135/85 or 140/90 mmHg or above, and a FPG of 100 or 110 mg/dL or above also include patients with obesity, DM, and hypertension. Therefore the syndrome is a collection of risk factors instead of the final diseases, and it is a reversible condition with appropriate nonpharmaceutical approaches. Whereas the diseases including hypertension, DM, symptomatic atherosclerosis, and, at least according to our opinion, obesity, are irreversible and final states which almost always require drug therapy to delay complications. So metabolic syndrome alone is a disadvantageous but reversible status but not a final disease, and after the development of one of the final metabolic diseases, the term of metabolic syndrome probably loses most of its significance, since from now on, the non-pharmaceutical approaches will provide little benefit to prevent development of the others, probably due to cumulative effects of the risk factors on systems for a long period of time. So definition of metabolic syndrome should be seen as a collection of reversible metabolic risk factors including overweight, hypertriglyceridemia, hyperbetalipoproteinemia, and WCH for several irreversible final diseases, such as hypertension, type 2 DM, CHD, and stroke, and obesity should be included among the irreversible final diseases.

It is already known that obesity can be reversed only by a few individuals and most of them are transient. This small percentage of reversibility can also be achieved with prominent weight loss even in type 2 DM and hypertension, although they are mainly accepted as irreversible end points of the metabolic syndrome. Additionally, obesity is usually acquired after a long period of time and usually starts to develop in early childhood and adolescence. Probably due to its long duration, it brings many irreversible changes in the body. It is already known that excess weight leads to both structural and functional abnormalities in many systems of the body, and risk of death from all causes, including cardiovascular diseases and cancers, increases parallel to the range of moderate to severe weight excess in all age groups (10). For example, effects of body weight on BP were shown previously by us that the prevalence of sustained normotension was significantly higher in the underweight (80.3%) than the normal weight (64.0%) and overweight cases (31.5%) in a study (11) ($p < 0.05$ for both). Similarly, 55.1% of cases with hypertension had obesity against 26.6% of cases with normotension ($p < 0.001$) in another study (12). Again, the mean age increased gradually and significantly from normal weight towards the obesity cases, parallel to the increased prevalence of WCH and hypertension, dyslipidemia, DM, hyperbetalipoproteinemia, and CHD in the present study.

The dominant underlying risk factor of the metabolic syndrome appears as an already existing overweight (5) or a

trend towards it, which is probably the main cause of insulin resistance, hypertriglyceridemia, hyperbetalipoproteinemia, IGT, and WCH. Even prevention of the accelerating trend of body weight with diet or exercise, even in the absence of a prominent weight loss, will probably result with resolution of many parameters of the syndrome (13). Thus, in recent years, goals of treatment of obesity have changed radically, and 'a 5% weight loss or even stabilization of weight' has become the goal of most treatment programs. Therefore, there is no reason to pursue the traditional goal of attaining an ideal body weight, which is so seldom attained and, if attained, is so rarely maintained.

Most of the metabolic consequences of obesity are believed to be caused by abdominal visceral fat, which leads to an increased concentration of free fatty acids in the portal vein and, consequently, to decreased hepatic insulin clearance, insulin resistance, hyperinsulinemia, and hypertension. This sequence of events leads to DM, dyslipidemia, and, ultimately, CHD. According to our opinion, limitation of excess weight as an excessive fat tissue in and around abdomen under the heading of abdominal obesity is meaningless. Instead it should be defined as excess weight including overweight and obesity via mean body weight alone or BMI (6), since adipocytes function as an endocrine organ that produces a variety of cytokines and hormones anywhere in the body (5). The resulting hyperactivity of sympathetic nervous system and renin-angiotensin-aldosterone system is probably associated with insulin resistance, endothelial dysfunction, and an elevated BP. Similarly, the Adult Treatment Panel III reported (7) that although some people classified as overweight have a large muscular mass, most of them also have excess fat tissue, and overweight and obesity do not only predispose to CHD, stroke, and numerous other conditions, they also have a high burden of other CHD risk factors including type 2 DM, hypertension, and dyslipidemia. So obesity is a final disease, rather than being a reversible parameter of the metabolic syndrome, with many terrible consequences on health, including type 2 DM, hypertension, CHD, stroke, and even cancers.

Probably WCH and hypertriglyceridemia are the most significant reversible parameters of the metabolic syndrome, currently. Some authors reported that WCH is associated with some features of the syndrome (14), and more than 85% of cases with metabolic syndrome have elevated BP levels (5). Even we observed a very high prevalence of WCH even in early decades in a previous study; 23.2% in the third and 24.2% in the fourth decades of life (15). The high prevalence of WCH in society was also shown in some other studies (16-18). When we compared the sustained normotension, WCH, and hypertension groups in another study, prevalence of nearly all of the health problems including obesity, IGT, DM, and CHD showed significant progression from sustained normotension towards the WCH and hypertension groups, and the WCH group was found as a progression step in between (19). So the detected higher prevalence of WCH even in early decades, despite the lower prevalence of excess weight in these age groups, may show a trend of gaining weight and many irreversible end points. On the other hand, we accept the WCH as a different entity from borderline/mild hypertension due to the completely normal HBP values of WCH, whereas they are abnormal in

mild hypertension cases, but both patients can benefit from life style modifications including exercise, weight loss, animal-poor but fruit and vegetable-rich diet to some extent. So WCH and hypertriglyceridemia are probably two of the most significant reversible parameters rather than being irreversible end points of the syndrome, thus their underlying etiologies rather than they themselves should be the main target of treatment.

As a conclusion, metabolic syndrome is a reversible progression step between physical health and irreversible final diseases terminating with increased morbidity and mortality. Thus definition of the syndrome should include reversible metabolic risk factors such as overweight, hypertriglyceridemia, hyperbeta lipoproteinemia, impaired glucose tolerance, and WCH, instead of the already developed irreversible diseases, including DM, hypertension, CHD, and stroke, and obesity should be included among the irreversible final diseases. In our opinion, after development of obesity, the term metabolic syndrome probably loses most of its significance, since from now on, nonpharmaceutical approaches such as lifestyle changes, diet, and exercise will provide little benefit to heal obesity and to prevent development of its complications.

References

1. Eckel RH, Grundy SM, Zimmet PZ. The metabolic syndrome. *Lancet* 2005; 365: 1415-1428.
2. Grundy SM, Brewer HB Jr, Cleeman JI, Smith SC Jr, Lenfant C. Definition of metabolic syndrome: Report of the National Heart, Lung, and Blood Institute/American Heart Association conference on scientific issues related to definition. *Circulation* 2004; 109: 433-438.
3. Clark LT, El-Atat F. Metabolic Syndrome in African Americans: implications for preventing coronary heart disease. *Clin Cardiol* 2007; 30: 161-164.
4. Tonkin AM. The metabolic syndrome(s)? *Curr Atheroscler Rep* 2004; 6: 165-166.
5. Franklin SS, Barboza MG, Pio JR, Wong ND. Blood pressure categories, hypertensive subtypes, and the metabolic syndrome. *J Hypertens* 2006; 24: 2009-2016.
6. Helvacı MR, Ozer C, Kaya H, Yalcin A. Practical cut off values to determine body mass index. *Med J Malaysia* 2008; 63: 122-124.
7. Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) final report. *Circulation* 2002; 106: 3143-3421.
8. O'Brien E, Asmar R, Beilin L, Imai Y, Mallion JM, Mancia G, et al. European Society of Hypertension recommendations for conventional, ambulatory and home blood pressure measurement. *J Hypertens* 2003; 21: 821-848.
9. Hunt KJ, Resendez RG, Williams K, Haffner SM, Stern MP. National Cholesterol Education Program versus World Health Organization metabolic syndrome in relation to all-cause and cardiovascular mortality in the San Antonio Heart Study. *Circulation* 2004; 110: 1251-1257.
10. Calle EE, Thun MJ, Petrelli JM, Rodriguez C, Heath CW Jr. Body-mass index and mortality in a prospective cohort of U.S. adults. *N Engl J Med* 1999; 341: 1097-1105.
11. Helvacı MR, Ozcura F, Kaya H, Yalcin A. Funduscopic examination has limited benefit for management of hypertension. *Int Heart J* 2007; 48: 187-194.
12. Helvacı MR, Kaya H, Yalcin A, Kuvandik G. Prevalence of white coat hypertension in underweight and overweight subjects. *Int Heart J* 2007; 48: 605-613.
13. Azadbakht L, Mirmiran P, Esmailzadeh A, Azizi T, Azizi F. Beneficial effects of a Dietary Approaches to Stop Hypertension eating plan on features of the metabolic syndrome. *Diabetes Care* 2005; 28: 2823-2831.
14. Mule G, Nardi E, Cottone S, Cusimano P, Incalcaterra F, Palermo A, et al. Metabolic syndrome in subjects with white-coat hypertension: impact on left ventricular structure and function. *J Hum Hypertens* 2007; 21: 854-860.
15. Helvacı MR, Kaya H, Seyhanlı M, Yalcin A. White coat hypertension in definition of metabolic syndrome. *Int Heart J* 2008; 49: 449-457.
16. Helvacı MR, Seyhanlı M. What a high prevalence of white coat hypertension in society! *Intern Med* 2006; 45: 671-674.
17. Hozawa A, Ohkubo T, Kikuya M, Yamaguchi J, Ohmori K, Fujiwara T, et al. Blood pressure control assessed by home, ambulatory and conventional blood pressure measurements in the Japanese general population: the Ohasama study. *Hypertens Res* 2002; 25: 57-63.
18. Celis H, Fagard RH. White-coat hypertension: a clinical review. *Eur J Intern Med* 2004; 15: 348-357.
19. Helvacı MR, Kaya H, Duru M, Yalcin A. What is the relationship between white coat hypertension and dyslipidemia? *Int Heart J* 2008; 49: 87-93.

Age at First Marriage in Bangladesh: Socioeconomic Differentials and Determinants

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ABSTRACT

In this study an attempt has been made to investigate the differentials of socio-economic factors that provide a strong picture of age at marriage and also identify the factors that influence age at first marriage of the female population. This paper utilized the Bangladesh Demographic and Health Survey (BDHS) 2007 data that covered a national representative survey of 10,996 ever married women. Among the women 91.4 percent were married before age 20 years, with most of the marriages taking place at the ages 13-16 years. Only 8.6 percent marriages occurred at ages 20 or older. Differential analysis shows that most of the married females have a rural background, are currently not working, they had no formal education, their husbands were also illiterate and Islam is the most dominant religion. Logistic regression analysis indicates that respondent's education, place of residence, wealth index, partner's education and religion were the most important significant covariates of age at first marriage. This study will help policy makers to develop suitable programs addressing the case of age at first marriage in the developing countries as well as in Bangladesh.

Key words: Age at first marriage, Socio-economic differentials, Logistic regression analysis, Bangladesh.

Introduction

Age at first marriage is a fundamental aspect in developing a marriage relationship. Actually, marriage is a universal social institution (United Nations, 1990) through which an adult male and an adult female generally involves in a marriage relationship and acquires new social status as a husband and wife. It was defined as the timing or age at which both male and female enter into marriage and their marital union was formed and assessed in years (United Nations, 1990; 2000). Age is a natural/biological and temporal term that is culturally constructed for both the male and female for basic social purposes, such as marital sexuality, reproduction, and social obligations in every society, in which they can adapt from one generation to another to their respective environment. Although research on human growth and development suggest that age of puberty and sexual maturity for both the male and female all over the world are more or less the same in biological sense; for example, puberty in general begins at the average age 12 for females and 1 to 2 years later for males from when primary and secondary sex organs for both the male and female gradually develop and with the progression of age, they both are matured enough to involve in sexual behavior, depending on emotional, cognitive and social maturity (Craig, 1996; Comb, 2001; Papalia, Olds and Feldman, 2002; Bancroft, 2002).

Based on the assumptions of several studies conducted by the United Nations (1988; 1990) and others conducted, showed that in the developed regions mean age at first marriage was from 18 to 25 years for women; in the African and Asian regions as developing and underdeveloped nations it was around 20 years for women, although early age at first marriage (under 17 years) for women in some nations, such as Bangladesh, Pakistan, India, Afghanistan, Bhutan was prevalent. In another recent comparative study the United Nations (2000) stated that singulate mean age at first marriage was 19.5-25.5 years for women in Africa, 20.7-26 years for women in Asia, 22.1-26.9 years for women in Europe, 27.9 years for women in Caribbean, 22.3-28.1 years for women in America, and 24.3 for women in Oceania respectively. Wikipedia (2008) explored and presented more or less the same results about age at first marriage across the countries. In one cross-cultural study Quisumbing and Hallman (2003) found that mean age at first marriage for wives in Bangladesh (15 years) was earlier than other selected developing countries, such as 17.9 years in Ethiopia, 18.4 years in Mexico, 19.9 years in Guatemala, 22.2 years in Philippines and 23.2 in South Africa.

In Bangladesh marriage is almost universal. Age at first marriage among females is very low. The state's legal provision on minimum age at first marriage in Bangladesh generally is minimum 18 years for females to access marriage relationships. Although periodical research reports indicate that singulate mean age at first marriage is gradually increasing ranging from 19.1 years for women in 1991 to 19.4 years for women in 2007 (BBS, 2007), due to changes in socio-economic status, especially among the middle and upper class families in both rural and urban areas (Philips and Hossain, 1998; BBS, 2001; Foster and Protik, 2005; Kamal, 2006; Islam, 2007; ICDDR, 2007). Several culture-specific studies reveal that most of the lower class families, irrespective if they are subcultures in

both rural and urban areas, generally expect early age at marriage due to prevailing low socio-economic status, traditional and customary way of life, dowry and virginity for women, and maintenance of family responsibility, integration and continuation (Aziz and Maloney, 1985; Saha and Bairagi, 2007).

Age at first marriage for females in a society is also influenced by their socio-cultural status and environmental situation in which they live. In rural Bangladesh there are many social pressure to 'marry off' pubescent girls (Aziz and Maloney, 1985). If the marriage of a pubescent girl is delayed, her parents and sometimes the girl herself are made to feel guilty. Sometimes neighbors and even relatives criticize parents if they have not married off their daughters soon after the onset of menarche. In such a situation, parents of poor socio-economic standing may begin to think of their daughter as a burden. In the Bangladeshi cultural context, younger females are in higher demand than older females as potential brides and they require fewer dowries as well. Various demographic and socio-economic factors are responsible for early age at first marriage. The purpose of this study is to investigate the differentials of socio-economic and demographic factors that have provided a strong picture of early age at first marriage, which enable us to understand the more influential factors that are truly related to early age at first marriage of the female population in Bangladesh.

Data Source and Methodology

The data used in this study has been taken from the Bangladesh Demographic and Health Survey (BDHS) 2007 nationwide sample survey conducted under the authority of the National Institute for Population Research and Training (NIPORT) of the Ministry of Health and Family Welfare, during the period 24 March to 11 August 2007. It was a national representative multistage cluster sample survey of which a total 10,996 currently married women aged 15-49 and 3,771 married men aged 15-54 were successfully interviewed.

Both the univariate and multivariate technique were performed to assess the factors associated with age at first marriage. Univariate classification analysis is used in order to observe the socio-economic conditions of the respondents. Bivariate classification analysis is used to investigate the socio-economic correlates of age at first marriage. Multivariate technique named as logistic regression analysis is used to identify the risk factor for age at first marriage of the respondents treated as a dichotomous dependent variable which take values 1 and 0 for age at first marriage being less than 20 years or age being 20 years and older (national level mean age at first marriage was 20 for female and 28 for male, BBS 2008). All the variables are presented in Table 1 (next page).

Results and Discussion

Socio-Economic Characteristics

Brief overviews of the study population, with respect to several socio-economic and demographic characteristics are presented in Table 2. Results indicate that the majority of the respondents are in age group 20-24 years (19.8 percent) followed by respondents in age group 25-29 years, 30-34 years and 35-39 years respectively. The percentage of the respondents in the last stage of the reproductive age (i.e. 45-49 years)

Dependent variable	Age at First Marriage of the Women; '0' for Age at First Marriage Being Less Than 20 Years and '1' otherwise
Independent variable	Categories
Respondent's education	0 = No education 1 = Primary 2 = Secondary 3 = Higher
Place of residence	1 = Urban 2 = Rural
Partner's education	0 = No education 1 = Primary 2 = Secondary 3 = Higher
Wealth index	1 = Poorest 2 = Poorer 3 = Middle 4 = Richer 5 = Richest
Respondents currently working	0 = No 1 = Yes
Religion	1 = Islam 2 = Hinduism 3 = Buddhism 4 = Christianity 5 = Others

Table 1: Description of Variables Used in Logistic Regression Analysis on Age at First Marriage of the Study Population

remains quite low. Islam, which is the predominant religion of Bangladesh, attaches great importance to the family by strengthening the ties bonding its members and safeguarding it against undermining influences. Hence, marriage is an important religious duty as well as an important social institution. It is found from Table 2 (opposite page) that Islam is the most dominant religion of the respondents (90 percent) and respondents with other types of religion are very low. More than 9 of every 10 respondents are married. There is no significant variation in the level of education between respondents and their partners. Most of the respondents and their partners have no education whereas very few of them have higher education respectively. The majority of the respondents are rich according to wealth index (47 percent) while 34 percent are in the poor category and 19 percent are in the middle class category. Among them 62 percent of women live in rural areas. It is evident from Table 2 that about 91 percent had been married when they were below age 20 and only about 9 percent were married at 20 years and older. Thus it may be said that about 91 percent of marriages in Bangladesh are teenage or adolescent marriages. Most of the respondents are currently not working (71 percent). This is mainly because employment opportunities are very limited in Bangladesh and very few women get the opportunity to engage themselves in any kind of income generating work.

Socio-Economic Differentials of Age at First Marriage

Table 3 provides the percentage distribution of ever-married women by age at first marriage and selected socio-economic characteristics for comparison purposes.

The results indicate that among the total number of married women in all age groups, most teenage marriages takes place at the ages 13 to 15 years and late marriage (i.e. marriage at age 20 years and older) is quite low. Respondents with no education are married at an earlier age than those having higher education. As respondents' educational level increases, the percentage of adolescent marriages (i.e. marriage before age 20 years) decreases and increases in the age at first marriage. This indicates that education may have a significant effect on age at first marriage, that is, education increase the age at marriage and consequently decreases the rate of early marriage.

Table 3 (page 32) reveals that, among the total ever-married women, the age at first marriage of Bangladeshi women still remains low. The percentage of adolescent marriage is higher in rural areas than the urban areas. This indicates the fact that marriage at an early age (teenage marriage) is more prevalent in the rural rather than urban areas of Bangladesh. It has also been observed that early marriages (both teenage and adolescent marriage) are most prevalent among the poorest and poorer than the respondents assessed to be middle and upper

Socio-Economic Characteristics	Frequency (N = 10,996)	Percentage (100)
Age (in years)		
15-19	1348	12.3
20-24	2174	19.8
25-29	1935	17.6
30-34	1661	15.1
35-39	1596	14.5
40-44	1218	11.1
45-49	1064	9.5
Religion		
Islam	9925	90.3
Hinduism	1011	9.2
Buddhism	23	0.2
Christianity	26	0.2
Others	11	0.1
Marital status		
Married	10146	92.3
Widowed	466	4.2
Divorced	139	1.3
Not living together	245	2.2
Respondent's level of education		
No education	3525	32.1
Primary	3268	29.7
Secondary	3346	30.4
Higher	857	7.8
Partner's level of education		
No education	3605	32.8
Primary	2882	26.2
Secondary	2911	26.5
Higher	1598	14.5
Wealth index		
Poorest	1775	16.1
Poorer	1995	18.1
Middle	2095	19.1
Richer	2201	20.0
Richest	2930	26.6
Type of place of residence		
Urban	4151	37.8
Rural	6845	62.2
Age at first marriage (in years)		
< 20	10050	91.4
20 +	946	8.6
Respondent currently working		
No	7761	70.6
Yes	3235	29.4

Table 2: Selected Socio-Economic and Demographic Characteristics of the Study Population (N=10,996), BDHS 2007

(richer and richest) classes. Among the married females, the majority of their husbands are illiterate and only a small proportion of their husbands have higher education. This indicates that husbands with no education have a tendency to marry a woman in earlier age and husbands having higher education have a tendency to marry a woman in advanced age. Religion has a moderate effect on age at first marriage. Hindus, Buddhists, Christians and others are less likely to be married at an earlier age than their Muslim counterparts.

Results of Logistic Regression Analysis on Age at First Marriage

The Logistic regression analysis is aimed at identifying the risk factors that have an influence on early age at first marriage. Results based on the multivariate logistic regression analysis for the age at first marriage are shown in Table 4 - page 33.

Education is the single factor strongly related to the postponement of marriage (Jejeebhoy, 1995). From the results, it appears that respondent's education is the most important factor

Variables	Age at First Marriage										
	≤10	11	12	13	14	15	16	17	18	19	20+
Current Age											
<20	0.1	0.1	5.0	16.2	20.8	21.5	16.5	11.8	6.9	1.1	0.0
20-29	0.4	0.6	3.3	17.7	14.7	14.9	12.8	10.5	9.2	5.5	10.5
30-39	0.7	1.7	4.6	22.9	13.7	15.3	11.4	7.9	6.8	3.6	11.4
40+	1.9	2.4	9.3	27.1	16.4	13.8	9.5	6.3	4.9	2.2	6.2
Respondent's educational level											
No education	1.5	2.3	7.6	30.3	16.8	15.0	10.9	5.4	5.0	1.7	3.5
Primary	0.6	1.2	5.4	24.8	18.7	17.0	10.9	8.3	6.3	2.8	3.9
Secondary	0.3	0.4	3.5	12.5	14.4	17.2	15.8	13.2	9.7	4.7	8.4
Higher	0.1	0.1	0.8	1.6	2.3	6.3	7.6	10.4	11.0	11.8	48.0
Marital status											
Married	0.6	1.1	4.9	20.5	15.5	15.7	12.5	9.2	7.3	3.7	8.9
Widowed	3.0	3.2	9.4	31.5	17.2	12.4	7.7	3.4	5.8	1.7	4.5
Divorced	1.4	2.2	5.0	22.3	16.5	16.5	6.5	6.5	7.2	7.2	8.6
Not living together	2.4	1.2	6.5	20.4	12.7	16.7	9.0	13.1	8.6	4.5	4.9
Place of residence											
Urban	0.7	1.2	4.2	17.4	13.6	14.0	11.6	9.9	8.3	5.2	13.9
Rural	0.8	1.3	5.7	23.2	16.7	16.6	12.5	8.5	6.6	2.8	5.4
Wealth index											
Poorest	1.1	1.6	5.6	30.0	19.8	16.7	10.6	5.4	4.8	2.0	2.4
Poorer	0.8	1.3	5.5	25.7	17.1	16.6	12.7	7.9	6.7	1.9	3.9
Middle	0.8	1.6	5.1	22.2	17.7	16.9	12.3	9.7	6.7	2.7	4.4
Richer	0.7	1.0	6.5	19.8	13.5	16.2	13.2	9.5	7.6	4.0	7.9
Richest	0.6	1.0	3.7	12.4	11.8	12.8	11.8	11.1	9.4	6.5	19.0
Partner's educational level											
No education	1.3	2.1	6.6	28.5	17.3	16.4	10.5	6.1	5.8	2.0	3.3
Primary	0.5	1.0	5.5	24.0	18.4	16.2	12.2	8.8	6.5	2.6	4.3
Secondary	0.6	0.7	4.6	15.9	14.4	16.5	14.8	11.7	8.0	4.1	8.9
Higher	0.3	0.8	2.3	7.9	8.2	11.0	11.0	11.0	10.8	8.9	27.9
Religion											
Islam	0.8	1.3	5.5	21.8	15.9	15.6	12.1	8.7	6.9	3.6	7.8
Hinduism	0.9	0.4	2.2	13.2	11.3	16.1	12.5	11.8	11.1	4.8	15.8
Buddhism	0.0	4.3	0.0	8.7	8.7	13.0	13.0	4.3	30.4	4.3	13.0
Christianity	0.0	0.0	0.0	19.2	19.2	11.5	7.7	19.2	3.8	3.8	15.4
Others	0.0	0.0	18.2	18.2	27.3	18.2	9.1	9.1	0.0	0.0	0.0

Table 3: Percentage Distribution of Ever-married Women by age at First Marriage and Socio-economic Characteristics, BDHS 2007

that influences the age at first marriage being 20 years and older, when the other variables are controlled. Result shows the likelihood of the age at first marriage being 20 years and above among women with primary education is 1.04 times higher than that of uneducated women. Here it is also observed that prevalence of early marriage among women educated at the primary level is nearly the same as that of uneducated women, but the marriage being 20 years and above is very much higher among the highly educated women than uneducated women. In part, this may be because the highly educated women have a higher socio-economic status and live in urban areas. Thus, it may be concluded that, age at first marriage in Bangladesh could be raised by increasing the level of education for females.

Type of place of residence may be equally important, as rural areas generally are associated with early marriage. People living in urban areas are exposed to a more diverse life style

and subject to a weaker social control than those in rural areas. Rural areas tend to have institutional and normative structures such as kinship and extended family that promote early marriage and childbearing (Goode, 1963; Dixon, 1971; United Nations, 1988, 1990). As expected, the occurrence of low age at first marriage is considerably higher in rural areas compared with urban ones. The analysis shows that rural women are 21 percent more likely to be married earlier (i.e. before age 20 years) than urban women. This differentiation is observed because industrialization, urbanization and education did not evolve uniformly throughout the country. The analysis further shows that husband's education has a significant effect on age at first marriage. The result shows that as the level of husband's education increases the likelihood of the age at first marriage also increases. This indicates that the women whose husbands have been educated had a significantly higher likelihood of age at first marriage at age 20 years and above compared with those having uneducated husbands.

Variables	ERC	OR
Respondent's Education		
No education (ref.)	-	1.00
Primary	0.04	1.04
Secondary	0.39***	1.48
Higher	2.30***	9.99
Place of Residence		
Urban (ref.)	-	1.00
Rural	-0.24***	0.79
Partner's Education		
No education (ref.)	-	1.00
Primary	0.03	1.03
Secondary	0.33**	1.39
Higher	0.52***	1.67
Wealth Index		
Poorest (ref.)	-	1.00
Poorer	0.31*	1.37
Middle	0.28	1.33
Richer	0.56***	1.75
Richest	0.91***	2.48
Currently Working		
No (ref.)	-	1.00
Yes	0.01	1.01
Religion		
Islam (ref.)	-	1.00
Hinduism	0.90***	2.46
Buddhism	1.29*	3.63
Christianity	1.22**	3.39
Others	-17.58	0.00
Constant	-3.71***	0.25

Notes: ERC = Estimated Regression Coefficient; OR = Odds Ratios; ref. = Reference Category; Level of significance: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$

Table 4: Determinant of Age at First Marriage: Logistic Regression Estimates of Odd Ratios ($OR = \exp(B)$) of the Study Population, BDHS 2007

Several cross-cultural studies (South and Crowder, 2000; Snyder, Brown and Condo, 2004) conducted in America evidenced that people from economically disadvantaged families tended to marry earlier compared with those from advantaged families. It is found from Table 4 that women with their wealth index poorer, middle and upper (richer and richest) classes significantly prefer to marry at age 20 years and above than the reference category. Specifically, respondents with highest wealth index have more tendencies toward late marriage (i.e. marriage at age 20 years and above). It also observed that age at first marriage at age 20 years and above is likely to be 1 percent higher among women who are currently working, than the reference category. In a cross-cultural study Sarkar (1997) found that Muslims compared to Hindus married earlier in rural villages. From the result, it appears that Hindus, Buddhists and Christians are 2.46 times, 3.61 times and 3.37 times significantly and more likely to marry at age 20 years and above than their Muslim counterparts.

Conclusions and Recommendations

Marriage is a universal institution to enter into a marriage relationship intended to meet sexual and reproductive needs, to control sexual drive and to adapt to an environment in Bangladesh, as it is in many other cultures around the world. For

these social purposes, some subcultures of Bangladesh, such as rural communities, in general, prefer more early age at first marriage compared to urban communities and affluent classes who support delayed age at first marriage. This study confirms that marriage is almost universal among females in Bangladesh. Among the 10,996 ever-married women who constituted this study population, 91.4 percent were married before age 20 years, with most of the marriages taking place at the ages 13-16 years. Only 8.6 percent of marriages occurred at ages 20 or older.

Differential analysis shows that most of the married females have a rural background, are currently not working and did not have a formal education. Their husbands were also illiterate and Islam was the most dominant religion among the respondents. It is evident from logistic regression analysis, respondent's education, place of residence, wealth index, partner's education and religion were most important significant factors that influence age at first marriage.

The findings of this study may have some policy implications that would help planners and policy makers of the Government to take appropriate policies regarding age at first marriage of the female population in Bangladesh. Education is one of the most viable means for enhancing the status of women vis-à-vis

rising the age at first marriage. Therefore, even more vigorous attempts should be made to keep the girls in school for an extended period. Along with formal education, women must have access to informal education. One dimension of informal education is that women should be made aware of the risks and consequences of early marriage. The mass media can play an effective role in this regard. Social mobilization programs through the same media might also be an effective way to change the orthodox religious and cultural values regarding “when to marry” and “whom to marry”. Public opinion may also be sought in coming to a consensus regarding a clear legal age at marriage. Moreover, marriage should be entered into with the full consent of the intending couples. The Government should also take appropriate measures to create more employment opportunities for young women in white-collar jobs, especially in the fields of health and education. In respect of the education of children, efforts should be made at multiple levels to ensure that there is no discrimination according to sex.

References

- Aziz, K. M. A. and Maloney, C. T. (1985). *Life Stages, Gender and Fertility in Bangladesh*. Dhaka: International Centre for Diarrhoeal Disease Research, Bangladesh.
- Bancroft, J. (2002). “Biological factors in human sexuality”, *Sex Roles: A Journal of Research*.
- Bangladesh Bureau of Statistics, (BBS), (2007). Key indicators on report of sample vital registration system 2006-2007, Retrieved from http://www.bbs.gov.bd/dataindex/Key_surs_2007.pdf.
- Bangladesh Bureau of Statistics, (BBS). (2001). *Statistical Yearbook of Bangladesh*. Ministry of Planning, Government of the People’s Republic of Bangladesh, Dhaka: Statistics Division.
- Bangladesh Bureau of Statistics, (BBS). (2008). *Statistical Yearbook of Bangladesh*. Ministry of Planning, Government of the People’s Republic of Bangladesh, Dhaka: Statistics Division
- Bangladesh Demographic Health Survey, BDHS (2007). National Institute of Population Research and Training (NIPORT), Dhaka, Bangladesh.
- Comb, N. J. (2001). *The Child: Infants, Children and Adolescents*. Mountain View, California: Mayfield Publishing Company.
- Craig, G. J. (1996). *Human Development*. Upper Saddle River, New Jersey: Prentice Hall Inc.
- Dixon, R. B. (1971). “Explaining cross-cultural variations in age at marriage and proportions never marrying”, *Population Studies* 25 (2): 215-234.
- Foster, A. and Protik, A. (2005), Age at marriage, migration, and marriage market equilibrium in rural Bangladesh. This article was retrieved from <http://paa2005.princeton.edu/download.aspx?submissionId=51609>.
- Goode, W. J. (1963). *World Revolution and Family Patterns*. New York. Free Press of Glenoe.
- ICDDR, (2007). “Consequences of early marriage on female schooling in rural Bangladesh”, *Health and Science Bulletin*, 5 (4); 13-18.
- Islam, M. A. (2007). Bangladesh struggles with “child marriage”, Retrieved from voiceofsouth.org/2007/07/15/child_wedding/-38k.
- Jejeebhoy, S. J. (1995). *Women’s Education, Autonomy, and Reproductive Behavior: Experience from Developing Countries*. Oxford: Clarendon Press.
- Kamal, N. (2006), Causes and consequences of early marriage. This article was retrieved from <http://www.iub.edu.bd/chpd/Causes%20and%20Consequences%20of%20Early%20marriage-Published%20Paper-2006-NKamal.pdf>.
- Papalia, D. E., Olds, S. W. and Feldman, R. D. (2002) *A child’s World: Infancy through Adolescence*. New York: McGraw-Hill Company.
- Philips, J. E. and Hossain, M. B. (1998). *The Impact of Family Planning Household Service Delivery on Women’s Status in Bangladesh*. Policy Research Division Working Papers, No. 118, New York: Population Council.
- Quisumbing, A. R. and Hallman, K. (2003). *Marriage in Transition: Evidence on Age, Education, and Assets from Six Developing Countries*, Policy Research Division Working Papers, Population Council.
- Saha, U. R. and Bairagi, R. (2007) “Inconsistencies in the relationship between contraceptive use and fertility in Bangladesh”, *International Family Planning Perspectives*, 33 (1); 31-37.
- Sarker, P. C. (1997). *Social Structure & Fertility Behaviour: A Cross-Cultural Study*. Dhaka: Centre for development Services.
- Snyder, A. R., Brown, S. L. and Condo, E. P. (2004). “Residential differences in family formation: The significance of cohabitation”, *Rural Sociology*, 69 (2); 255-260.
- South, S. J. and Crowder, K. D. (2000). “The declining significance of neighborhoods? Marital transitions in community context”, *Social Forces*, 78 (3); 1067-1099.
- United Nations, (2000). *World Marriage Patterns*. New York: Population Division.
- United Nations. (1988). *First Marriage: Patterns and Determinants*. New York: Population Division.
- United Nations. (1990). *Patterns of First Marriage: Timing and Prevalence*. New York: United Nations, Department of International Economic and Social Affairs. ST/ESA/SER.R/111.
- Wikipedia, (2008). Age at First Marriage. The pages were last modified 20 November 2008. http://en.wikipedia.org/wiki/Age_at_first_marriage. WIKIPEDIA Foundation, Inc.

Case report: Sudden Statins withdrawal

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ABSTRACT

Statins is a group of drugs used to lower blood cholesterol. This group of medication has a different mode of action to improve the blood vessels' function.

Acute withdrawal of this medication may cause serious hazards. This phenomenon has scarcely been discussed in the literature. We report a case with the effect of acute statins withdrawal and discuss briefly this phenomenon.

Key words: Statins, acute withdrawal

Introduction

Coronary heart disease is the leading cause of morbidity and mortality worldwide (1).

Lowering cholesterol unequivocally reduces the frequency of cardiovascular events and atherosclerosis (2). Acute statins discontinuation may induce endothelial dysfunction and increase the risk of cardiovascular events (3-7). Statins acute withdrawal effect is not commonly discussed in literature although it is a serious hazard. We report a case of recurrent acute statins withdrawal and discuss the evidence of its effect.

Case Report

Mr. X is 53 years old, works as an administrator in a big construction company. He is known to be diabetic for the last 20 years. He has been a hypertensive patient for the last 10 years. His lipid profile was discovered to be disrupted 3 years ago and he has been on statin therapy since that time but he is not using it continuously. Mr. X uses statin in an on/off pattern. One month ago, he visited his GP complaining of chest pain associated with exercise and improved by rest.

Mr. X attended today for his regular check up. His main complaint was the increased frequency of chest pain with exercise level less than before. He experienced chest pain.

From the history, Mr. X was an ex-smoker; he quit tobacco smoking 6 years ago. He is not drinking alcohol or using any illicit drugs. His father died at age of 54 years due to a massive myocardial infarction. His mother had hypertension.

On examination:

Weight 110Kg, height 167 cm, BMI 39 (stage II obesity). Blood pressure was 139/82mmHg. Pulse was 84b/m, regular, equal both sides.

Chest and heart examination were normal, peripheral pulsations were normal (Radial, posterior tibialis and dorsalis pedis), no carotid or abdominal bruit was detected.

Investigation:

ECG showed left ventricular hypertrophy with lateral ischemic changes.

Fasting blood glucose was 170mg, HBA1c 8.1% (previous reading was 7.4%), post prandial blood glucose was 256mg/dl. His liver and kidney function tests were within normal range. His lipid profile showed raised T-chol, LDL-C, and low HDL-C. Interestingly his lipid profile showed fluctuation during the last year correlated with the period of Statins treatment discontinuation (Table 1 - next page).

	1 st quadrant	2 nd quadrant	3 rd quadrant	4 th quadrant
T-chol	4.6mmol/l	6.3mmol/l	5.1mmol/l	7.2mmol/l
LDL-chol	2.4mmol/l	4.1mmol/l	3.3mmol/l	5.6mmol/l
HDL-chol	0.9mmol/l	0.8mmol/l	0.9mmol/l	0.87mmol/l
TG	2.6mmol/l	3mmol/l	2.2mmol/l	3.1mmol/l

Table 1: Quarterly lipid profile

Discussion

Coronary heart disease, the result of coronary atherosclerosis is the leading cause of morbidity and mortality worldwide. Lowering cholesterol unequivocally reduces the frequency of cardiovascular events and atherosclerosis (8). The 3-hydroxy-3-methylglutaryl coenzyme A (HMG-CoA) reductase inhibitors, collectively referred to as statins, have assumed the central role in the treatment of hypercholesterolemia because of their superior ability to reduce levels of low-density lipoprotein cholesterol (LDL)(8).

Statins are effective in the primary and secondary prevention of coronary heart disease (9). Many guidelines are strengthening the use of statins for primary and secondary prevention. In the United States, statin use has also increased because of stringent LDL guidelines established in the third report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (ATP III) (10). The panel even recommended lowering the goal for LDL to less than 70 mg/dl for those at very high risk of coronary heart disease. Furthermore, statin treatment is considered lifelong for many patients.

The first report to suggest that the discontinuation of statin treatment may increase vascular events came from New Zealand.(11) In that study, 126 patients with atherosclerotic disease treated with simvastatin were switched to fluvastatin. Rates of thrombotic vascular events during the most recent 6 months during simvastatin therapy were compared with rates in the following 6 months during fluvastatin therapy. Mean doses of simvastatin and fluvastatin were 21.8 and 36.8 mg/day, respectively, although simvastatin is 4 times more potent than fluvastatin. Levels of LDL increased by 34%, and the frequency of thrombotic events when the patients were taking fluvastatin increased 3-fold, compared with the frequency during simvastatin therapy (27 vs 9 events, $p < 0.001$). The mean time to events after the change in statin was 17 weeks. Although statin treatment was not discontinued, switching to a relatively ineffective dose had detrimental effects on cardiac event rates. The authors suggested that the observed tripling in events was likely related to statin therapy and not to the nature of the disease processes.

A retrospective subgroup analysis of the Platelet Receptor Inhibition in Ischemic Syndrome Management (PRISM) trial revealed that in patients with acute coronary syndromes, statin withdrawal was associated with an increased risk of cardiovascular events (12). The PRISM investigators recruited patients with chest pain at rest or accelerating in the past 24 hours and with evidence of coronary artery disease, namely, electrocardiographic evidence of myocardial ischemia (new ST-segment changes or T-wave inversion), elevated creatine

kinase activity above twice the upper limit of normal, and/or a history of coronary heart disease (myocardial infarction or coronary revascularization, positive results on an exercise or dipyridamole nuclear stress test, or ? 50% narrowing of the luminal diameter of a major coronary artery as shown on a previous angiogram). The primary end point of the subgroup analysis was the occurrence of death and nonfatal myocardial infarction. Follow-up was conducted at 7 and 30 days.

Of the 3232 patients included, 465 (14.4%) had used a statin before the onset of symptoms. In 86 (18.5%) of these patients, statin therapy was withdrawn during hospitalization. These patients had a 3-fold increased risk of having a primary end point compared with those who continued statin therapy (hazard ratio 2.93, 95% confidence interval 1.64-6.27, $p = 0.005$ at 30 days). However, nearly 30% of the study population was excluded from multivariate analysis because of a lack of troponin-T level measurements at baseline.

When the analysis was repeated by including all patients, the direction of the trend was maintained, but differences were not significant (adjusted hazard ratio for total cardiovascular risk 2.22, 95% confidence interval 0.90-5.49, $p = 0.08$). Nevertheless, crude rates for myocardial infarction or death at 7 days were significantly higher in those who discontinued treatment (8.2%) than in those who continued treatment (3.8%, $p = 0.031$).

The results suggested that, irrespective of troponin-T level, patients with acute coronary syndromes who discontinued statin therapy had outcomes worse than those of patients who continued therapy.

In a subsequent observational study, the National Registry of Myocardial Infarction, the effects of statin withdrawal on hospital outcomes were assessed.(13) Data was collected from July 2000-February 2002 in 183,570 patients from 459 hospitals. Included in the analysis were 78,224 patients with non-ST-elevation myocardial infarction. Of these patients, 54,635 (69.8%) had not taken statins before or at any time during their hospitalization, whereas 13,871 (17.7%) were taking statins before hospital admission. Of the patients taking statins, 4870 (35.1%) did not receive statin treatment during the first 24 hours of their hospitalization. Discontinuation of therapy during the first 24 hours of hospitalization was associated with increased morbidity and mortality compared with continuation of therapy (11.9% vs 5.7%, $p < 0.01$). These findings suggested that discontinuing statin therapy in the first 24 hours of hospitalization in patients with non-ST-elevation myocardial infarction was associated with worsened hospital outcomes.

In another report, researchers investigated the association between previous and early in-hospital statin therapy and outcomes for acute coronary syndromes by using data from the multinational Global Registry of Acute Coronary Events (GRACE), which involved 94 hospitals in 14 countries.(14) From April 1999-September 2002, 19,537 patients with acute coronary syndromes were enrolled. The 4056 (20.8%) patients taking statins before the event were least likely to present with or to have a final diagnosis of ST-elevation myocardial infarction or to have an infarct larger than that of patients not using a statin. Most patients receiving statins had a final diagnosis of unstable angina. In addition, discontinuation of statins during hospitalization in 428 (10.6%) patients worsened their outcomes. Hospital outcomes, such as pulmonary edema (8.0% vs 4.9%, $p=0.007$), cardiogenic shock (8.7% vs. 1.6%, $p<0.001$), cardiac arrest (8.2% vs 1.9%, $p<0.001$), sustained ventricular tachycardia or ventricular fibrillation (6.2% vs 2.8%, $p<0.001$), death (11.6% vs. 2.1%, $p<0.001$), and cardiovascular death (17.3% vs 9.2%, $p<0.001$) were significantly higher in the group that discontinued statins during hospitalization than in the group that continued treatment. As reported for non-ST-elevation myocardial infarction, the beneficial effects of statins in patients with ST-elevation myocardial infarction were rapidly lost when the statins were discontinued during hospitalization.

The risk associated with statin withdrawal in patients with stable cardiac conditions was retrospectively assessed in the large-scale, double-blind, parallel-group Treating New Targets (TNT) study that compared atorvastatin 10 mg/day with atorvastatin 80 mg/day to determine differences in clinical end points (15). This study concluded that short-term discontinuation of statin therapy in patients with stable cardiac conditions did not seem to increase the risk for an acute coronary event. The TNT study has limitations affecting its conclusion. In the TNT study, patients were excluded if they had uncontrolled hypertension, previous myocardial infarction, a coronary revascularization procedure, severe or unstable angina within 1 month of screening, any planned procedure for the treatment of atherosclerosis, an ejection fraction of less than 30%, or hemodynamically important vascular disease. However these conditions were inclusion, rather than exclusion, criteria in the trials of acute coronary syndrome.

The effects of statin treatment and withdrawal were evaluated in a prospective study of eight healthy men with normal cholesterol levels.(16) Atorvastatin 80 mg/day was given for 30 days. Forearm blood flow was assessed by means of venous occlusion plethysmography before, during, and after treatment. Endothelial-dependent vasodilation was assessed as ischemia-induced reactive hyperemia, and endothelial-independent vasorelaxation was assessed with the administration of nitroglycerin. Atorvastatin treatment lowered serum cholesterol and C-reactive protein levels and increased endothelium-dependent vasodilation without affecting endothelial-independent vasodilation. This increase was lost on the first day after drug discontinuation, whereas C-reactive protein and serum cholesterol levels remained inhibited and failed to increase on day 1. The authors concluded that the beneficial effects of statin treatment on endothelial function were rapidly lost after

discontinuation of therapy and that the beneficial effects were independent of serum cholesterol levels and inflammation.

In another study, otherwise healthy subjects with hyperlipidemia were treated with atorvastatin 10 mg/day for 3 months.(17) Treatment reduced LDL, C-reactive protein, and soluble vascular cell adhesion molecule-1 levels, and increased human tissue plasminogen activator levels. After atorvastatin was withdrawn, C-reactive protein, soluble vascular cell adhesion molecule-1, and tissue plasminogen activator levels returned to baseline sooner than did LDL levels. The authors suggested that anti-inflammatory and anti-procoagulant effects of statins were rapidly lost after treatment was discontinued and that these effects were unrelated to LDL levels. Platelet hyperactivity has been shown after statin discontinuation (19).

Conclusion

Statins are not a drug given to patients without educating them on its importance, how to use, side effects, when to stop and the hazard of sudden discontinuation. Discontinuing statins in patients with acute coronary syndromes appeared to increase the risk for cardiovascular events. A sudden discontinuation of statin therapy appears to lead to a rapid loss of its vascular protective effects, and, in some instances, vascular deleterious and prothrombotic activity may increase above baseline levels. A similar increase in risk was not observed in patients with stable cardiac conditions, whose low baseline rate of events might not have provided enough power to observe significant differences between statins withdrawal and statins continuation.

References

- 1) Thom T, Haase N, Rosamond W, et al, for the American Heart Association. Heart disease and stroke statistics-2006 update: a report from the American Heart Association statistics committee and stroke statistics subcommittee. *Circulation* 2006;113:e85-151. Available from <http://circ.ahajournals.org/cgi/content/full/113/6/e85>. (Erratum in *Circulation* 2006; 113(14):e696.)
- 2) Scandinavian Simvastatin Survival Study Investigators. Randomised trial of cholesterol lowering in 4444 patients with coronary heart disease: the Scandinavian simvastatin survival study (4S). *Lancet* 1994;344:1383-9.
- 3) Thomas M, Mann J. Increased thrombotic vascular events after change of statin [letter]. *Lancet* 1998;352:1830-1.
- 4) Laufs U, Endres M, Custodis F, et al. Suppression of endothelial nitric oxide production after withdrawal of statin treatment is mediated by negative feedback regulation of rho GTPase gene transcription. *Circulation* 2000;102(25):3104-10.
- 5) Vecchione C, Brandes RP. Withdrawal of 3-hydroxy-3-methylglutaryl coenzyme A reductase inhibitors elicits oxidative stress and induces endothelial dysfunction in mice. *Circ Res* 2002;91:173-9.
- 6) Heeschen C, Hamm CW, Laufs U, Bohm M, Snapinn S, White HD. Withdrawal of statins in patients with acute coronary syndromes [letter]. *Circulation* 2003;107:27.
- 7) Spencer FA, Fonarow GC, Frederick PD, et al, for the National Registry of Myocardial Infarction. Early withdrawal of statin therapy in patients with non-ST-segment elevation myocardial infarction: national registry of myocardial

- infarction. *Arch Intern Med* 2004;164(19):2162-8.
- 8) Levine GN, Keaney JF, Vita JA. Cholesterol reduction in cardiovascular disease. *N Engl J Med* 1995;332 (8):512-21.
- 9) Clark LT. Treating dyslipidemia with statins: the risk-benefit profile. *Am Heart J* 2003;145(3):387-96.
- 10) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. Executive summary of the third report of the national cholesterol education program (NCEP) expert panel on detection, evaluation, and treatment of high blood cholesterol in adults (adult treatment panel III). *JAMA* 2002;285:2486-97.
- 11) Thomas M, Mann J. Increased thrombotic vascular events after change of statin [letter]. *Lancet* 1998;352:1830-1.
- 12) Heeschen C, Hamm CW, Laufs U, Snapinn S, Bohm M, White HD, for the Platelet Receptor Inhibition in Ischemic Syndrome Management (PRISM) Investigators. Withdrawal of statins increases event rates in patients with acute coronary syndromes. *Circulation* 2002;105(12):1446-52.
- 13) Spencer FA, Fonarow GC, Frederick PD, et al, for the National Registry of Myocardial Infarction. Early withdrawal of statin therapy in patients with non-ST-segment elevation myocardial infarction: national registry of myocardial infarction. *Arch Intern Med* 2004;164(19):2162-8.
- 14) Spencer FA, Allegrone J, Goldberg RJ, et al, for the GRACE Investigators. Association of statin therapy with outcomes of acute coronary syndromes: the GRACE study. *Ann Intern Med* 2004;140(11):857-66.
- 15) McGowan MD. There is no evidence for an increase in acute coronary syndromes after short-term abrupt discontinuation of statins in stable cardiac patients. *Circulation* 2004;110:2333-5.
- 16) Lee KT, Lai WT, Chu CS, et al. Effect of withdrawal of statin on C-reactive protein. *Cardiology* 2004;102(3):166-70.
- 17) Puccetti L, Pasqui AL, Pastorelli M, et al. Platelet hyperactivity after statin treatment discontinuation. *Thromb Haemost* 2003;90:476-82.
- 18) Puccetti L, Pasqui AL, Pastorelli M, et al. Platelet hyperactivity after statin treatment discontinuation. *Thromb Haemost* 2003;90:476-82.