Bachelor of Science in Civil Engineering

Case Study on Vulnerable Pedestrian: Garment Workers' Road Safety Education Source

Md. Rashed Al Noman

Md. Ahsan Habib

Ahnaf Shahriar

Department of Civil & Environmental Engineering

Islamic University of Technology

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By

Md. Rashed Al Noman (Student ID: 115426)

Md. Ahsan Habib (Student ID: 115423)

Ahnaf Shahriar (Student ID: 105430)

Islamic University of Technology (IUT), Dhaka, Bangladesh
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By

Dr.Shakil Mohammad Rifaat

Associate Professor

Department of Civil & Environmental Engineering,

Islamic University of Technology, Board Bazar, Gazipur.

DECLARATION

We hereby declare that the undergraduate project work reported in this thesis has been performed by us and this work has not been submitted elsewhere for any purpose (except for publication).

November, 2015

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Md. Rashed Al Noman (student id: 115426)

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Md. Ahsan Habib (Student ID: 115423)

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Ahnaf Shahriar (Student ID: 105430)

DEDICATION

Dedicated

To

Our Beloved Parents

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ABSTRACT

Roaming safer as vulnerable pedestrian are composite learning chores. Education is the focal prior for the growth of a nation. In the arena of acquiring knowledge, safety education governs a dynamic role in influencing the approaches and behaviors of pedestrians. So, road Safety education is lifesaving advancement. For improving road safety education, it requires the involvement of diversified sources. Due to lack of consciousness and acquaintance, now a days pedestrian injuries commencing road traffic accident is a prominent public health concern all over the world. The objective of this study is to observe the percentage of refined pedestrian and to pinpoint the sources that may affect the vulnerable road user's behaviors to become safety concern. As the economy of Bangladesh is extensively hooked on the Ready Made Garments (RMG) industry and the mode of transport of these substantial percentage of user is walking, that's why for this research garment workers are nominated as vulnerable pedestrian. Numerous study supports that this domineering communal has toppled under intense extortion of road accident. To serve the purpose of this research near about 500 samples have been collected from 8 different renowned garment industries which are previously identified as most prominent road accident zones. This study demonstrates through logistic regression model to analyze and detect the edification source of this convinced civic of the society through noteworthy exploration in perception depending on innumerable aspect, which is going to be promoted as the development of safety educational view among the vulnerable pedestrian. Indeed, this study enhances the policy makers to corroborate these affected societies and take the plunge to increase pedestrian safety awareness in an incredible percentage through schooling of that notorious quota.

LIST OF CONTENTS

TABLE OF CONTENTS

CHAPTER ONE: INTRODUCTION

1.1   Background

The readymade garments industry acts as the backbone of our economy and as a catalyst for the development of our country. Billions of dollars has been fetching as exports from this sector. Unemployment problem are also solved in the country due to these readymade garments.

After the independence of 1971, Bangladesh was one of the poorest countries in the world. The industry that has been making crucial contribution to rebuilding the country and its economy is none other than the readymade garment (RMG) industry which is now the single biggest export earner for Bangladesh. The sector accounts for 81% of total export earnings of the country. Bangladesh started its journey in the 1980s and has come to the position it is in today. . Since then, Bangladeshi garment industry did not need to look behind. Despite many difficulties faced by the sector over the past few years, it has carved a niche in world market and kept continuing to show robust performance. Since the early days, different sources of impetus have contributed to the development and maturity of the industry at various stages. We learned about child-labour in 1994, and successfully made the industry free from child labour in 1995 (Dhaka Tribune 2014).

The MFA-quota was a blessing to our industry to take root, gradually develop and mature. While the quota was approaching to an end in 2004, it was predicted by many that the phase-out would incur a massive upset in our export. However, the post-MFA era is another story of success. Proving all the predictions wrong, we conquered the post-MFA challenges. Now the apparel industry is Bangladesh's biggest export earner with value of over $24.49bn of exports in the last financial year (from July 2013 to June 2014) (Dhaka Tribune 2014).

Despite the epic growth of our RMG industry, and its bright prospects, challenges are still there. One of the biggest challenge currently faced by our RMG industry is to ensure workplace safety and better working conditions for the millions of garment workers.

According to the study, the US-based fashion companies are expected to boost their sourcing from Bangladesh in the next two years. McKinsey, a global management consulting firm, described Bangladesh as the next hot spot in apparel sourcing. The renowned firm forecasts export-value growth of 7-9% annually and our apparel export will double by 2015 and nearly triple by 2020 provided that we can successfully overcome a few challenges including developing infrastructure and skill workforce (Dhaka Tribune 2014)

It is the responsibility of all of us to protect the interest of this industry which has given our economy a strong footing, created jobs for millions of people, especially for women, lifted them from the abyss of chronic poverty and given them a dignified life. Now what we need to do is deal with all the challenges facing our garment industry, paving the way for its further development.

1.2   Cause of the Study

The garment industry is by far the country's most important manufacturer, earning around $5 billion annually and accounting for about two thirds of all exports. Bangladesh has about 2,500 garment factories with upto 10 million livelihoods dependent on it directly or indirectly. (Bangladesh Garments Industry 2006)

About 80 per cent of garment workers are women. The Ready Made Garments sector has more potential than any other sector to contribute to the reduction of of poverty.

Despite the phenomenal success of the RMG sector the working conditions and wages of workers in the industry are cause for serious concern.

Bangladesh's current position as a leading garments exporting nation needs to be consolidated. The economy-wide reverberations of failure would be disastrous. We believe it is in everybody's interest to sustain this industry – an industry which changed the lives of so many people, particularly women, in Bangladesh.Besides this, the unemployment problem is solved by the readymade garments.

The Ready-Made Garments (RMG) industry occupies a unique position in the Bangladesh economy. It is the largest exporting industry in Bangladesh, which experienced phenomenal growth during the last 25 years. Given the remarkable entrepreneurial initiatives and the dedication of its workforce, Bangladesh can look forward to advancing its share of the global RMG market.

We are facing some safety problems in both garments environment and outside the garments. Safety need for the worker is mandatory to maintain in all the organization. But without the facility of this necessary product a lot of accident is occur incurred every year in most of the company.

Every year, hundreds of workers die in workplace accidents. The table below (Workplace deaths in Bangladesh in 2013) provides an opportunity to compare the last six years – however no direct comparisons can be made between the last three years (2010 to 2013) and the previous years for the following reasons: - in the initial years information was not collected on work-related road traffic deaths were – in the initial years no regional newspapers were monitored In addition, when trying to assess trends one needs to consider that in some years the death figures are often distorted by one single incident – as in the Tazreen fire in 2012 and the Rana Plaza building collapse in 2013. The table below allows one to compare years taking the

issue of road traffic and mass disaster incidents into account. The first column shows that the level of workplace death in the last four years appears to be pretty(Safety and Rights Society 2013).

Year	Nos of deaths (without major disasters and without road traffic deaths)	Nos of deaths including Tazreen fire (2012), Rana Plaza building collapse (2013) and Garib and Garib& Ha-Meem (2010)	Nos of road traffic deaths	Total deaths monitored
2008	320	-	-	320
2009	265	-	-	265
2010	312	52	19	383
2011	357	-	31	388
2012	327	112	51	490
2013	323	1134	53	1510

These statistics indicates the necessity of study of traffic safety education of garments worker. From available literature review a less number of studies have been done addressing this issue. It is understood that detailed study and survey of safety perception and related statistical modeling is required for knowing the reasons of accidents and thus we can take effective measures.

1.3   Objective of the Study

Road safety education (RSE) programs are frequently funded and implemented without evidence of their actual effects (Dragutinovic and Twisk, 2006; Williams, 2007). Because of a growing interest in evidence-based policy (OECD-ECMT, 2008), road safety outcome measures are now being requested as evidence of road safety education effects on road casualties. These demands, however, raise some difficult methodological issues, such as whether road casualty reduction could serve as the only outcome criterion, and whether effects from different types of RSE

programs can be compared in terms of their relative effectiveness. The objective of the study is to find the group of garments workers who need the safety education.

1.4 Benefit of the Study

At the end of the study we will able to know among the garments workers which category worker will need the safety education. In the real experience, suppose we need 50 garments worker for teaching them about traffic safety. In this case the garments authority will decide whom they will send. They will try to send the workers who have no knowledge on safety education or have a very little knowledge on it, so that they can get safety knowledge. Our study will help to select the garments workers who have least knowledge or no knowledge of traffic safety.

CHAPTER TWO: LITERATURE REVIEW

2.1 Study Regarding Working Environment of Garments

Bangladesh is the second-largest garment exporter in the world with more than 4.0 million people (80% of them are women) working in this sector. About 80% of the exported products from the country are from the garment sector. Improving safety of those workers is one of the urgent issues for the sector (JICA 2013).

In tackling the issue of safety, JICA redirected 1 billion taka (BDT) from the "Financial Sector Project for the Development of SMEs (FSPDSMS)" to the loan for improving safety of the factories of RMG in the country. The new loan project is also part of "the Project for Capacity Development on Natural Disaster-Resistant Techniques of Construction and Retrofitting for Public Buildings". Although the collapse of Rana Plaza was not because of the natural disaster, retrofitting techniques can be applied to improving safety of the buildings.

The (ILO 2013) Program on Improving Working Conditions in the Ready-Made Garment Sector has been developed to support the interventions identified in the National Tripartite Plan of Action on Fire Safety & Building Integrity and recent commitments made by the Government of Bangladesh. The program is based on the Joint Tripartite Statement by the Government of Bangladesh (GoB), employers and the workers. Improving Working Conditions in the Ready-Made Garment Sector program is designed in line with the priorities set in the Sixth Five Year Plan (SFYP 2011-2016) of Bangladesh, which recognized the urgent need for job creation.

The ILO consulted widely with stakeholders of the RMG sector to identify the areas where it can provide short term and long term support in improving working conditions in the sector.

Currently only about 20% of Bangladeshi RMG workers have some understanding of their legal entitlements. Male workers are ahead of understanding of legal entitlements than female ones, although male comprises 20% of the total work force. Female workers are the main working force of the RMG section. Average age of women is 21 years, average education around 5.6 years, persistent wage gap 30%, less than one percent in managerial level (GTZ 2010). Current statistics show that female line-operators can earn approximately 60 % of their fellow male line-operators' salaries, as the men tend to have the advantage of being employed in more technically skilled jobs whereas women are stuck in low-skilled jobs due to their relatively low level of education and training (The DiA Blog 2011)

By one estimate, it employs 12% of women aged 15 to 30 in the country. In November 2013 government has raised 77% rise in the minimum wage following Rana Plaza tragedy but the workers especially the female ones are yet to materialize their due dreams of decent work, security and safety.(The Amin and Syeda,2014) In 1979 there were only 9 factories and in 1983, there were about 50 garment factories in the country but now more than 5,000 export oriented industries. The most tedious condition of work in the garment factories is the long working hours. On an average, a garment worker has to work for more than 12 hours a day. Mandatory overtime and less payment for overtime work is another issue which needs attention. Workers have to work for both day and night flouting the law. There is no job security and they do not get any maternity leave although according to the law they deserve it(Mridula and Khan 2014).Though section 384 of the Labor Act reveals that employer should train workers as to the provisions of labor law so that they have some understanding of their legal entitlements, there is no penalty provision for employers if they fail to arrange such training program. The Labor Act should be amended further and penalty provisions should be included. Furthermore, this Act should include appropriate penalty provisions for wage discrimination between male and female workers. Provision as to overtime matter must be effective.

Based on the results of extensive consultations, the program adopted an approach that has five vital components:

- Building and Fire Safety Assessment

- Strengthen Labor Inspection & Support Fire and Building Inspection

- Build Occupational Safety and Health (OSH) awareness, capacity and systems

- Rehabilitation and skills training for victims

- Implement Better Work program in Bangladesh

2.1.1   Security and Safety Net of Garments Worker

Role of labor and industrial laws are of paramount importance. Total economy of a country greatly depends upon the industrial sector. Proper management of labor is an essential matter for growth of industrial sector. The object of Labor laws is no doubt to maintain industrial peace and to meet the surge of problems in employment and to protect the rights of workmen (NHRC 2014). But due to various defects and loopholes in the labor laws the workers in our country are indiscriminately victimized and are deprived of their legal rights. So it is a question whether the Bangladesh Labor Code, 2006 along with its amendments is a proper law in all aspects to meet the demands of the labor of Bangladesh. This study mainly aims at justifying the status of compliance regarding security and safety net of the garments workers in Bangladesh in line with national and international legal framework and standard practice coupled with the vow to investigate the main loopholes of the present labor law in the country. This study has employed both qualitative and empirical approach because of mixed nature of the problem with a view to achieving the best outcome of the research. After analyzing primary and secondary data this study came up with few recommendations important of which are the Labor Act should include appropriate penalty provisions for wage discrimination between male and female workers and for not arranging awareness training by owners. Effective

application of the National Labor Policy 2012 is a must to ensure decent work, occupational safety and health within the general framework of rights of workers. Government may make 30 'Special Monitoring Cell (SMC)' and 5 'Apex Monitoring Cell (AMC)' that will monitor the security and safety net of workers. In terms of factory construction, factory owners must follow building code strictly. Those who will not follow it must be punished severely. As this labor intensive industry, there must be a 'Special Approval Authority (SAA)' for building of factory. All members of this team must be expert and factors like earthquake must be considered. Housing accommodation provided by employers will be make worker feel safe and work peacefully. Number of Inspectors should be increased and they must by biasfree while visiting garments factory and interviewing workers. Inspectors should use observation method to get information. Finally, it is essential to make workers confident that they are working in a safe factory. That feeling will reduce the damages and life-loss when any accident occurs.

2.2 Study Regarding Woman in Garments Sector

It is a reality today that the garment industry in Bangladesh is at the heart of the country's export boom and has remained so ever since the first factory opened in 1976. The industry has grown dramatically over the past 35 years, and today accounts for 80% of Bangladesh's total exports.(ASK 2013) There are now 4,825 garment factories in Bangladesh employing over three million people. This sector at present attracts the largest Foreign Direct Investment (FDI) of more than $1,000 million (CHECK THE LATEST FIGURE) compared to $2.4 million in 1986. Today, one third of foreign direct investment comes from European companies, principally from the UK.

2.2.1   Condition of Women in Professional Sector

It is to be noted that in most cases the employers engage garment workers, mainly women, in the factory without any formal agreement or job contract. Thus they can

be easily hired and fired and no compensation is offered when they are laid off in the interest of factory owners. As for example, many factory owners because of their failure to meet the deadline of shipment or on becoming loan defaulters close their factories leaving the garment workers in utmost uncertainties of which the women are the main sufferers. However, Bangladesh has recently amended the Labor Law in 2013, which protects the fundamental rights of women workers, including the right to maternity leave. At the international level, Bangladesh has ratified the UN (CEDAW), as well as ILO Convention 111 on Discrimination in Employment and Occupation. The reality is that, despite such legislation, women workers' rights remain ignored in the Garment sector. Women workers are employed in poorly paid jobs facing severe labor rights violations and do not get their legal entitlements. They are also forced to work at night often exceeding 10 working hours which is a violation of the labor standard.

2.2.2   Condition of Women in Income and Economic Sectors

As has been said earlier, women are poorly paid in this sector. As a result of sustained campaigning by women workers, women rights and human rights activists and other trade unionists in Bangladesh, the minimum wage for garment workers was raised in 2010 for the first time in four years. Receipt of wages in the garment industry depends on meeting an assigned production target. If production targets are met, a sewing operator's salary now starts at 3,861 taka (approximately £32) a month and a helper's wage at 3,000 taka (£25) a month. This amount is inadequate in meeting the minimum living standards in the urban areas. Besides the above, they get no other benefits or festival allowances.

2.2.3   Condition of Women Garment Workers in Social-Political Sectors

Women garment workers are also disadvantaged socially and politically. As for example, they face problem in the areas of accommodation, transport, and access to health treatment. Most of them are living in the urban slums and they have no access to government social protection measures like VGD and VGF cards in rural areas. They also have no right to form labor/trade union and therefore politically they have no power and voice to bargain with the factory owners. Existing situation also deter them from getting involved in any right based activities for their wellbeing.

2.2.4   Women's Occupational Hazards and Safety

Fire at Tazreen Garment Factory has caused death to 112 garment workers and the collapse of Rana Plaza to over 1000. These reveal the bizarre working conditions in Garment factories of Bangladesh. Apparently, their safety is nobody's concern. Neither the apparel retailers nor the factory owners take proper measures to ensure that such untoward incidences do not occur at their factories.

But in spite of all these loopholes in this sector, and that cheap labor is the main driver of the sector's growth, it is also fair to say that this growth has provided economic opportunities to millions of women who would have very few other options to escape extreme poverty. The garment sector, despite an extremely-low paying industry, has positively transformed the lives of many women in Bangladesh by providing economic empowerment. It is most important at this moment to ensure a safe working environment for the women workers where they can exercise their rights fully and satisfactorily.

2.3 Study Regarding Modes of Transports Used by Workers &   Roadsides Characteristics

There are about 4,000 garment industries in Bangladesh, most of which are clustered in and around the capital city. Together they account for 75 percent of the country's export earnings and employ around 1.8 million people which is almost one half of the total industrial workforce of the country. Though it is the most important economy sector of Bangladesh, unplanned and haphazardly built garment factories are also inducing many social, housing and most importantly urban transportation problems which are a great cause of concern.

2.3.1   Location of Garment Industries and Employment Situation

In order to find spatial location and employment statistics of each garment industry of Dhaka city, necessary information is collected from the head (BGMEA). Based on the gathered information a comprehensive database is developed that comprises the names, addresses and the number of employees, etc. of each garment industry that are enlisted with BGMEA till 2004 (BGMEA 2004).

Analysis of database shows a total of 2960 enlisted garment industries in and around Dhaka Metropolitan City and about 1,070,754 workers are employed in these industries (Debnath 2005). Of the total labor force about 90% are female workers. Out of the analyzed 2960 garments industries observed that nearly 62 % are found to be clustered along the primary arterials and the secondary streets of Dhaka city and are located within the central business district (CBD) areas (Haque et al. 2007). The remaining 38% are spreaded scatteredly along the city road network. Clustering is considered if more than one industry is found to be bunched together at a particular location. It also reveals that all together almost 72 % workers are working in these industries.

2.3.2   Workers Walking and Road Crossing Problems

It is reported by the garment workers that while walking, the main problem is posed by encroachment of footpaths in many descriptions (Haque et al. 2007). Besides encroachment problem, overall effectiveness of footpaths is also undermined by the presence of hazardous uncovered manholes, electric posts, signposts, traffic signals, footbridge landings etc.

This poorly sited street furniture prevents full use of the footpaths, impede visibility of road users and thereby make workers movements uncomfortable and hazardous. Eventually, in the absence of functional footpaths, the workers are pushed to walk on the active roads.

Moreover, due to foul use of road sides particularly for stacking construction materials, uncontrolled parking and placing garbage bins etc., workers are further compelled to by-pass them by going deep into the main roads and thereby increasing possibilities of road accidents. On account of inadequate network of city's drainage system, many of the city streets get flooded during the rainy season whenever there are heavy downpours and cause immense suffering to the workers.

Another threat to the pedestrian safety is often created by different utility agencies when they dig up roads for laying pipes and cables. It is also reported that while crossing roads, in general motorist show little respect to the garment workers, voluntarily drivers hardly give away any easy crossing opportunity. Instead they harass them by sounding of horn and forcing them to run away quickly. As such, as an individual, finding difficulties in roadway crossing, particularly at the mid-block, often forms group to exert pressure on the moving traffic stream.

Moreover, due to the hostile attitude of motorists, often pedestrian especially female workers who are very much neglected by the motorists, cross roads without paying

any attention to the oncoming vehicles and literally force motorist to slow down their speed. Moreover, hawker's problems at foot bridges discourage them to use the facilities particularly in the afternoon shift. On the other hand, with no standby generator facility when power failures do occur, the underpasses become blackout and unusable. Power failure as well as absence of street lighting in street lanes/by-lanes also poses security problems for the night-shift female worker

2.3.3   Modes of Transports Used by Garments Workers

From the questionnaire survey analysis (Haque et al. 2007), it is found that 26 % workers get wage in the range of Taka 1000 – 1500, 63 % get Taka 1500 – 2000 and the remaining 11% get Taka 2000 – 2500. This revelation essentially suggests that the workforce engaged in this vital sector is poorly remunerated. With this amount of take-home salary, they are compelled to live in slums and low-cost slum areas along the city periphery.

Analysis of workers' house rent expenses reveals that out of 228 workers surveyed, 19 % spends less than Taka 500 only, 48 % spends in the range of Taka 500 – 800, 18 % spends Taka 800 – 1000 and only 15 % spends more than Taka 1000 per month for this purpose. By and large those who live without family spend around 40 % of their income for house rent and are forced to live outside the built-up areas forming mess system.

It is also found that due to very low income level, poor garment workers are not only forced to live in miserable conditions at slump areas, about 88 % of the workers can't afford to pay travel expenses and are compelled to commute on foot and only 12 % of the workers use bus services. Non-availability of cheaper and female friendly public transport along their travelling direction is another main reason for the high percentage of walk trips.

Though, bicycle is considered as one of the affordable modes of transport for low income group people but as most of the workers are female, this space efficient mode are not playing any role to solve their transport problem.

Moreover, it is observed that even male workers are also not using bicycles for commuting purpose. When they were asked about this, they mentioned lack of purchasing capacity and having no secured bike-parking stands at workplaces as the main reasons for not using bicycles. Finding no other alternatives presently most of the workers are commuting on foot and quite naturally to reduce the length of walking trips they compelled to reside in those slum areas that are close to their job places.

May be because of this reason, low lying areas particularly those are located at the Eastern and Western fringes of Dhaka city are found to be the most popular residential areas of the poor garments workers. Availability of cheaper mess facilities as well as close proximity (2 – 3 km) of these areas with respect to the position of vast majority of garment industries of Dhaka city are considered to be the main reasons to choose these areas by the garment workers.

2.4 Traffic Safety Education

Pedestrian safety education can change observed road crossing behavior, but whether this reduces the risk of pedestrian injury in road traffic crashes is unknown. There is a lack of good evidence of effectiveness of safety education for adult pedestrians, specially elderly people. None of the trials was conducted in low or middle income countries.

There are many researches on safety education of pedestrians and children. But researches on safety education of garments workers are very few. As garments

workers go to work place mostly by walking, we can consider the garments workers as pedestrians. Some researches on safety education and their results are shown below.

2.4.1 Researches on Traffic Safety Education

The real traffic situation appears to be the most suitable for traffic training, whereas classroom training may be effective if certain methods are used in conjunction with audiovisual aids. The methods used in traffic training may be described as theoretical instruction, demonstrations, practical training and behavior modification. There is little evidence that theoretical instruction is effective in influencing road safety behavior. The best results seem to be obtained from demonstrations and behavior modification. Media play an increasingly important role in traffic training, the pedestrian mainly focus on table-top models, slides, film/video and print material. The most promising results are found in experiments using film or video, especially when these films are based on demonstrations following imitation-learning principles (Rothengatter 2002).

If traffic safety education is to survive as a viable countermeasure, program planning and execution must become far more scientific and evaluation must become an integral component (Ian and Johnston 1992).

2.4.2 Method of Traffic safety Education

Different methods can be used for safety educations. As for example a method of developing cartoon game on traffic safety education of Chinese people was presented. Based on the psychological characteristic of people and constructivism learning theory, the design of game scenario, character's emotion and interaction is introduced. The scene in this cartoon game is based on Gibson's theory of affordances and all the signs on objects are easily distinguished. A finite state

machine is used for expressing the emotion state of a cartoon character, and NPC (non player character) is introduced to arouse the interest of a user. The cartoon game can run both on local PC and on Internet, a user can learn safety knowledge by interactive method (Lio 2006).

2.4.3   Place of Traffic Safety Education

The knowledge and behavioral improvements can be achieved by both classroom instruction and the behavioral training, even though the latter approach appeared to be slightly superior. This suggests that instruction carried out in the classroom can be beneficial in acquiring complex psychomotor skills, which is in contrast to earlier findings indicating that classroom instruction can only affect knowledge and does not improve road crossing skills. The conclusion is reached that precise formulation of the educational objectives and use of audiovisual media are essential factors determining the effectiveness of cognitive instruction of road crossing skills in the classroom (Schagen and Rothengatter 1997).

2.5   Issues Regarding the Evaluation of Road Safety Education Programs

There are some issues regarding the evaluation of road safety educations. Some of the issues are discussed below.

2.5.1   Crash-related Outcome and the Need for Surrogate Measures

Several characteristics of crashes in combination with the objectives of road safety education weaken their usefulness as outcome criteria in evaluations (Hauer, 2008). First, the relationship between risk behavior and crashes is asymmetrical. Although about 95% of crashes can be attributed to risky behaviors or human failure (Sabey and Taylor, 1980), only an extremely small proportion of risky behavior actually results in a crash. Therefore crashes and injuries remain rare events in the population of road users.

For sufficient statistical power to demonstrate an effect on crash-related outcomes, a study would require that large numbers of participants (hundreds of thousands) be included in an education program and that their crash and injury records be monitored over a long period of time (years) (Hauer, 2008). Given the emotional and economic burden of injury and death, and the scarce financial resources available for interventions, it is neither practical nor ethical (Chalmers, 2003) to expose a large number of road users to programs of unknown quality, just for the purpose of evaluation.

Thus, surrogate outcome criteria are needed that are still predictive of crashes, but that are reliable, easily obtainable, and available in a short period of time. The theoretical basis for such a surrogate criterion may be found in two fields. In the field of road safety, it is the use of safety performance indicators (SPIs) as predictors of crashes (ETSC, 2001; OECD-ECMT, 2008). In the field of social sciences, it is the use of behavior models (BMs) to predict behavior from underlying psychological determinants (Bartholomew et al., 2006; Glanz et al., 2002). The relationship with road safety education is as follows. Road safety education aims to modify risk behavior that is known to increase crash risk (SPI), for instance drink-driving. This goal is achieved by changing one or more of the underlying psychological determinants, for instance the 'attitudes about drink-driving'.

2.5.2 Safety Performance Indicators and Predictors of Risk

Behavior as surrogate measures SPIs are variables that are causally related to crash-related outcomes,either as an empirically tested relationship or as a logicalrelationship (ETSC, 2001). For empirically-tested SPIs, the extent to which risk behavior increases crash risk is known, and therefore the effect of the intervention can be quantified in terms of crash related outcomes. For logical SPIs, this is not the case, so it can only be inferred that the risk behavior will increase crash risk. Unfortunately, 'empirical' SPIs are mainly available for 'car driving' and

not yet for other travel modes such as cycling, walking or moped riding (Hakkert and Gitelman, 2007). Thus, evaluation studies for these travel modes can only make use of logical SPIs. Similarly, behavior models (BMs) are used to assess expected effects on (road) behavior. BMs, such as the Health Belief Model or the Theory of Planned Behavior, provide theories regarding how behavior can be predicted from underlying psychological determinants (Glanz et al., 2002).

If it were possible to predict behavioral change from changes in underlying determinants, variables from a particular BM could be used as outcome criteria in evaluation studies of RSE. Of all determinants, behavioral intention is the strongest determinant of behavior (Glanz et al., 2002). Intention mediates the influence of other predictors, such as attitudes and knowledge, on behavior and indicates "How hard one is prepared to try, or how much effort one will exert, in order to achieve desired outcomes" (Webb and Sheeran, 2006).

To assess the actual strength of the intention-behavior relationship after an intervention, (Webb and Sheeran , 2006) conducted a meta-analysis of randomized controlled trials, and concluded that a large change in intention only resulted in a medium-to-small change in behavior. This finding confirmed again the intention-behavior gap, but further analyses also showed the conditions under which this gap was greatest, namely:

(a) When participants lacked control over the behavior,

(b) When the behavior was performed in a social context, for instance smoking and drinking with friends, and

 Although these conclusions were not differentiated by age group, some of these characteristics may have an even greater impact on young adolescents.

Lack of control especially may play a stronger role among adolescents than among adults, because of adolescents' greater impulsiveness (Gerrard et al., 2008; Gibbons

et al., 2009; Gibbons et al., 2002; Reyna and Farley, 2006), their still developing cognitive and executive skills (Blakemore et al., 2007; Blakemore and Choudhury, 2006), and their inexperience as road users (Twisk and Stacey, 2007; Vlakveld, 2011).

In addition, the influence of the social context may differ between adolescents and adults, because of peer pressure that leads to adolescents taking greater risks in the presence of peers than when being on their own (Brown, 2004; Gardner and Steinberg, 2005; Sumter et al., 2009). In studies of young adolescents, changes in behavior intentions may be a less reliable proxy for actual behavior changes than for adults. Behavior change, rather than change in intention, is thus the preferred criterion for evaluation studies involving this age group.

2.5.3 Observation of Behavior Versus Self-Report

For the measurement of behavior, two methods are at a researcher's disposal: observations of road behavior and self reports by means of questionnaires and diaries. Observations generate rich and reliable data but, because of the high financial costs, often include a relatively small and/or unrepresentative sample of participants, and are restricted to only a few behaviors and traffic situations. Self-report surveys, on the other hand, are less costly and therefore can include large numbers of participants, and focus on a wide range of behaviors and situations. This feature improves the generalisability of the data, but the accuracy of the reports may be questioned (Wahlberg, 2009). It is beyond the scope of this article to provide a full account of all the evidence, but from these general characteristics of the two methods, one could conclude that when road behavior strongly varies among subgroups (age, gender, social economic status), trip circumstances (trips to school versus trips to a party), and social situations (the presence of friends), self-reports may provide a more complete picture than observation.

To study the validity of such self-reports among young adolescents, (Elliott & Baughan ,2004) reviewed the literature and concluded, based on the few studies that had actually assessed the strength of the relationship, that 'there is little reason to assume that self-reported behavior will not serve as a good proxy for more objectively measured behavior. Further, (Twisk et al., 2014 (forthcoming) analyzed the relationship between self-reported risk behavior and self-reported crash involvement among young adolescent cyclists and pedestrians, and found that self-reported risk behavior explained 6% to 11% of the variance in self-reported crash involvement. Given the low frequency of crashes and the asymmetrical relationship with risk behavior (Hauer, 2008), this predictive power is rather strong, and supports the validity of self-reported risk behaviors as surrogate criteria for RSE program outcomes, especially for those risk behaviors that strongly vary by subpopulations and by contextual factors such as the presence of peers and trip conditions. In contrast, if an RSE program focuses on specific competencies and skills, such as road crossing (Duperrex et al., 2009) or interactions with trucks (Twisk et al., 2013), observation of small samples of participants performing strictly defined tasks may provide reliable estimates of skill acquisition.

2.6   Safety Programs and Program Types

Five road safety programs were evaluated in their field settings. All five programs aimed to improve safe behavior by raising risk awareness rather than by improving road competence (Twisk et.al, 2014) Self-reported behavior was thus the preferred method to assess the effects. In the present study, a quasi-experimental design was used (Cook and Campbell, 1979), which involved a comparison between pre- and post-test scores of an intervention group and a reference group. A quasi-experimental design differs from a 'true' experiment in the sense that the participants are not randomly assigned to one of the experimental conditions. The road safety programs were recruited and selected for evaluation if the following qualitative criteria were met the program:

(a) Addresses risk behavior,

(b) Is well established in the field, meaning that the program has been delivered on a regular basis and

Policy makers fund the program because of its assumed effectiveness.

This information was obtained by a short questionnaire among policy makers and education professionals. All programs were classroom-based but differed in duration from a few hours to a full day. The program also differed in approach and delivery. Three 'cognitive' programs aimed to deter youngsters from taking risks by improving their understanding and insight through information and demonstrations of the safety-critical features, such as braking/stopping distances, limitations in visual perception and reaction times, and the vulnerability of the human body. These programs assumed that information and personal experiences were sufficient to generate behavioral change. Two 'fear-appeal' programs aimed to deter youngsters from taking risks by eliciting fear and informing them about the negative and often gruesome consequences of risk behavior. These programs used videos of crashes and personal accounts of road victims and assumed that the generated fear and anticipated regret were sufficient for behavioral change. Fear appeal programs are popular with policy makers, but are often less effective than commonly believed.

For instance, studies of the effect of fear appeal in health related programs showed that fear appeal programs are only effective when a person feels sufficiently competent to deflect the risk (efficacy) (Peters et al., 2012). Fear appeal may have different effects on road behavior. The threats may–theoretically–be neutralized

by the actor's perceived 'superior' road skills, his perceived efficacy. The present study compares the effects of cognitive and fear-appeal programs on self-reported risk behavior among young adolescent.

2.7   Role of Different Organizations in Providing Road Safety Educations

Roles of some institutions for traffic safety education are discussed below.

2.7.1   Role of High Schools providing Road Safety Educations:

Young workers (15–24 yrs old) have a disproportionately high rate of injuries in the workplace and many are employed on a casual, temporary or intermittent basis, in jobs that require low technical skill (Thamrin et al., 2010). One approach to reducing the burden of young worker injury is through improvements in the provision and effectiveness of safety training, initially at school and then in the workplace. The value of school-based introductory safety training can be inferred from a study in Canada which found that only one in five employees had received safety training in their first year with a new employer (Smith and Mustard, 2007).

In an Australian survey of 270 workplaces in the hospitality industry, the need for improvement in induction training for young workers was highlighted (Hicks, 2009). Indeed, the importance of providing occupational safety education in the secondary school setting has been widely recognized (Davis and Pollack, 1995; U.S. Department of Health and Human Services, 1995; NIOSH, 1999; Schulte et al., 2005).

To improve school-based education, consistency and effectiveness are two aspects that have been identified as requiring further attention. A report for the European Agency for Safety and Health at Work revealed inconsistency in approaches to occupational safety education, both between and within member states (Sas, 2009). It has been argued that, the quantity and quality of occupational safety education is largely at the discretion of the instructor and school (Sas, 2009; Salminen and Palukka, 2007; Schulte et al., 2005). The quality of education may be influenced by the teacher's enthusiasm and experience, the availability of time and resources, and

the level of engagement of the students themselves (Burkeet al., 2006). Internationally, there is a vast quantity of occupational safety information and resources, including those specifically for high school students. However, there appears to be limited evidence for the effectiveness of the resources or programs.

While there is evidence that school-based educational programs have the potential to increase knowledge about safety (Lerman et al., 1998; Linker et al., 2005), it cannot be assumed that this knowledge will translate to safe behavior and ultimately, injury reduction. A recent analysis of workplace safety education initiatives for young workers in Canada described current approaches as informational rather than instructional. Specifically, it was suggested that current programs largely fail to promote self-advocacy, considered a critical factor in enabling safety knowledge to be put into practice (Chin et al., 2010).

Thus, there is a need for more research focused on attaining a better understanding of how school-based occupational safety education can be made effective in positively influencing behaviors, and on the complementary roles of industry- and school based training. Key informants of the situation in schools are the teachers themselves, the perspectives of whom have received little attention in the literature (Salminen and Palukka, 2007). In this combined qualitative and quantitative study of teachers in South Australia, we sought to systematically assess teachers' approaches and attitudes regarding school-based occupational safety education, and to identify teacher attributes, school characteristics and teaching methods most predictive of effective learning (according to teachers' perceptions). The main focus of this paper is on introductory occupational safety education provided prior to work experience programs usually offered in 10th grade, and corresponding approximately to the minimum working age of 15 years.

2.7.1.1   Occupational Safety Education in South Australian High Schools

The education system in Australia is broadly similar to that in other developed countries, comprising compulsory primary and secondary education and non-compulsory tertiary education. Secondary education (or high school) comprises year levels 8–12, and is compulsory to year 10. Schools in South Australia (a State of 1.6 million persons), both Government and non-Government, are required to follow the same curriculum framework, which allows for some flexibility.

At senior secondary level (years 10–12), students study a combination of compulsory and elective subjects. All schools offer pathways to both vocational education and university. Occupational safety education may be delivered to high school students in one of two ways: (1) within a subject (as a topic or to prepare students for subject-related work placements) or (2) to prepare students for work experience programs, usually conducted in year 10, in which the almost all students participate, regardless of subject choice. In South Australia, various teaching resources are made available to the state's 211 high schools, including Passport to Safety, a Canadian-developed resource, and Workplace Learning Guidelines published by the educational authority, the Department of Education and Children's Services [DECS] (2008). Although the latter are provided to assist schools' compliance with the duty of care requirements, the extent to which they are applied is uncertain.

2.8   Methodologies Involved in the Studies and their Lacking

From the discussion above, we understand how much priority we should give on garments worker as pedestrian.

Previously many researches have been undertaken on garments workers. They are mostly on health safety, working environment. By those researches they didn't consider the mentality of the garments workers. A less number of works have been done on road safety of garments workers. But in our study we are giving more

importance to the mentality of garments workers regarding the traffic safety by statistical modeling and data collecting through a very standard and functional survey. By this study we will able to know the workers who got their safety educations from which sources. It will help us to select the workers for safety education.

CHAPTER THREE: METHODOLOGY

In this study, the target population for the random collection of survey samples consists of workers in the following garments factories:

- ➢ Sayem fashion ltd.
- ➢ Radiant sweater industries ltd
- ➢ Savar Sportswear company ltd.,
- ➢ Aziz Group Of Industries
- ➢ M/S Spicy Fashion Ltd.
- ➢ Goldstar Garment Ltd
- ➢ Big Boy's apparels ltd.
- ➢ Islam garments

3.1 Justification for Choosing the Sites:

The first two industries are located in a spot near the Dhaka- Mymensingh highway (Total no. of accidents 831, from 1998-2010), and third one is near Dhaka-Ashulia Highway, which are one of the most accident prone zones of Bangladesh where a large number of victims are shortlisted to garments workers only. Fourth one is located at Tejgaon industrial area, Dhaka, fifth one is located at Mirpur, sixth one is located at Shamoli & the last two is located at Gulshan area, Dhaka. These two are also accident prone zones (Total no of accident 9125, from 1998-2010) [5]. The authors believe that these garments would fix and fit to most average pictures of the situations throughout the Dhaka city regarding situations where garment industries are located alongside of a major highway.

3.2   Questionnaire Design

A study based on students' perception as pedestrian risk [6] was consulted for the design of questionnaires for this study. Some of the questions are directly relevant to this study and are accepted as it is; some has been curved to make it appropriate with the objective of the study. Pedestrian safety education was assessed by a scale using two terms with response categories "Yes" or "No" to measure whether the concerned worker has any safety knowledge. Later this response has been converted as dependent variable by expressing in binary variable (1= knowledge obtained from different sources. In our study the response variable get any safety knowledge or have no idea about safety education, is a binary or dichotomous variable

A sample question is given below:

1   <u>What is your sex?</u>

[ ] Male   [ ] Female

2   <u>Which age group do you belong to?</u>

[ ] below 18   [ ] 19 to 20   [ ] 21 to 22   [ ] 23-24   [ ] 25+

3   <u>What is your household monthly income before tax?</u>

[ ] < 5000   [ ] 5001-10000   [ ] 10001-15000   [ ] 15001-20000
[ ] >20000

4   <u>How many family members are there in your household?</u>

5   <u>What is your marital status?</u>

[ ] Married   [ ] Unmarried

6   How many kids do you have?

[ ] No Kid   [ ] One Kid   [ ] Two Kids   [ ] More than Two Kids

7   What is your usual mode of travel?

[ ] Transit (Bus, Tempo)   [ ] CNG, Taxi Cab   [ ] Walking
[ ] Bicycle, Rickshaw   [ ] Motorcycle   [ ] Car

8   On an average, how many hours do you walk in a week?

9   Do you have any physical disability?

[ ] No Defects   [ ] Hearing Problem   [ ] Eye Sight Problem [ ] Others

10 In which area do you work?

[ ] Ashulia   [ ] Dhaka-Mymenshing   [ ] Gulshan-1   [ ]Tejgaon
[ ] Others

11 What is the distance from your home to your workplace?

[ ] Less than 1Km   [ ] 1Km to 3Km   [ ] 3Km to 5Km   [ ] More than 5Km

12 Have you ever involved with an accident while walking?

[ ] Yes   [ ] No

13 Have you ever seen a pedestrian involved with an accident?

[ ] Yes   [ ] No

14 Have any of your friends or relatives ever been involved with an accident?

[ ] Yes   [ ] No

15 How long have you been working in this sector?

16 What's your educational qualification?

17 How many years have you been living in Dhaka?

18 How much money do you spend in each month for transportation purpose?

19 Have you ever attended any safety training where pedestrian safety issues are discussed?

[ ] Yes   [ ] No

20 Have you received any safety education?

[ ] No safety education   [ ] TV/Radio   [ ] Newspaper
[ ] Traffic Police Week   [ ] Others

2.3 Statistical Modeling

Logistic regression model has been utilized in this study which is one of the most widely studied and applied statistical and econometric techniques. In this model, the logit is the natural logarithm of the odds or the likelihood ratio that the dependent variable is 1 (have safety education) as opposed to 0 (non-safety knowledge). The probability P of a hit-and-run is given by

$$Y = \text{logit }(P) = \ln (P/1\text{-}P)\ \beta X \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(1)$$

Where β is a vector of parameters to be estimated and X is a vector of independent variables. When an independent variable xi increases by one unit, with all other factors remaining constant, the odds increase by a factor $\exp(\beta i)$ which is called the odds ratio (OR) and ranges from 0 to positive infinity . It indicates the relative amount by which the odds of the outcome (safety knowledge) decrease (OR>1) or increase (OR<1) when the value of the corresponding independent variable increases by one unit.

CHAPTER FOUR: DATA ANALYSIS & MODEL DEVELOPMENT

A number of variables, assumed to have relations to the traffic safety perception of each garments worker interviewed were selected and assessed at a 90% confidence interval. In the final model 20 individual variables proved to have statistical significance. That means 20 variables are affecting to acquire or not acquire of safety knowledge. A total of 500 samples were collected. The formation of variables from the questionnaire survey as well as their mean and standard deviation is presented in Table 4.1. Some of the discarded variables from the final model for their statistical insignificance are number of kids in a family, marital status, education level etc.

Using the software 'STATA' a logistic regression model analysis was applied to analyze the data.

By developing logistical regression model from the collected data, we will find the group of workers who lacks on safety education.

TABLE 4.1: Summary Statistics of Variables

Explanatory Variables	Description of Variables	Mean	Standard Deviation
Transport cost <200tk	Transport Cost<=200tk = 1; Otherwise=0	0.106	0.308146
Gender	Male=0; Female=1	0.18	0.384
Age less than 18	<18=1; otherwise=0	0.032	0.176
Age 18 to 20	18<Age<=20=1; otherwise=0	0.198	0.398
Age 20 to 22	20<Age<=22=1; otherwise=0	0.262	0.44
Age 22 to 24	22<Age<=24=1; otherwise=0	0.296	0.456
Greater than equal 25	>=25=1; otherwise=0	0.212	0.409
Income less than 5000	<5000=1; Otherwise=0	0.214	0.41
Income 5000-10000	5000<income<10000=1; otherwise=0	0.554	0.497
Income 10000-15000	10000<income<15000=1; otherwise=0	0.226	0.418
Income Greater than 15000	<15000=1; otherwise=0	0.006	0.007
Living with Family Member	If living with family member=1; otherwise=0	0.514	0.5
No Kid	No kid=1; otherwise=0	0.518	0.5
One Kid	1 kid=1; otherwise=0	0.192	0.394
Two Kids	2 kids; otherwise=0	0.19	0.392
More than two kids	3<= kid=1 ; Otherwise=0	0.1	0.3
Any Accident seen	No=1; Otherwise= 0	0.476	0.503
Any Relative Involved in Accident	No=1; Otherwise= 0	0.336	0.473
No Defects	No defect=1; otherwise=0	0.854	0.353
Hearing Problem	Hearing Prob=1; otherwise=0	0.042	0.2
Walking problem	Walking prob=1; otherwise=0	0.034	0.181
Other Physical problem	Other physical prob=1 ; otherwise=0	0.07	0.255

TABLE 4.1: Summary Statistics of Variables

Explanatory Variables	Description of Variables	Mean	Standard Deviation
Using Public Transit as mode of Transport	Public Transit=1; otherwise =0	0.322	0.467
Using three wheelers (CNG driven) as mode of Transport	Three wheelers (CNG driven)=1; Otherwise=0	0.006	0.077
Using Walk as mode of Transport	Walk=1; otherwise=0	0.468	0.499
Using Cycle as mode of Transport	Cycle=1; otherwise=0	0.202	0.401
Using Motorcycle as mode of Transport	Motorcycle=1; otherwise=0	0.002	0.044
Using Car as mode of Transport	Car=1; otherwise=0	0	0
Walking hour <1hr. per week	Walking hour <1= 1; otherwise=0	0.04	0.196
Walking hour 1- 4 per week	1<Walking hour <4= 1; otherwise=0	0.514	0.5
Walking hour 4-7 per week	4<Walking hour <7= 1; otherwise=0	0.24	0.427
Walking hour 7- 10 per week	7<Walking hour <1= 1; otherwise=0	0.102	0.302
Walking hour >10 per week	Walking hour >10= 1; otherwise=0	0.104	0.305

TABLE4.1 : Summary Statistics of Variables

Explanatory Variables	Description of Variables	Mean	Standard Deviation
Ashulia	Ashulia=1; Otherwise=0	0.278	0.448
Dhaka-Mymensing	Dhaka- Mymensingh=1; Otherwise=0	0.216	0.411
Gulshan	Gulshan=1; Otherwise=0	0.364	0.481
Tejgaon	Tejgaon=1; otherwise =0	0.006	0.077
Other Area	Other Area=1; Otherwise=0	0.136	0.343
Home distance less than 1km	Home distance<1km=1; otherwise=0	0.584	0.493
Home distance 1-3km	1 km<Home distance<3km=1; otherwise=0	0.29	0.454
Home distance 3-5km	3 km< Home distance <5km=1; otherwise=0	0.098	0.297
Home distance > 5km	Home distance>5km=1; otherwise=0	0.028	0.165
Work experience <1 year	Work Exp.<1yr =1 ; otherwise =0	0.05	0.218
Work experience 1-3 years	1yr<Work Exp.<3yr =1 ; otherwise =0	0.294	0.456
Work experience 3-5 years	3yr<Work Exp.<5yr =1 ; otherwise =0	0.26	0.439
Work experience 5-7 years	5yr<Work Exp.<7yr =1 ; otherwise =0	0.168	0.374
Work experience 7-10 years	7yr<Work Exp.<10yr =1 ; otherwise =0	0.138	0.345
Work experience >10 years	Work Exp.>10yr =1 ; otherwise =0	0.09	0.286
Transport cost 200-500tk	200tk<Transport Cost<=500tk = 1; Otherwise=0	0.408	0.491955
Transport cost 500-700tk	500tk<Transport Cost<=700tk = 1; Otherwise=0	0.258	0.437972
Transport cost 700-1000tk	700tk<Transport Cost<=1000tk = 1; Otherwise=0	0.164	0.370646
Transport cost >1000tk	Transport Cost>=1000tk = 1; Otherwise=0	0.064	0.244998

CHAPTER FIVE: RESULT &DISCUSSION

The estimation results for the final model are shown in Table 5.1 & 5.2. Based on the *p*-values of the *t*-tests, 65 variables from 20 factors were found to be significant ($p \leq 0.05$) or marginally significant ($p \leq 0.1$).

By inputing the data in the 'stata' software at first we find the goodness of the feet. Total number of observation was 500, Where the pseudo R2 is 46.84%, log likelihood is -139.24555, LR chi2 for 20 obsrvation is 245.38 and probability> chi2 is 0. So, we can say that the health of the model is good.

Then by the software we can find the 'odd ratio' and 'P value'. 'P value' less than 0.1 is taken as significant as the confidence level of the model is 90%. From these significants where the value of odd ratio is less than 1, those category of garments workers are concerned about road safety and if the odd ration is more than 1, those groups are vulnerable and they need road safety education.

Details in the form of tables are given below.

TABLE 5.1: Goodness of Fit

Number of Observation	500
Pseudo R2	0.4684
Log likelihood	-139.24555
LR chi 2 (20)	245.38
Probability>chi 2	0

TABLE 5.2: Results by Logistic Regression Analysis

Variables	Odds Ratio	P>|z| - value
Gender	.153	<0.001
Age 20 – 22yrs.	2.212	0.062
Age 22- 24yrs.	2.579	0.024
Income 10000-15000	2.365	0.055
Living with Family Member	.645	<0.001
More than two kids	4.351	0.012
Walking hour 1- 4 per week	4.024	<0.001
Walking hour 7- 10 per week	0.304	0.006
Ashulia	4.947	0.001

TABLE 5.2: Results by Logistic Regression Analysis

Variables	Odds Ratio	P>|z| - value
Gulshan	31.323	<0.001
Home distance less than 1km	12.261	0.007
Home distance 1-3km	6.382	0.034
Home distance 3- 5km	4.243	0.009
Any Accident seen	1.776	0.092
Work experience 5- 7 years	0.444	0.056
Using Walk as mode of Transport	0.235	0.012
Using Public Transport (Bus, Tempo) as mode of Transport	0.350	0.063
Hearing Problem	9.452	0.004
Any Relative Involved in Accident	0.474	0.051
Transport cost less than 200tk	2.363	0.087
constant	1.611	0.684

5.1 Result Analysis

The odd ratio (.15) for gender is less than one which indicates that the female is well aware of safety knowledge comparing with their male counterpart. Perhaps female are more concerned about their safety issues and try to learn more about it. Both the age group >20 to 22 (odd ratio=2.212) and >22 to 24 receives less safety information comparing with other age categories. Perhaps more age of the worker are less concerned about their safety as they feel confident when aged and neglect safety issues.

If a RMG worker having monthly income in between 10000 tk.to 15000 tk. he doesn't receive safety education from different sources (OR=2.365). This income group is relatively at the higher income category among the RMG workers. Perhaps they are over confident due to their experience, hence ignore safety issues.

Personal life also seems to have influence on safety consciousness of workers. The workers who belongs to a family (OR=0.64) appear to be more concerned about road traffic safety knowledge acquisition compared to the workers who have no family responsibility. A probable reason could be carelessness caused by lack of "feelings of responsibility" by non-family workers. The study also finds a keen relationship between the numbers of children under a worker's parentage and the worker's road safety awareness. The odd ratio is 4.35 for people who have more than two kids. This result indicates that having more kids make the RMG workers less cautious about their safety. More kids perhaps make workers busier to earn their livelihood and it is likely that they get less chance to gather safety information.

Our model result justifies that eye- witness of an accident make does not make more conscious of acquiring safety knowledge (OR= 1.77). Unfortunately direct observation of an accident doesn't have any impact on the mind of the RMG worker

by taking initiative of gaining traffic safety knowledge. May be the workers are too busy with their work that they forget the incident. However, the result is reverse if any relative of the RMG worker involved in the accident (OR=0.47). As it's a case of relative this group of worker may not forget the incident and more cautious about their safety issues by acquiring knowledge.

Workers who use public transit and walk as their main mode of transport are more prone to get road safety knowledge from different sources (OR= 0.35 and OR=0.24 respectively). Perhaps these groups feel that they are more vulnerable comparing to those who use other mode. Therefore, they give more emphasis on safety.

As expected, workers who walk less (<4 hrs. but>1hrs in a week) receives less safety knowledge (OR=4.02) and workers who walk more (<10 hrs. but > 7hrs.) gathers more safety knowledge from different sources (OR= 0.30). Perhaps more walking group is more aware about the hazards on roads that are why they are more interested about safety issues. On the other hand, less walking group are less cautious about safety issues may be because of less exposure to traffic hazard. People who have working experience 5-7 years are more aware to gather safety education from various sources. Probably after working several years they are calm and composed and understanding the importance of safety.

As expected if the distance between home and workplace is less, the tendency of receiving traffic safety knowledge is negative (OR= 12.26; OR= 6.38 and OR= 4.24 respectively for Home distance less than 1km; Home distance 1-3km; Home distance 3- 5km). As the workers of these categories does not travel more traffic safety consciousness may not be grown to them as they are less expose to traffic. Result in Table 2 shows that if a worker is in a low spending group for transportation purpose he is less interested to gain safety knowledge(OR=2.36). It is likely that this group represents the lowest income group and they are concerned about safety knowledge.

Location of the industry was found to have influence of receiving safety education. Workers having their workplace at Ashulia are less interested to gain safety knowledge (OR 4.95). The reason of this finding is not very clear as these industries are generally established beside the highway. As expected, the workers in the industries in Gulshan area are less concerned about safety knowledge (OR= 31.22). Gulshan area is a residential area within the city center and low- speed traffic is observed due to traffic congestion. Due to less vehicle speed the workers feel less threat regarding safety which perhaps makes them less concern about safety issues.

According to the result of the study physical condition of the workers plays a significant role in case of receiving safety education. Specifically, RMG workers who have hearing problem are not interested to take safety education from different sources (OR= 9.45).The result is expected as physically challenged person having hearing problem are facing difficulties to capture any campaign regarding safety. Therefore, they may be less interested of acquiring safety education.

CHAPTER SIX: CONCLUSION

This study was conducted among 500 garments' workers to capture the actual scenario of the penetration of road safety knowledge dissemination. The objective of the study was to investigate the factors which influence of getting safety education/ knowledge from different sources. This study identified the target group of garment workers who are vulnerable from road safety perspective and require safety education. This study helped to select the garments workers who have least knowledge or no knowledge of traffic safety. The results of this study can be used for planning traffic safety campaigns for the most vulnerable RMG workers based on their self-reported traffic safety perceptions. It can also be considered as a pilot study for a national study to find ways to minimize the traffic related injuries among the RMG workers of this country. If a training program on traffic safety is to be organized throughout the nation, there will be huge cost involved in this process.

This study reveals that not everyone in the industry needs training on traffic safety. For example, according to our study a RMG worker will be in vulnerable group if he has the following characteristics and require safety training on urgent basis:

- (i)   Age 20- 24
- **(ii)**   Income 10000- 15000 tk/ month
- **(iii)**   Having more than two kids
- **(iv)**   Working in an industry situated in Ashulia or Gulshan area
- **(v)**   Walking 1-4hrs in a week
- **(vi)**   Distance between home and workplace is between zero to five kilometer
- **(vii)**   Transport cost less than 200tk in a month
- **(viii)**   Having hearing problem
- **(ix)**   Observed any accident

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