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*Multi-Knowledge Electronic Comprehensive Journal*  
*for Education and Science Publications (MECSJ)*

ISSN ONLINE ( **2616-9185** )

**ISSUE ( 7 ) , 2018**





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## Aim & Scope

**Aims to enhance the level of published articles by improving integrity, morals and keeping papers in high professional standards to spread the good knowledge to all up-coming researches, scholars and scientists. So, the main objective of MECS is to advance the professionalism level of existed research, and to enhance the focus on new emerging trends.**



# Colorectal Cancer and Folate pathway, 19-basepair deletion in particular: A review article

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## Abstract

*Background:* Colorectal cancer is a major cause of mortality and morbidity in Jordan and worldwide. Abnormality of DNA methylation is a possible mechanism for the development of cancer. Dihydrofolate reductase (*DHFR*) is involved in DNA methylation. Genetic polymorphisms in the *MTHFR* gene may result in altered enzyme function, thus affecting cancer susceptibility and treatment response to antifolate cancer therapeutics.

*Aim:* this study aims to review the 19-basepair deletion polymorphism of *DHFR* gene characteristics and CRC, chemotherapy and the relationship between them.

*Results:* according to studies, there was an association between cancer and genetics as well as different polymorphisms, particularly, *DHFR* gene and 19-19-basepair deletion polymorphism. The association was noticed in response and having cancer in life.

*Conclusion:* cancer, in general, is one of the most important topics to be studied in present due to its high prevalence in the world. CRC by itself is one of the most vital issues in researches as it is highly variable and prevalent in different countries especially in Middle East and Jordan. The relationship between genetics, 19-basepair deletion particularly and different diseases are confirmed. However, its relationship with CRC is not very well defined. Accordingly, this topic needs further research with different methodologies and in contrast to different factors, in order to have a clear statement about this issue.

**Keywords:** Colorectal cancer, *DHFR* gene, Jordan



## 1. Introduction

### I. 1.1 CANCER AND COLORECTAL CANCER

**II. CANCER IS A TERM GIVEN TO A GROUP OF RELATED DISEASES. IN ALL TYPES OF CANCER, SOME OF THE BODY'S CELLS START TO DIVIDE IRREGULARLY AND MIGHT PROPAGATE TO OTHER TISSUES (NATIONAL CANCER INSTITUTE, 2015).**

*Cancer can start almost anywhere in the human body, which is made up of trillions of cells. In normal condition, human cells divide and multiply to make new ones as needed. When cells aged or become damaged, they die, and new cells take their place (National Cancer Institute, 2015). In cancer, however, this orderly process fails. As cells become more abnormal, aged or damaged cells survive at the time where they should die, and new cells form when they are not needed. Tumors will be formed which is abnormal growths because of the irregular division of these extra cells. (National Cancer Institute, 2015). Colorectal cancer (CRC) can be defined as a malignancy of the epithelial of the large bowel. The estimations say that 1 million new cases are being diagnosed yearly with a mortality rate of 52%. Most of the cases are diagnosed in the developed world with a rate of 64% men and 66% women which suggest that the environment and genetics are considered factors that influence its incidence (Ferlay et al., 2010).*

CRC is the third cancer in terms of prevalence, and the fourth in terms of causing death.. The highest incidence of CRC has been recorded in the industrialized regions of North America, Central Europe, New Zealand and Australia and lower in Asia, Africa and South America (Ferlay et al., 2010).

### 1.2. GENETICS AND COLORECTAL CANCER

At least one-third of all CRC is thought to have a genetic component (Lichtenstein et al., 2000), but only about 5% is explained by the high-penetrance familial syndromes (Merg, Lynch, Lynch, & Howe, 2005). These syndromes, however, give an insight into some of the important genes in colorectal carcinogenesis.

**III. THE COMPLEXITY OF THE ROLE OF FOLATES IN THE CELL ARISES FROM THE INVOLVEMENT OF THE AVAILABILITY OF ONE-CARBON UNIT FOR NUCLEOTIDE SYNTHESIS AS WELL AS FOR METHYLATION OF DNA, HISTONES, AND OTHER PROTEINS (NOVAKOVIC, STEMPAK, SOHN, & KIM, 2006). FOLATE LEVELS ALTERATION IN THE CELL CAN BE ASSOCIATED WITH IRREGULAR DNA REPAIR AND METHYLATION, WHICH INCLUDE ELEVATED GLOBAL DNA HYPO- AND HYPERMETHYLATION OF PROMOTERS OF TUMOR SUPPRESSOR GENES. COLON CARCINOGENESIS INVOLVES ALL OF THESE EVENTS (ULRICH, CURTIN, SAMOWITZ, ET AL., 2005). THE KEY ENZYMES IN FOLATE PATHWAY ARE METHYLENETETRAHYDROFOLATE REDUCTASE (MTHFR), METHIONINE SYNTHASE (MTR), METHIONINE SYNTHASE REDUCTASE (MTRR), REDUCED FOLATE CARRIER 1 (RFC1), AND DIHYDROFOLATE REDUCTASE (DHFR). THE ACTIVITY OF ENCODING THESE ENZYMES MAY BE ALTERED BY POLYMORPHISMS IN GENES, WHICH MIGHT, CONSEQUENTLY, INFLUENCE COLON CARCINOGENESIS (ULRICH, CURTIN, POTTER, ET AL., 2005).**

### 1.3. IMPORTANCE OF THE STUDY

CRC is considered a major health issue in Jordan since it is ranked the first most common cancer among males and the second among females. It is also classified as the fourth most deadly type of cancer after lung, breast cancers and leukemia (Tarawneh & Nimri, 2012). Throughout the development of adenocarcinomas, a number of molecular, cellular, and histological changes cause a shift from normal epithelium to adenoma and, finally, to cancer. These alterations can be caused both by genetic and non-genetic events (Blanco-Calvo, Concha, Figueroa, Garrido, & Valladares-Ayerbes, 2015).

Folate metabolism is crucial for the DNA synthesis. At a cellular level, the blockage of the folate metabolism leads to a defective incorporation of uracil into the DNA chain. Recently, it is assumed that alteration of DNA methylation is associated with carcinogenesis and low methylation has been noticed in almost all cancers, especially colorectal cancer (Osian et al., 2009).

Dihydrofolate reductase (DHFR) is one of the main enzymes of the folate pathway catalyzes the NADPH dependent reduction of dihydrofolate (DHF) to tetrahydrofolate (THF) (Hayashi et al., 2012). This activity of DHFR enzyme is crucial for the biosynthesis of purine and thymidine, which is required for DNA polymerization (Selga, Noe, & Ciudad, 2008).

In 1956, 5-Fluorouracil (5-FU) was synthesized as a nucleic acid metabolism inhibitor and is one of the most widely used antineoplastic agents. The major growth-inhibitory effect of 5-FU has been associated

with its metabolites, fluorodeoxyuridine monophosphate (FdUMP) and fluorouridine triphosphate (FUTP). Thymidylate synthetase (TS) is the target enzyme of 5-FU which F-dUMP binds covalently to it in the presence of N5, N10 methylenetetrahydro-folate (methylene THF), in order to block DNA synthesis by forming a ternary complex. FUTP is incorporated into a various class of RNAs and inhibits the normal metabolism of RNAs. The resistance to 5-FU greatly influences the efficacy of cancer chemotherapy.. As a result, it was urgent to study the mechanism of the cellular resistance to 5-FU. Many reports have said that TS increment is responsible for 5-FU resistance. Therefore, in 5-FU-resistant cells, DNA is formed though due to excess of TS which produce thymidine monophosphate (TMP). It has been found that a co-enzyme of TS called methylene THF had to increase in 5-FU resistant cells in order to produce TMP normally. This methylene THF is a reduced form of DHF, consequently, DHFR level would be high in 5-FU resistant cells so that enough amount of methylene THF would be supplied (Konishi et al., 1990).

#### 1.4. THE AIM OF THE STUDY AND RESEARCH QUESTIONS

this study aims to review the *19-bp deletion* polymorphism of DHFR gene characteristics and CRC, chemotherapy and the relationship between them.

Based on this, the research questions for this paper are:

- What are the main factors that made CRC one of the most studied topics by researchers?
- What are the variables in CRC?
- What is the role of genetics in Cancer in general? And in CRC particularly?

## 2. Literature Review

### 2.1 Colorectal cancer overview

Colorectal cancer (CRC) is cancer occurs in the epithelial tissues of either the colon, the mucosal colonic polyps, or the rectum. The rectum is defined as the distal 15 cm of a bowel, measured in the anal verge. The colon is located from the terminal ileum and the ileocecal valve to the beginning of the rectum (Cappell, 2005).

It is believed that genetic and environmental factors enhance the development of CRC. The risk of CRC increases with age, however, patients of all ages are at risk (Tarawneh & Nimri, 2012).

CRC arises from benign neoplasms and develops into adenocarcinoma through a gradual histological progression sequence, proceeding from either adenomas or hyperplastic polyps/serrated adenomas. Genetic alterations are associated with specific steps in this polyp-adenocarcinoma sequence and are known to drive the histological progression towards colon cancer (Butterworth, 2006).

Patients' survival is directly linked to the metastasis of primary colorectal tumors and accounts for 90% of patients' mortality. About half of the subjects with CRC can be cured by surgery and multimodal treatment, but therapy choices are restricted especially for metastasized patients. This is demonstrated by 5-year-survival rates of higher than 90% for early-stage patients, 65% for patients with regional lymph node metastases, and less than 10% in patients with metastatic disease (Koelzer et al., 2015).

## *2.2 Incidence and epidemiology*

In 2015, an expected 1,658,370 new cases of cancer will be diagnosed in the United States and 589,430 people will die from the disease (National Cancer Institute, 2015).

The number of new cases of cancer (cancer incidence) is 454.8 per 100,000 men and women per year (based on 2008-2012 cases) (National Cancer Institute, 2015).

The number of cancer deaths (cancer mortality) is 171.2 per 100,000 men and women per year (based on 2008-2012 deaths) (National Cancer Institute, 2015).

The age-standardized incidence rate (ASR) of CRC globally is 20.1 per 100,000 males and 14.6 per 100,000 females. The ASR is 40.0 in males and 26.6 in females in the developed parts of the world; in less developed areas, the rates are 10.2 and 7.7 in males and females respectively (Ferlay et al., 2010).

The highest ASRs in males are observed in Australia/New Zealand (48.2), followed by North America (44.4) and Western Europe (42.9). While, the lowest rates were found in South-Central Asia (4.7) and Central Africa (2.3) (Ferlay et al., 2010).

Cancer is one of the leading causes of morbidity and mortality in Jordan. Cardiovascular disease comes the first at the scale of mortality with a percentage of 35.9 while cancer is considered as the second cause of death (14.6%) (Ferlay et al., 2010)

The total number of registered new cancer cases in 2010 was 6820, with a percentage of 72.2 Jordanians (4921 cases compared to 4798 cases in 2009), a number of (4849) invasive cancers were registered while the rest of registered Jordanian cases (21) were in situ carcinoma (Tarawneh & Nimri, 2012).

CRC is one of the top ten prevalent cancers among Jordanian cancer patients of both sexes, it takes the second place with a percentage of 11.5. It is the first prevalent cancer among Jordanian males with a percentage of 14.2. On the other side, it is the second prevalent cancer among Jordanian females with a percentage of 9. It has been noted that the vast majority of CRC patients among Jordanian are found in fifteens and above age category with a percentage of 71.2 of Jordanian CRC female patients and 75.3% of Jordanian CRC male patients (Tarawneh & Nimri, 2012).

The male-to-female incidence rate ratio (IRR) among Jordanian CRC patients is equal to 1.03 (Freedman, Edwards, Ries, & Young, 2006).

### *2.3 Risk factors for colorectal cancer*

The incidence of sporadic colon cancer is believed to be affected by several factors such as lifestyle, environmental factors, diet, and acquired somatic mutations (Mundade, Imperiale, Prabhu, Loehrer, & Lu, 2014). About 70%-85% of CRC cases are sporadic and the patients do not have known inherited risk factors. Only 15–30% of CRCs may have a main genetic component, which gives a share in the development of CRC in first- or second-degree relatives. Hereditary nonpolyposis colorectal cancer (HNPCC) or familial adenomatous polyposis (FAP) are of the main causes of heritable colorectal syndromes (Mundade et al., 2014).

#### *2.3.1 Environmental factors*

The environmental changes, driven by the economic transition are referred to be the main cause of the rise of CRC incidence rate in developing regions (Center, Jemal, & Ward, 2009). Moreover, age and environmental factors, such as obesity, dietary patterns, heavy alcohol consumption and smoking, are thought to influence CRC risk (Bishehsari, Mahdavinia, Vacca, Malekzadeh, & Mariani-Costantini, 2014). According to Surveillance, Epidemiology and End Results (SEER) Program database, the incidence rate of developing colorectal cancer is more than 14 times higher in persons aged 50 years or more to those younger than 50 years (Bhattacharya, Bhattacharya, Basu, Bera, & Halder, 2014).

The World Cancer Research Fund/American Institute for Cancer Research (WCRF/AICR) expert panel informed that high intakes of dairy products, dietary fibres, nuts, fish, fruits and vegetables decreases CRC risk while high smoking, body mass index (BMI) and waist circumference, red and processed meat intake and alcohol consumption are related to a higher CRC risk (Aleksandrova et al., 2014).

Ulcerative colitis (UC) and Crohn's disease (CD) are considered primary Inflammatory Bowel Disease (IBD). A dramatic rise in incidence rates of CRC has been seen in IBD patients (Goldacre, Wotton, Yeates, Seagroatt, & Jewell, 2008). The development of IBD-associated colonic cancer IBDACa/Dys is associated with several factors such as disease duration, the extent of IBD disease, the age of onset, the degree of inflammatory response, and a family history of colorectal cancer (Xu et al., 2015).

An increased CRC risk has been marked with diabetes in most, but not all. Although consistency issues had been seen in epidemiologic studies of the relationship of diabetes with the risk of colorectal cancer, most studies are compatible with a positive association (Larsson, Orsini, & Wolk, 2005).

Acromegaly is a rare condition in which an increased risk of CRC has been explained by higher circulating levels of insulin-like growth factor-1 (Rokkas, Pistiolas, Sechopoulos, Margantinis, & Koukoulis, 2008).

### 2.3.2 Genetic factors

#### 2.3.2.1 Molecular Pathways

CRC is a complex disease that develops through the effects of multiple genetic mutations and epigenetic changes that include genes regulating cell growth and differentiation (Mundade et al., 2014). Recently it was reported that between 15–30% of CRCs may have a major hereditary component, given the occurrence of CRC in first- or second-degree relatives (Taylor, Burt, Williams, Haug, & Cannon-Albright, 2010). Most of the colorectal heritable syndromes are due to either familial adenomatous polyposis (FAP) or hereditary nonpolyposis colorectal cancer (HNPCC) (Fearon, 2011).

Familial adenomatous polyposis (FAP) is an inherited syndrome characterized by the development of multiple adenomas in the colorectum, a high risk of colorectal cancer (CRC), and the existence of extracolonic manifestations (Leoz, Carballal, Moreira, Ocana, & Balaguer, 2015).

Lynch syndrome is an autosomal-dominant condition characterized by a predisposition to several adult-onset cancers, most commonly CRC. Lynch syndrome is caused by mutations in DNA mismatch repair (MMR) genes (MLH1, MSH2, MSH6, and PMS2) that can be identified through clinical genetic testing (Burton, Hovick, & Peterson, 2012).

#### 2.3.2.2 Polymorphisms

The human genome is composed of over three billion bases of DNA encoding somewhere between 25,000 and 30,000 genes (Lander et al., 2001; Venter et al., 2001). Multiple forms of genetic variation are present

in the human genome, but the most common form is the single nucleotide polymorphism (SNP). SNPs are DNA variants where a single nucleotide at a fixed position in the genome is substituted with another (Orr & Chanock, 2008). Traditionally, SNPs have been defined as sequence alterations that are present in the general population with a minor allele frequency (MAF) of >1% and they have been regarded to result in neutral or benign phenotypic alterations (Collins, Brooks, & Chakravarti, 1998). It has been estimated that there are in excess of 10 million common SNPs within the genome occurring, on average, every 300-1,000 base pairs (Orr & Chanock, 2008). Although the vast majority of SNPs are shared between populations, many are specific to populations or continental grouping of populations that share a recent history. This subset of SNPs is probably going to offer ascent to the observable phenotypic differences in and between populations, including disease susceptibility and outcome (Orr & Chanock, 2008). In this regard, SNPs can be used to measure admixture in populations and may be utilized to map genes that could account for the differences in disease incidence between populations (Patterson et al., 2004; Shriver et al., 2005).

It has been estimated that up to 50,000 to 200,000 SNPs may be biologically important (Chanock, 2001; Risch, 2000; Sachidanandam et al., 2001). SNPs have the potential to directly contribute to disease pathogenesis, acting in a variety of ways depending on where they occur. SNPs located within genes can have serious consequences for the function or structural stability of a protein if they change its primary structure (Orr & Chanock, 2008). Exonic SNPs that result in amino acid substitutions are referred to as nonsynonymous SNPs (nsSNPs). These are the best-characterized class of genetic polymorphisms as they are subject to detection bias and their functional effects are usually easily assayable (Orr & Chanock, 2008).

The relative severity of an amino acid substitution can be predicted by evaluating the biochemical properties of the amino acid side chain in question. The significance of amino acid substitutions can be assessed using algorithms, such as the Sorting Tolerant From Intolerant (SIFT) and PolyPhen (Ng & Henikoff, 2006; Ramensky, Bork, & Sunyaev, 2002). Exonic SNPs that do not alter protein's primary structure are called synonymous and were thought to be functionally uninteresting. However, these SNPs can affect mRNA stability and alter splicing signals in genes (Capon et al., 2004; Chamary, Parmley, & Hurst, 2006). SNPs in introns, regulatory and gene-distant regions can also be functionally important by affecting gene regulation.

Promoter SNPs can directly affect transcription of a gene while intronic SNPs may affect splicing mechanism. Even SNPs that occur in apparent gene deserts have been associated with disease risk (Zanke et

al., 2007). Methodologies for prediction of functional intronic or regulatory SNPs are in their infancy (Orr & Chanock, 2008).

Other classes of genetic variants include short tandem repeats (STRs) and variable number tandem repeats (VNTRs), collectively known as microsatellites. They are often extremely heterogeneous within a population (Orr & Chanock, 2008). Copy number variants (CNVs) are structural variants containing large regions of variable copy numbers and can have MAF >1% (Iafrate et al.

l., 2004). It has been estimated that a pair of individuals from a population will differ by at least 11 CNVs (Sebat et al., 2004).

CNVs may encompass entire genes, promoter regions, and have dose effects (Iafrate et al., 2004). CNVs, therefore, may affect on phenotype, however, the technology required detecting and assaying CNVs has not reach a level of accessibility and versatility as that of SNPs (Eichler, 2006).

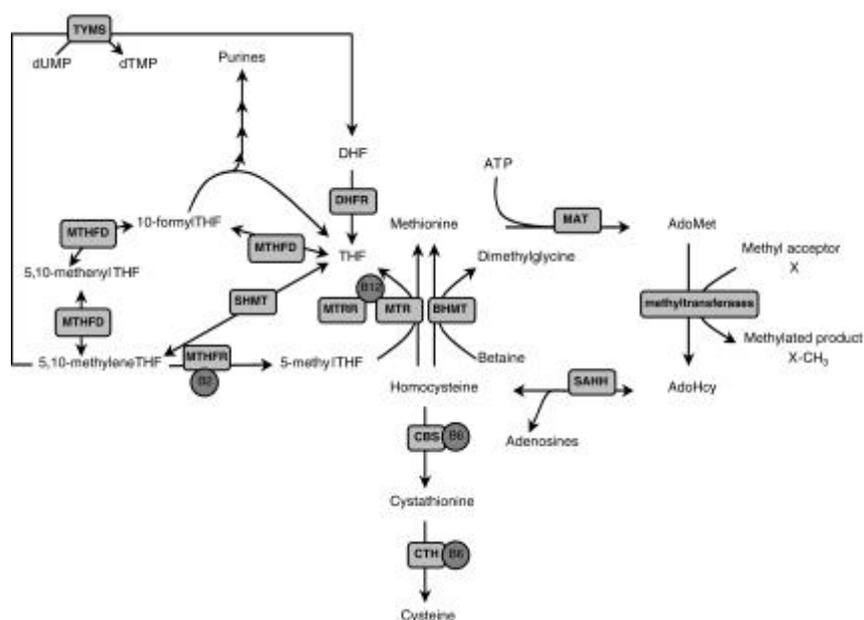
Insertion-deletion variants (indels) occur when one or more base pairs (up to several kilobases) are present in some genomes, but not in others. An inversion variant is one in which the order of nucleotides gets reversed in a specific region of the chromosome. A well-known inversion variant has been identified on chromosome 17 in which ~900 kilobase interval is in the reverse order in approximately 20% of individuals with Northern European ancestry (Levy et al., 2007). Block substitutions, on the other hand, are strings of adjacent nucleotides that vary between genomes (Frazer, Murray, Schork, & Topol, 2009).

#### *2.4 Folate metabolic pathway and DHFR*

Methyl groups needed to synthesize nucleotides necessary for DNA biosynthesis and methylation of DNA, RNA, and proteins are supplied by cellular folates which function as donors and acceptors of methyl groups (Hubner & Houlston, 2009).

DHFR is a ubiquitous enzyme seen in all organisms. The enzyme has a role in catalyzing the reduction to 5,6,7,8-tetrahydrofolate (THF) from 7,8-dihydrofolate (DHF) by stereospecific hydride transfer to the C6 atom of the pterin ring from the NADPH cofactor with concomitant protonation at N5 as figure (1) shows. DHFR has a core role in maintaining cellular pools of THF and its derivatives, which are fundamental for thymidylate and purine synthesis and accordingly for cell growth and proliferation. DHFR is the main source of THF, and as such is a vulnerability of rapidly proliferating cells: Several crucial anticancer and antimicrobial drugs mechanisms of action are based on targeting the enzyme. The seeking for the

therapeutic target of the anticancer drug methotrexate (MTX ) was part of the stimulant for more than 40 years ago for studies leading to the discovery of DHFR. MTX is considered one of the most potent chemotherapeutic agents in the treatment of lymphomas and leukemias. In the treatment of rheumatoid arthritis by MTX, DHFR is also the likely target. Trimethoprim is an important antibacterial agent which binds to bacterial DHFRs 105 times tighter than it does to vertebrate DHFRs. Pyrimethamine is the antimalarial agent which targets DHFR from *Plasmodium falciparum* (Schnell, Dyson, & Wright, 2004).



**Figure (1): Schematic representation of the folate cycles and homocysteine metabolism (Blom & Smulders, 2011). AdoHcy S-adenosylhomocysteine, AdoMet S-adenosylmethionine, AICAR 5-aminoimidazole-4-carboxamide ribonucleotide, SAHH S-adenosylhomocysteine hydrolase, ATP adenosine triphosphate, BHMT betaine-homocysteine methyltransferase, CBS cystathionine  $\beta$ -synthase, CTHcystathionine  $\gamma$ -lyase, DHF dihydrofolate, DHFR dihydrofolate reductase, dUMP deoxyuridine monophosphate, dTMPdeoxythymidine monophosphate, FAICAR formyl-AICAR, MAT methionine-adenosyltransferase, MTHFD methylenetetrahydrofolate dehydrogenase / methenyltetrahydrofolate cyclohydrolase / formyltetrahydrofolate synthetase, MTHFR methylenetetrahydrofolate reductase, MTR methionine synthase, MTRR methionine synthase reductase, SHMT serine hydroxymethyltransferase, THF tetrahydrofolate, TYMS thymidylate synthase**

### *2.5 The role of genetic polymorphism of DHFR 19-bp deletion in cancer*

DHFR has a role in catalyzing the reduction of oxidized folates, like folic acid as well as DHF, to THF. Accordingly, folic acid supplementation benefits depend on DHFR activity. The reduction of DHF produced by TS to regenerate THF requires DHFR (Bailey, 2009).

The 19-bp deletion placed in intron 1 was reported in 2004. The current reference sequence of DHFR (NC\_000005.8) contains the 19-bp deletion allele. The homozygosity frequency of the 19-bp deletion allele in whites is 17% to 22% (Bailey, 2009).

The Putative binding site is removed by the 19-bp deletion variant removes for the transcription factor Sp1 and accordingly, DHFR expression might be affected. An increase in DHFR expression was observed by two studies due to the 19-bp deletion allele where no effect has been noticed by a third report (Bailey, 2009).

Studies on 19-bp deletion variant and Neural Tube Defects risk yielded conflicting results. In a large cohort, the combination of del/del genotype and multivitamin use was associated with 50% increase in breast cancer risk (Bailey, 2009).

### *3. Conclusion*

Cancer, in general, is one of the most important topics to be studied in present due to its high prevalence in the world. CRC by itself is one of the most vital issues in researches as it is highly variable and prevalent in different countries especially in Middle East and Jordan. The relationship between genetics, 19-basepair deletion particularly and different diseases are confirmed. However, its relationship with CRC is not very well defined. Accordingly, this topic needs to have multiple studies with different methodologies and in contrast to different factors, in order to have a clear statement about this issue.

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## Impact of effective online brand advertisements on the consumer attitude

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### Abstract

With the recent developments in technology, advancements have trended to the incorporation of the internet into business enterprises as a marketing tool. This has been made prominent in the recent years, where social media has taken over global advertisements with both small and large companies channeling their efforts to have their products and services marketed to consumers through social media platforms. Analyzing all the factors in this game, it has become of essence for growth oriented strategists to give laser focus to the attitudes, needs and feelings of consumers towards their online brand advertisements. In a nutshell, the argument revolves around the significant turnarounds that if harnessed in the operations can create a domino effect on consumer choice of the brand. This paper looks at the impact of effective online brand advertisements on consumer attitudes, achieved in a detailed discussion sub-divided into sections that encompass the introduction, the strategies and theories in online marketing as well as predictors of consumer attitudes.

**Key words:** *online brand advertisements, consumer, social media, consumer behavior, business.*

## **1. Introduction**

For any growth oriented organization, it is critical to comprehend that consumers are at the heart of productivity. Every product or service released into the market becomes beneficial to the company according to consumer intervention; otherwise there would be no motivation to even produce in the first place. Based on the shift in the global business sphere which is now characterized by vicious competition, it has become necessary to re-strategize the advertising to effectively harness and retain larger consumer bases (Alhabash, Mundel & Hussain, 2017). Coupling this up with the rapid developments in the technological sector that have transitioned the world into a global village, the old school field advertisement system has proven ineffective for global oriented enterprises. In other words, it has become more convenient to use online social media platforms like Facebook, Twitter, Instagram and many others for marketing in the quest to establish globally recognized brands. In order to achieve the desired results, producers have deemed it necessary to consider the behavior and thought patterns of consumers before, during and after viewing online advertisements. This research seeks to explicate the impact of effective online brand advertisements on consumer's attitude and responses to the given products and services.

## **2. Evolution of Online Advertisements**

Looking at the dynamics of business operations, it is of essence to understand the shift in online advertisements in relation to the ever changing customer needs. The fact is, generations forever change, and the methods that may have yielded results in the past centuries become outdated and can no longer appeal to the new age of millennials, hence the need for organizations to comprehend the online advertisement industry from yester years and today, it is important to have a prospective look on future expectations (Alhabash, Mundel & Hussain, 2017). On the onset, before the emergence of media channels and the internet, organizations relied heavily on billboards, newspapers, magazines, posters and flyers to market their products in physical locations targeting consumers. This method faced a major drawback as it could not avail the interactive privilege to consumers, thus difficult to channel feedback to producers. Then, came the age of TVs and Radios that improved the advertisement arenas.

Innovation of the internet became the game changer in the advertisement business as through World Wide Web services, companies that the wishing to amass global influence managed to build their brands (Zeff & Aronson, 1999). Advertisement was made possible by use of ad clicks alongside web banners that

were designed to appeal to internet user's interest, informing them of trendy products and services. Finally, the innovation of social media platforms which have revolutionized the advertisement industry. This came upon realization that many users had embraced the social media platforms, which availed connection of billions of individual from all corners of the globe. Marketers have taken advantage of these platforms, creating pages and groups that showcase their products as a branding advertisement strategy, which if properly used can yield impeccable results (Chu, Kamal & Kim, 2013).

### **3. Advertisements and Consumer Contention**

Based on how easy it has become to advertise, the world has become congregated with advertisements, especially on social media platforms hence the need for growth oriented companies to re-evaluate the strategies they use to market their products, lest they wind up in the ignored categories of social media users. For instance, users could be trying to communicate with loved ones via Facebook and then be toggled to like pages that they have no interest in. The next day, same trend and in the end these users become irritated and opt to ignore or in the worst case block the advertisement pages, developing a very negative attitude which could be very consequential to companies aiming to grow and establish brands recognized on the world wide scale. Importantly also, looking at the saturated advertisements being hassled into consumers' everyday lives, most have adopted a negative attitude, meaning that consumers may discard advertisements of products and services they may be in need of solely based on past unrewarding experiences (Chu, Kamal & Kim, 2013).

According to Chu, Kamal & Kim (2013) the internet the trend has grown worse, with click advertisements standing in the way of surfing where websites have had to trick individuals to click links they are not interested in but as an attempt to yield more traffic, to have companies pay. This has in turn created bad advertisement attitudes on the part of the consumer who even prefer old school methods in attempt to escape the hassles encountered when seeking to view products online. In a nutshell, the clustered advertisers need to reconsider the tactic they use on online users, embracing user appropriate mechanisms like the use of sponsored features on social media platforms like Twitter and Facebook.

Based on the aforementioned setbacks, it is important for advertisers to come up with effective methods that can appeal to the consumers eliminating the pressure they face. The following avenues can therefore be effectively utilized to achieve the desired goal:

### **1. Online Advertising**

Upon the realization that many people spend a lot of time on the internet, advertisers sought to explore online advertisement channels in an effort to ensure that they net more consumers. Advertisement in this approach was initially made by the use of banner ads alongside search ads, which when clicked redirect users to marketer's pages. This was done in the quest to create globally recognized brands, which through being advertised over online means were expected to gain popularity amongst consumers (McCoy et al, 2007; Vollmer & Precourt, 2008). The efforts paid off as brands that took this path including; Coca-Cola and Nivea amassed a lot of influence on the global sphere to become international brands worth emulation. Recent statistics show that most successful globally recognized organizations had to invest a lot of resource in this marketing journey, which eventually paid off creating iconic multinationals in business enterprises (McCoy et al. 2007). Motivated by these successful stories many companies have over time embraced this approach in order to capture more consumers instigating growth in business operations.

As the trigger point for modern advertisements, online marketing has proven to be a very effective tool which if used strategically can help to create good consumer-producer relationships (Yan et al. 2009). Furthermore, through enabling feedback features on websites, it has become more effective for users to make even better judgments before purchasing services and products as clarifications can be made instantly. On the flipside, search engines have also played a major role in customer targeting whereby instead of targeting everybody, companies can monitor search traffics and forward advertisements that correspond with consumer needs. This in turn, creates efficiency hence saving time on each consumer because banners focus on individual needs (Zeff & Aronson, 1999).

This medium bears immense capabilities as it offers access to a large number of users. However, failure to design consumer oriented banners and ads, will push them away, hindering the progress. The truth is that, as visual beings, many people subconsciously develop interest in and choose products that appear good and vice versa, hence it is essential for companies to comprehend that, investing in visually appealing

and easy to navigate ads and banners is the secret ingredient towards drawing more customers.

Consequently, there is the issue of foresee ability of the advertisements based on the choice of themes as well as what is they represent. Good features will create good opinions, which will create trust in brand as consumers would always prefer well organized and easy to navigate sites (Thompson, 1995).

More often than not, consumers get hooked on given brands just to lose interest after few weeks, a major blow to producer companies. This trend is also experienced in online ads, where once interested parties lose attention and choose to ignore and block the ads deeming the unnecessary and irritating. To address this challenge, advertisers should carry out research to guideline the ads laying emphasis on trending issues, which consumers can relate to. In addition, a consumer centered approach should be used where disturbing pop-ups should be replaced with interesting catch phrases and banners. Looking at the Jupiter's research, where internet users were interviewed the findings indicate that more than 65% of the respondents confirmed that they hate ad pop ups that cover their browsing pages, which they do not click(Yan, Liu, Wang, Zhang, Jiang, & Chen, 2009).

## **2. Social media**

Social media platforms were initially intended to connect people with loved ones and bridge the geographical limitations that made it difficult to convey information over larger scopes. Like wildfire, social media platforms have spread to become key aspects of people's lives. Younger generations have embraced social media usage more with the older generation making significant steps not be left behind using Facebook, Twitter, Instagram, Snapchat among others as the platforms to network with friends and family. According to Mangold & Faulds (2009), marketers in the recent years evaluated the market and saw an opportunity, which they sought to exploit; the larger number of users could also be used to feedback on products as well as facilitate spread of new products as quickly as the marketers intended. The next challenge became branding where marketers through garnering larger follower numbers are tasked with delivery of promised products lest bad reviews from dissatisfied customers hinder goal achievement.

Social media usage thrives in relationship building, where marketers are able to engage the target consumers getting information on the feelings and attitudes in regard to services offered. By so doing, adjustments can be made based on the feedback garnered, making social media a very important tool

(Mangold & Faulds, 2009). Moreover purchasing has become more efficient as online interactions save the physical hassles consumers would have encountered if they instead walked into shops. In other words social media platforms assist that the consumers have a voice in the quality of products, as open dialogue is held with marketers making it is easier to draw a common ground. Consumers get to appreciate the producer's capacity and efforts while, on the other hand producers get insight on the needs of customers.

Much social media advertisement were initially very effective, but things took a different turn when it became clustered just like the traditional methods. On the onset based on how easy it was to create groups and push them to social media platform like Facebook and Twitter, it lost its intended business factor and once again advertisements became outdated and eventually people lost interest in advertisements. For already established brands there was not much of a problem, but for new entrants the impact of the same proved catastrophic(Okazaki & Taylor, 2013). Nobody could trust new businesses propelled by these social media platforms as everybody was in it not for consumers or the business aspect but so that they could look cool. Over time this dilemma has set many businesses at a disadvantage, where you have something that can be of very vital significance to you but it cannot based on the bad reputation people associate it with.

Despite social media platforms being very instrumental in marketing, it is evident that the intended branding and marketing goal was not achieved. To have better insight on the same it is of significance to have a look at theoretical perspectives.

#### *Source Credibility Theory*

Based on judgement, from the perspective of the consumer that matters brand accuracy, fairness and completeness, it emphasizes the essence of knowledge management and controlling business grounded on the fact that consumers assume the reliability of a product or service solely on the aforementioned factors. This frameworks the purchase decisions meaning if they were satisfied with the advertisement they can go ahead to purchase products otherwise shoddy advertisements steer them away. In social media marketing thereby marketers have the mandate to invest in advertisement using the expertise of creative designers to come up with banners, logos and advertisements that consumers can find credible enough. The assumption going through the consumer's line of thought is simple, if the marketer cannot invest in advertising there are higher chances the product does not meet the advertised standard(Chu, Kamal & Kim, 2013).

Alternatively, source credibility looks at the consumer-marketer relationship as a new challenge for both that needs to be cultivated. Take an instance of a person taking his fridge to a repair workshop. There is a very high likelihood that the man would prefer somebody they are conversant with, who may have even assisted in fixing other electronics, than rushing to a new one who happens to have opened a repair shop recently (Thompson, 1995). Instead of opening more avenues for disappointment, it is a human nature to seek where trust has already been fostered. That is the reason majority of consumers today will choose to trust advertisements made by the use of newspapers and magazines as compared to social media platforms, where is a higher risk of being conned.

Notably, the theory presents trust and source credibility as the major issues (Thompson, 1995). However, the internet is a strange place, where anything is possible. Consumers have learnt lessons and heard stories from peers all advocating for source credibility verification. Changing dynamics and introduction of online money transfer as well as banking has made matters worse, as now people end up scammed over social media channels, hence the alertness and second guessing of products. For upcoming companies it is evident that there are trust related challenges whereby consumers shy away from online advertised products, letting go of favorable deals that they feel are intended to lure them into being scammed and losing their money (Vollmer & Precourt, 2008). The truth is that people are extra careful these days, and for a company to convince consumers of credibility, trust harnessing efforts have to be made including exploring other avenues of advertisement markedly newspapers first, before going for social media marketing.

Significantly, by marketers creating professional social media accounts and channels, it becomes easy to traverse the competitive business storms that play a major role in chinking credibility (Okazaki & Taylor, 2013). Twitter has taken the initiative to create official channel features, where the real accounts bear blue ticks distinguishing them from ghost accounts. Marketers have been realized to realize the essence of credibility; some going an extra mile to use celebrities to aid in tweeting and “hash tagging” their accounts as legit eliminating consumer worry that they could be unknowingly be communicating with individuals with malicious intentions. To sum up this theory is the aspect of advertorials, whereby companies have chosen newspaper and magazine formats to create their banners and ads, as users are more conversant with them, hence likely to create trust.

### *Persuasion Knowledge Model*

This theory revolves around the idea that the way the consumer thinks of an advertisement is governed by the extent of knowledge the consumer has, as far as an advertisement is concerned. This is to say that it all depends on how well consumers can be persuaded to choose a specific product based on their comprehension on what advertisement entails. For instance by understanding the goals, expectations and strategies that marketers may be using, a consumer can either choose or derail from using a given product or service. The mantra behind this theory maintains that, the more informed a consumer is, regarding a given advertisement procedures alongside goals, the less likely it is for such a consumer to be persuaded into accepting the product or service. In other words, comprehension of underlying methodologies inhibits an acceptance (Vollmer & Precourt, 2008).

Focusing on the vast knowledge surrounding advertisements where, advertisers are supposed to create enthusiasm in consumers and then allow consumer curiosity take over the wheel. A challenge that emerges in this context is that informed target consumers are already conversant with the persuasion model. They know the process. As a result, they choose to ignore advertisers efforts manifested through banners reverting to enjoying their social media catching up with their loved ones. Importantly, by consumers receiving numerous pop up advertisements and ads marketing given products, they get used to the advertisement patterns knowing when to expect them and how they are conveyed. Armed with this familiarity mindset, consumers become experts in avoiding the advertisements that they consider a nuisance to their browsing experiences (Clow, 2004). This can further be explained by the YouTube ads that most consumers have indicated that they are always waiting for skip options.

#### **4. Native Advertising**

Native advertising is the alternative approach, which seeks to address all the consumer related challenges associated with the other advertisement channels. Defined as an advertisement technique used on social media platforms, where ads are made to sync with the entities of that platform, Native advertising represents the feature incorporated in social media platforms that allows sponsored advertisements (Wojdyski& Evans, 2016; Chu et al. 2013). Regarded as the most effective consumer centered approach, Native advertising takes into consideration the social media usage of users minimizing interruptions and pop ups that irritate. The advantage of using this method is that it helps to distinguish serious organizations from fraudsters who are unlikely to go the extra mile of paying to have their products advertised. On the other hand, research has indicated that many consumers prefer to click sponsored or promoted advertisements based on the non-intrusive way in which the advertisements are made, where tricks are not used to lure unsuspecting users to click links they have no interest in (Wojdyski& Evans, 2016).

Conveniently, having yielded positive results for so many times, consumers have developed trust in marketers that use this method, meaning they have better consumer netting chances as compared to counterparts. Furthermore, grounding our argument on the aspect of source credibility, companies aligning themselves to this approach are regarded as genuine amongst consumers looking at the trouble they undergo before underpinning advertisements. In addition, Native ads exhibit secure avenues for consumer-marketer conversation where clarifications are made and the products offered showcased, nevertheless, as the sponsored advertisements are likely to capture a larger number of consumers, more emphasis is put on the given responded (Wojdyski& Evans, 2016). As a result the marketers have to be professionals who understand business dynamics creating a friendly environment for informative conversation. This model boosts brand familiarity.

## **5. Predictors of consumer attitude towards online advertisement**

Consumer attitudes do not just crop up without having frameworks, there exists forces that push potential consumers to act the way they do in regards to online marketed brands. The predictors include;

### **1. Usability**

We live in a world where education has been at the center score of life being hailed from all directions. Introduction of online and social media advertisements is propelled by the assumption that social media users are literate and somehow understand the dynamics of business (Okazaki & Taylor, 2013). The issue that arises is that the more educated and informed people have the lower chance to be being attracted to advertisements as they understand all the lure-techniques that can be used to influence consumers towards given products, thereby avoiding them. On the other hand by having individuals who have very little understanding of the goal behind online marketing, they would just view the ads for entertainment purposes if funny or cancel ad pop ups that they deem insignificant as they resolve back to their browsing (Okazaki & Taylor, 2013).

Evidently also, it is critical to note that the main problem is that people click ads to get more information about something, the curiosity to find out more in regards to certain products or services. The truth is that people's circumstances differ greatly impacting their response to given ads. For instance in areas where data surfing is expensive, people would prefer to ignore advertisement ads and banners as they deem the webpage redirection as data consuming, hence doing everything in their power to minimize costs that they had very well not planned for in the beginning. Usability thereby acts as a major player behind the behaviors towards brands advertised through online channels.

## 2. Trust

This predictor is founded in alignment to the aforementioned theory, source credibility. The logic behind trust and consumer advertisement attitudes is simple, if it happens that consumers have faith and have garnered trust in online advertisers, they develop positive attitudes towards advertisements (McCoy et al. 2007). A further extension of the trust is on the users' comfortability with computer systems and their comprehension of how the internet has been used to generate the advertisements showcased over online media. In other words, instead of the consumers assuming that the advertisements are computer generated and ignoring them, understanding that online marketing is a business oriented advertisement just like the rest is the first step towards building trust in the approach.

## 3. Information

Consumers' attitude is determined by the magnitude of information at their disposal. Where shallow details are revealed consumers feel that information is being withheld intentionally probably to hide facts about products or services that advertisers do not want consumers to know (Chu, Kamal & Kim, 2013). On the other hand, availing a lot of information would communicate desperation from the part of the marketers eliciting doubts from the consumers' who feel; if the products were worth it there is no need for that much advertising. Emphasis should be put on the kind of information released to the consumers and the drawbacks it may evoke.

## **6. Recommendations and conclusion**

This paper has presented several issues regarding the attitudes consumers may have towards online advertisements, using theories and predictors to solidify the arguments. Marketers have the mandate to take into consideration a number of aspects to foster positive attitudes from consumers which translates to achievement of the company's goals (Clow, 2004).

Firstly, laser focus should be put on predictors of consumer attitudes namely; usability, trust and information and marketers encouraged to hack into market trends to uncover consumer needs, thus aligning their products in that direction. Secondly, having looked at the online advertisement techniques and their evolution, company marketers should merge those that are working for each as well as address the weaknesses (Okazaki & Taylor, 2013).

The government should take up the initiative and develop policies that are directed towards ad quality. This move will eliminate trolls and jokers who choose to derail the online marketing industry, especially social media, giving genuine companies a major challenge in creating trust with customers. Importantly, the Native advertising strategy should be embraced by companies, as it has amassed trust amongst consumers. And finally, social media platforms should come up with more subtle methods of advertisement that do not interfere with consumers browsing.

In conclusion, having weighed all the arguments presented in this paper, it is evident that inasmuch as online brand marketing is being used, a consumer attitudes depend on a number of factors. For companies to make the most out of online advertising, a holistic approach, which takes into account consumers' needs, is necessary.

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## **Investigating the impact of preventive maintenance treatment practices on pavement performance**

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### IV. ABSTRACT:

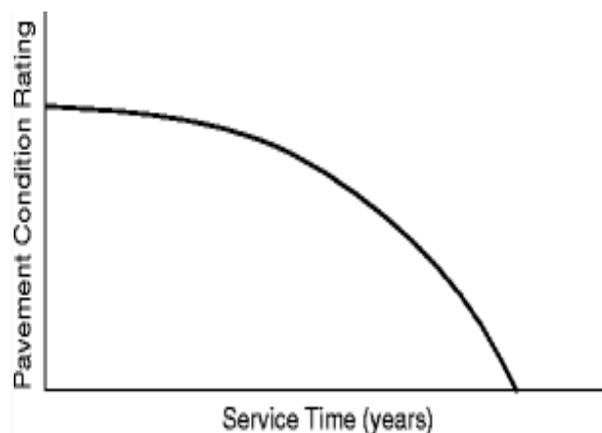
Pavement maintenance strategies have become a significant study field in the 21<sup>st</sup> Century. Maintenance practices are defined as all procedures that can be taken to resolve all possible deterioration forms. This paper basically attempts to examine the relationship between preventive maintenance treatment practices and the overall performance of the pavement. The researcher followed the descriptive method by reviewing various studies and researches in this field. The study clarified that there are several classifications of pavement types and the main types are (Flexible and rigid) pavements. The study also clarified that there are various factors influenced the overall pavement performance, such as construction quality, moisture level, subgrade, traffic load and maintenance. The main results of this study are: adding the proper type of maintenance at the right time could lower the expected rehabilitation cost and enhance the pavement efficient performance, the preventive maintenance is a basic maintenance practice that are considered as a cost-effective rehabilitation and enhance the pavements operational life.

*Keywords: Pavement maintenance, preventive maintenance, performance, traffic load.*

## V. INTRODUCTION:

Pavement maintenance strategies have become a significant study field in the 21<sup>st</sup> Century. Maintenance practices are defined as all procedures that can be taken to resolve all possible deterioration forms. Such maintenance procedures must be implemented on the pavement surfaces when they remain considered efficient, and before the appearance of actual maintenance demands. Thus, the preventive maintenance treatment practices were recognised accompanied by the enhanced knowledge of the essential need of pavement management systems (Hein & Croteau, 2004). AASHTO Highway Committee defined preventive maintenance as a pre-designed plan that aims to treat existed roadway system in a preventing expected deterioration, cost-effective way that enhances the overall functional system performance (FHWA, 1999). These preventive maintenance treatment practices mainly aim to enhance the pavement performance by adding a planned maintainability and cost efficiency preventive strategies.

Pavement performance can be recognised through the performance curve that represents the relation between the possible loads on the road during the service time and the pavement situation. On the other hand, actual curves of performance could be generated depending on pavement deterioration historical reports. Figure (1) presents the typical performance curve of pavement, the figure indicates that the rates of pavement deterioration associated in an increasing manner until reaching to a high deterioration level at the end of the expected service life of the pavement (Butt et al., 1987).



**Figure (1): typical pavement performance curve**

the possible traffic loads. This In this level, the pavement structure is expected to become unable to uphold stage clarifies the huge significance of pavement maintenance treatment practices to decrease the negative effects when reaching this stage especially quality and cost bad effects. Therefore, this paper attempts to investigate the impact of effective preventive maintenance treatment practices on pavement performance.

## VI. 1.1 STUDY AIMS AND OBJECTIVES:

This paper basically attempts to achieve the following objectives:

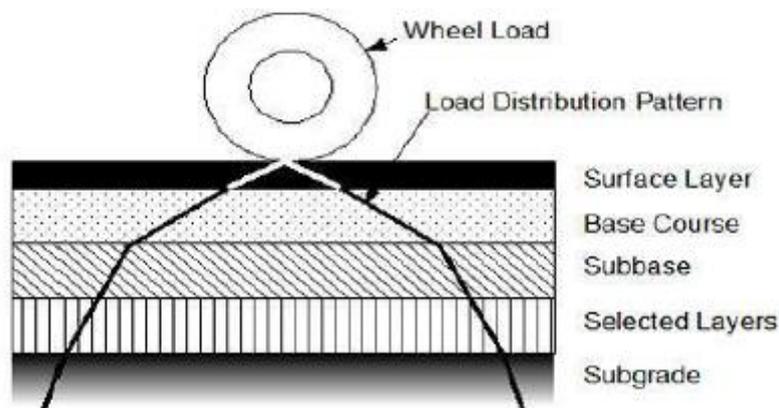
1. Examine the relationship between preventive maintenance treatment practices and the overall performance of the pavement.
2. To investigate factors that could influence pavement performance.
3. To assess road management strategies through defining efficient way and time to apply maintenance treatment practices.

## VII. 2. PAVEMENT TYPES:

Pavement can be defined as a solid covering floor that creates a suitable surface for traveling. There are several classifications of pavement types and the main types are (Flexible and rigid) pavements which will be discussed as follows;

### A. 2.1 Flexible pavement:

Flexible pavement is composed of various granular material layers that covered by a surface layer which consists of bituminous waterproof materials. This type of pavement is considered a flexible one due to the fact that it bends under high traffic load levels. The flexible pavement design basically aims to distribute the load to all flexing layers to avoid the excessive stressing of one layer which will cause the failure of the overall pavement design. The following figure illustrates the flexible pavement design and the distribution of loads over it:



**Figure (2): The flexible pavement design**

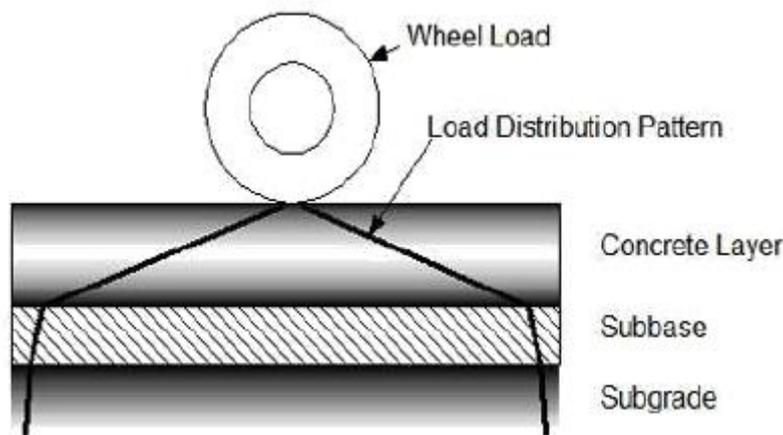
The basic concept of flexible pavement design is to transport the loads to the pavement layers that have various strengths. The highest stress level is directly exposed to the top layer; therefore, this layer is considered as the least flexible and the strongest material layer. Whereas, the deeper pavement layer that exposed to the lowest stress level is the most flexible one (David, 2006).

### *B. 2.2 Rigid pavement:*

This pavement is a stiffer pavement that basically consists of Portland cement concrete (PCC) course surface. The PCC material has a high modulus of elasticity which made this kind of pavement owns a sufficient flexural strength that enables it to transfer the exposed traffic load to a wider area.

In this pavement type, the slab action is the common pattern of load distribution as the rigid pavement reacts as an elastic surface that laid over a rigid layer that constructed by PCC materials (Mathew & Rao, 2007).

Figure (3) illustrates the common load distribution shape over rigid pavement surface.



**Figure (3): The Rigid pavement design and load distribution**

### VIII.3. FACTORS THAT AFFECT PAVEMENT PERFORMANCE:

There are various factors that influence the overall pavement performance such as (Sitaramanjaneyulu et al., 1998; Norman, 2009):

#### 1. The quality of construction:

The pavement performance is directly influenced by the quality of utilised construction materials, the proper moisture percentage and the proper compaction. All of these terms could be achieved when recruiting skilful construction employees, and when implementing a good quality control construction practices.

#### 2. Traffic load

The volume, repetitions and duration of exposed traffic load are the basic factors that could influence the performance of pavements. The pavement deterioration that existed according to traffic loads is defined as the damage that could be caused per load pass of the standard axle (which is equal to 80 KN single axle load [E80]). Therefore, the ability to tolerate a repeated standard axle load (E 80's) is the basic standard of designing any pavement.

#### 3. Moisture:

Adding an improper level of moisture in a pavement could considerably weaken the coherence of gravel materials, and weaken the overall pavement. There are various sources of pavement moisture, such as, the moisture that enters through pavement cracks and surface holes. In addition to moisture that comes through capillary action of pavement underlying water table. The main issues that could be generated according to the excessive moisture levels are the particles lubrication, easy displacement of pavement particles and loss of particle interlock, which could cause the failure of pavement performance.

#### 4. Subgrade:

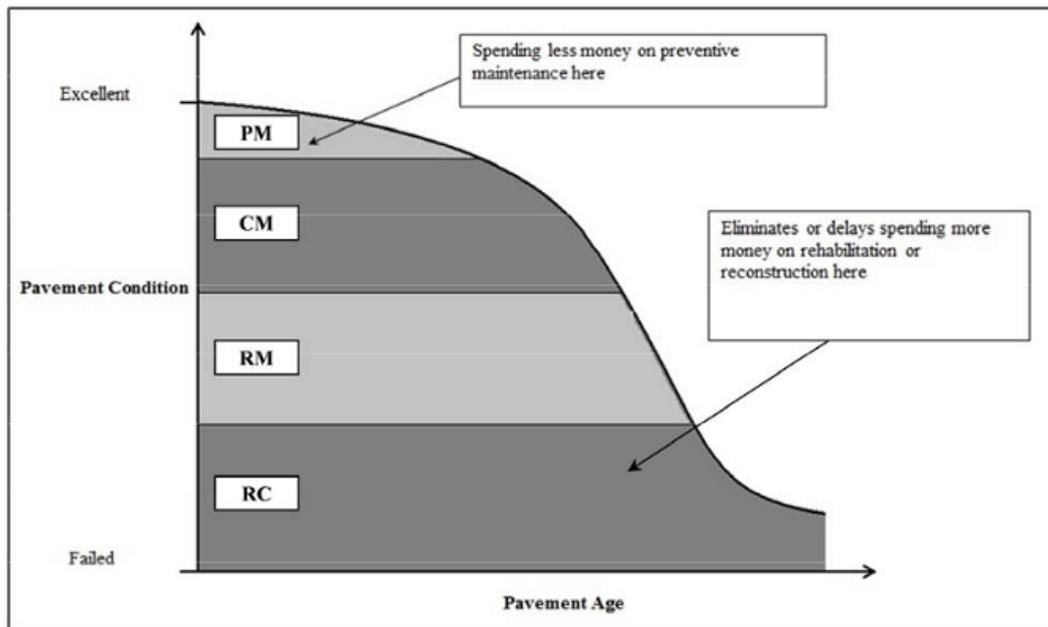
Subgrade surface can be defined as the underlined pavement surface that directly exposed to wheel loads. If this underlying surface of soils is too weak then the pavement will fail due to the excessive flexing behavior of the pavement under the traffic load. If this layer is not designed adequately, then the pavement failure will be noticed.

## 5. Maintenance:

The kind and the time of implementing maintenance practices are considered as the main influencer of the quality of the overall pavement performance. Additionally, the way of implementing the maintenance procedures is a crucial factor that has a great impact on the performance. All pavements will deteriorate when time passing according to the above-mentioned factors. Therefore, the maintenance practices are an essential step to enhance and solve the deterioration conditions. Adding the proper type of maintenance in the right time could lower the expected rehabilitation cost, and enhance the pavement efficient performance. Therefore; this paper will focus on one kind of maintenance practices which is the preventive maintenance and its influence on pavement performance.

## IX. 4. PREVENTIVE MAINTENANCE:

The maintenance practices can be divided into various kinds such as; preventive, periodic and major maintenance approaches. Preventive (Routine) maintenance is considered as one of the essential pavement maintenance practices to keep roads surfaces in sufficient usable situation, and to avoid reaching to the major corrective maintenance conditions. The preventive maintenance includes crack sealing, patching, drainage recovering and edge repairing practices (Odoki & Kerali, 2002). One of the main maintenance practices that could avoid the overall pavement deterioration is the drainage repairing practices. Road appurtenances and plant control activities are other essential preventive maintenance activities. In general, Patching and sealing are considered the critical issues that preventive maintenance seeks to avoid. The main aim of patching repairing practices is to evade roads surface deterioration through potholing repairing and solving the structural cracks problem. On the other hand, Crack sealing maintenance practices basically deal with wide structural cracking and in treat transverse thermal road cracking. The main healing priority of this maintenance kind is to treat the transverse thermal cracking and this should accompany with the wide structural cracking to take this issue as a critical problem to be solved by the crack sealing preventive maintenance practices (Hein & Croteau, 2004). Preventive maintenance depends on implementing a cost-effective rehabilitation strategies without enhancing the structural pavements capacity (Peshkin & Hoerner, 2005). The following figure illustrates the main benefits of adding preventive maintenance strategies;



**Figure (4): Benefits of preventive maintenance**

The preventive maintenance often treats the surface of pavement in a manner that avoids the water to enter into the sub-layers of the pavement structure. The right time to implement such treatment practices is when the pavement is considerably at a good situation and in an acceptable condition to enhance the pavements operational life (Zaniewski & Mamlouk, 1999). Preventive maintenance practices are also considered as cost-effective rehabilitation strategies as it reduced the required cost of maintenance (Hicks et al., 1999).

## X. 5. CONCLUSIONS

Maintenance practices are defined as all procedures that can be taken to resolve all possible deterioration forms. Thus, the preventive maintenance treatment practices were recognised accompanied with the enhanced knowledge of the essential need of pavement management systems. These preventive maintenance treatment practices mainly aim to enhance the pavement performance by adding a planned maintainability and cost-efficiency preventive strategies. There are various factors that influence the overall pavement performance. The kind and the time of implementing maintenance practices are considered as the main influencer of the quality of the overall pavement performance. Preventive maintenance basically depends on implementing a cost effective rehabilitation strategies without enhancing the structural pavements capacity. This pavement treatment practices could enhance the overall operational pavement performance while adding a cost-effective maintenance practices when the pavement is considered at the acceptable working condition.

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# Moral Intelligence and its Role in Formulating Children Characters

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## Abstract

With the recent shift in trends from the traditional setup, where people inclined themselves to values and morals, to the modern care free lifestyles, morality has been discarded causing fatal impacts on society. However, taking into account that the world cannot function harmoniously; studies have been made on the issue which propagated the concept of moral intelligence. As a study, moral intelligence is driven by understanding and then improvement of behavior, and aimed at presenting its position alongside the other universally accepted intelligences. It refers to the capacity to embrace an ethically oriented approach when dealing with values and actions. There are four identified competencies that make up moral intelligence, markedly; integrity, responsibility, forgiveness and compassion. The aforementioned principles when merged with the seven values as identified by Michelle Borba, have the role of moral intelligence in the formulation of children characters. In other words, the argument seeks to illustrate how integrating of the frameworks of moral intelligence can be beneficial to guardians, parents and educators alike in their quest to model a morally adept children. This paper will explore the fundamental pillars upon which moral intelligence is grounded, how its capacity can be tapped to facilitate nurturing of children's character as well as the contention that existed on whether moral intelligence is and can be considered independently as a form of intelligence. The arguments are systematically developed as presented herein.

**Keywords:** morality, moral intelligence, children's characters.

## **Introduction**

Moral intelligence is the ability to harness and practice ethical fundamentals to values, where judgment and analysis of possible consequences precede actions. According to Lennick and Kiel (2011) moral intelligence can be defined as the mental capacity of an individual to conceive and determine the application of universal human principles to goals, values and everyday actions. This is to say, one gets to understand and embrace the key tenets behind actions and behavior, which elicit responsibility. Correspondingly, Borba (2001) emphasizes that moral intelligence is the pendulum that accords one with the capacity to distinguish right from wrong. Looking at the morality linked issues that are playing a major role in tearing society apart in the name of modernism, it has become critical to re-evaluate the concept of moral intelligence and come up with strategies that can ensure upholding of the same (Lennick & Kiel, 2011). In the quest to achieve these milestones, stakeholders have identified the importance of focusing on children, as they are in their formative ages, where values adopted are embraced all the way to old age. Importantly also, by following this approach, stakeholders have a better chance of fixing morality related issues, instead of bandaging them (Beheshtifar, Esmaeli & Moghadam, 2011). This paper hereby seeks to explore moral intelligence in detail, providing its role in the formulation of children's characters.

## **Gardener on Morality Intelligence**

In the study of intelligence, the Gardener theory most refers to the multi intelligences that can be manifested in humans. The research was eventual and involved a number of adjustments which occurred in two phases. On the onset, Gardener noted seven intelligences including; verbal, musical, visual, mathematical, bodily, interpersonal and intrapersonal. Upon further research, the theory was adjusted to include other intelligences to the first mentioned; analysis, markedly; emotional, social, spiritual and moral (Gardner, Kornhaber, & Wake, 1996). It is important to note that the Gardener theory did not regard moral intelligence as an intelligence for a long period of time, in which the proponent maintained that, in order to remain objective and unbiased, a non-moral and value free approach was necessary (Gardner, 2000).

Gardener further opines that in analyzing the concept of intelligence, scholars should be careful not to be clouded by own perceptions of character, personality and other spectrums human beings are likely to

take. Most importantly, the proponent maintains, the challenge of merging morality with intelligence, considering the fact that, cultural specificity and diversity constrictions may emerge creating irrational judgments with no substantial basis (Gardner, 2000). Furthermore as much as the moral principles may constitute to form the intelligence, it does not holistically add up as an intelligence, emphasizing if it existed then people with it may exhibit a number of characteristics. They range from; diversified comprehension of issues, immersion of self in sacred issues, commitment to the two aforementioned, to the capacity to go beyond normal approaches. However recent research has linked to Gardner's research, presents clearly the existence and importance of moral intelligence independently (Gardner, 2000; Salma, 2018). Looking beyond Gardner's issues, presents immense capacities that this paper uses to express the role of moral intelligence of children.

### **Models in Moral Intelligence**

In the recent years, scholars have explored moral intelligence presenting key pillars, features and practices that ensure that the same is attained. Two models have been embraced in this essay, which have provided great insight on the essence of aligning children with the concept of moral intelligence. Initially, Lennick and Kiel (2011) four competencies of moral intelligence will be identified which this paper has referred to as "principles." Similarly, the seven essential virtues necessary in modeling morally intelligent children will be analyzed.

#### Principles of moral intelligence

##### *1. Integrity*

Integrity is a major tenet behind moral intelligence. According to the Merriam- Webster dictionary, the word "integrity" is defined as a firm inclination to a code governing moral values (Daly & Caputi, 1987). This is to say, parents and guardians aiming to cultivate morally intelligent children should seek to demonstrate uncompromised beliefs and series of actions (Coles, 1998). Grounded on this framework, children are taught to embrace the truth as the best option when confronted with choices. This is done not only through verbalization but also by modeling, where the adult chooses the truth at all times, thus creating

a dynamo effect as children are imitators. What they see the adults they look up to embrace greatly influences their actions, like clockwork (Beheshtifar, Esmaeli & Moghadam, 2011). Importantly also, through reward schemes and having intense conversations with the children, educators uphold integrity by informing children the essence of admitting mistakes when wrongs have been committed.

According to Clark and Fujimoto (1999) integrity is determined by the kind of choices people make when confronted with a number of aspects. Children should be mentored to integrate integrity to their actions and learn to stand by what is right all the time. Informing the young ones more often that there are hatchbacks that accompany the same helps in preparing them for the real unforgiving world by preparing them of what to expect. This approach enhances development of a good character as the children learn to accept that it all tones down to what is on the inside (Clarcken, 2009). Moreover, instead of pointing fingers, one can choose to work on self and create an impact in society. Essentially, integrity entails keeping promises. Parents and concerned stakeholders should note that in order to bring up virtuous children, they should also commit to keep promises they have made, evoking subconscious conception on the children that follow through with promissory commitments is what breeds trust (Narvaez, 2010).

## *2. Responsibility*

Responsibility, in this context, is being forthcoming and ready to acknowledge wrongs and show willingness to face the consequences for the committed wrongs. Verily, responsibility is the ultimate measure of integrity. Raising children to know that, despite having wide scopes of freedom and rights, it is critical that one follows through to the chosen actions (Clarcken, 2009). In other words acknowledging that, yes, one has free will, but sticking with the implications of actions is the true measure of moral intelligence. As reflected by Gigerenzer (2007), true intelligence is accepting full responsibility for one's actions, bearing in mind that convictions precede actions. For kids, nurturing them to understand the principle of cause and effect will positively influence behavior as the children act in full knowledge that consequences are inevitable in the future. This is critical as it formulates better decision making and morally sound approaches to issues, which influences positive character (Sivanathan & Cynthia Fekken, 2002).

Significantly also, by learning to carry own cross, students receive guidance on the need to desist from blame games and fostering accountability. Responsibility in moral intelligence is best imparted to

children through demonstration. This is whereby congruence is experienced in words as well as action (Coles, 1998). For instance; a teacher should appreciate students' correction of omissions, encouraging them to open up more. In so doing, children will learn to appreciate responsibility. Evidently also, by guiding children into volunteering, they will cultivate responsibility from the lens of doing something good to harness fulfillment. Coupling this with not expecting immediate results polishes patience and hence a good character.

### 3. *Compassion*

Compassion is of importance in moral intelligence as it presents two key perspectives. On the onset, it demonstrates humanity, where the needs to find out what others are going through further estranged morality revision. In addition, compassion involves expressing patience in reasoning and being ready to leave any time as nobody has ever guaranteed coming back. This approach of

life makes young people appreciate the little things that they would have otherwise taking them for guarantee, ensuring that even in their later ages they do not depart from the morals and values that were imparted to them (Beheshtifar, Esmaeli & Moghadam, 2011). The truth is compassion looks beyond the normal physical eye, where, instead of judging situations and people solely on the way they appear, one gets to learn that there is more than meets the eye thereby, shifting criticality to the distinctive features aside the physical ones that define individuals (Coles, 1998). Nurturing children following this perspective ensures that even in the coming years the society is assured of having individuals that understand why laws are important and not just abiding for the sake of it.

Looking at the other side of the coin, compassion is not only impactful on the less fortunate, but can equally play a major role in the children in question affairs. By comprehending that it is okay to seek help in a difficult situation, society has the opportunity of modeling morally upright citizens who believe in fellowship in times of crises and being there for each other, as opposed to the "am okay" culturally constricted dynamics today where people are suffering silently while surrounded by brothers and sisters (Clarke, 2009).

#### 4. *Forgiveness*

Forgiveness entails letting one's own guard down and being able to look beyond other people's actions and mistakes. According to Enright (1998) forgiveness is the readiness to accept the shortcomings of other people and tolerating them despite the wrong that was committed. Lennick and Keil (2005), further point out that there are two forms of forgiveness one has to embrace in the quest to attain higher moral intelligence. The first one is forgiving the people who have treated us wrong many times, and the other one is, taking a more personal approach whereby one is able to forgive oneself despite self-evaluation and discovery of iniquities. Teaching children to forgive from their initial formative ages as maintained by Piaget (1972), hallmarks the whole life of them. Mentoring young people to embrace forgiveness is the best way of preparing them for the imperfect world that is characterized by disappointments. Instead of blindly walking into life thinking of it as a perfect cosmos, forgiveness is the key reminder that we are in constant learning because of our mistakes (Piaget, & Cook, 1952). They define us.

Furthermore, this enhances creativity and critical thinking for the young learners who are aware that their opinion is highly welcomed. That in fact, being wrong is an integral part of the learning process. People get comfortable with communication and get to learn that communication is what resolves the daily challenges encountered and as a result, the children grow to become open minded individuals very welcoming to criticism which in turn shapes their moral intelligence (Gigerenzer, 2007). Forgiveness allows one to learn to look beyond bitterness and hatred.

Essential Virtues in Raising Children as noted by Michele Borba

##### **1. Empathy**

According to Borba (2001) empathy is the capacity of an individual to identify with other people's issues. Empathy looks beyond pity, where other people's problems become part of an individual who feels the need to intervene. It is important not to confuse empathy with sympathy as sympathy entails looking at people suffering with pity and feeling sorry for them instead of making efforts to help (Borba, 2001). By teaching introducing children to the concept of empathy through demonstration, where they are taught to develop sensitivity towards other people's feelings. This in turn guarantees the raising of, not only morally

upright children conversant with considering the feelings and attitudes of others, but also they get to appreciate whatever has been availed to them (Coles, 1998).

## **2. Conscience**

More often than not, people go around complaining and saying, “My conscious is not clear.” In the moral intelligence approach it is of great essence to understand the weighty meaning the aforementioned words harbor. Conscience can be defined as identifying the right and correct way to do something and actually following through with the same (Narvaez, 2010).

It is the hub upon which moral growth develops looking at the role it assumes in behavior guidance. In a nutshell, children should be cultivated to embrace positive behavior as conscience frameworks that distinguish between right and wrong. Following this model, children learn to judge options before delving into them, which, when repeated, enhances buildup of positive character (Borba, 2001).

## **3. Self-Control**

Self-control is the practice of training the mind to stay in control and regulate one from choosing pleasurable options at the moment that eventually may elicit dire consequences. Grounded on the fact that human beings are hedonistic by nature with the ability to weigh between pain and pleasure of an action, teaching children to suppress the immediate gratification (Sivanathan & Cynthia Fekken, 2002). Instead, the children are modeled to focus on self-control especially when confronted with exciting options and encouraging logical and critical thinking when making both small and large choices (Borba, 2011). This is achieved by training the child to know that every choice has a consequence, meaning they would weigh and re-weigh options as they know they are solely responsible (Beheshtifar, Esmaeli & Moghadam, 2011)

## **4. Respect**

Respect is a very simple concept but at which humanity has had trouble hacking. More often than not, people let go of their calm demeanors and portray levels of disrespect that leave people in shock. At the heart of character lies respect, which goes deeper than verbalization as it entails conduct. Teaching children to abide by respectful behavior can be toned down to a number of stages, first one is making the child understand the concept of respect by not just teaching but also modeling the same (Coles, 1998). Secondly, upholding the child's respect for authority and firmly standing against impunity manifested through rudeness. By establishing the boundaries and having no interference from parents, guardian or educator succeeds in positive character development as the child grows up knowing that respect is not negotiable.

## **5. Kindness**

Kindness revolves around being people centered. A kind person naturally demonstrates genuine interest in the welfare and well-being of others. From a young age, children should be taught the essence of being kind to other people. Through the implementation of reward mechanisms, where children are gifted upon demonstrating impeccable respect, the culture can be nurtured as continued repetition of the same creates habit (Clarken, 2009). Importantly also, embracing the concept of kindness means that the children will learn to accept and acknowledging that despite people's diverse origins and backgrounds, we are all the same (Borba, 2001). The modeling can be enhanced by buying books for instance that show good characters who have been rewarded with happy endings as well as videos that the child can be able to relate to.

## **6. Tolerance**

This can be defined as remaining objective and upholding the dignity and rights of everyone despite differing beliefs on the same. The diversities are many ranging from political opinions, race and origin, religious beliefs just to name a few (Sivanathan & Cynthia Fekken, 2002). As opposed to stereotypic thinking that stands in the way of rationality, tolerance show cases of high level moral intelligence whereby one harnesses the concept of "live and let live." One chooses to judge the coherence of arguments and reason as opposed to traditional fallacies that advocated for intolerance and automatically considering, "the other" as automatically wrong, by the mere fact that their arguments and beliefs contradict with own. In modeling young people, educators and those in charge should employ non participant observation to assess

how intolerant the kids are. This provides a good ground in formulating the appropriate measures, which if geared correctly can be used to cultivate moral intelligence (Borba, 2001).

## 7. Fairness

Borba outsets fairness as a virtue. Borba expresses fairness as opting for open-mindedness that instigates acting fairly and justly at all times. As a parent or educator, setting a good example for the children is beneficial as they grow up sticking to, what mom or my teacher does (Sivanathan & Cynthia Fekken, 2002). Through treating all the young people at one's disposal fairly, the children get to embrace the same values, moreover, teaching the children to behave with utmost fairness and calling out on them in times they derail helps significantly as they get to identify the gravity of their actions (Beheshtifar, Esmaeli & Moghadam, 2011). Looping these foundations over a long period of time become part of the children translating to them having great character worth emulation.

## Conclusion

The concept of morality is complex, challenging and takes significantly long time to master. Similarly, moral intelligence as presented in the above presented argument is equally challenging. It is evident that society has reached a moral dilemma today, making people unwilling and reluctant to come forth when morality related issues are raised. This tendency has been attributed to ignorance with many assertions claiming that the subject is avoided as people are less concerned with moral intelligence. Looking at the education system, it is evident that the same seriousness as should, considering the peaking immorality (Coles, 1998). Focusing on the future, it has become evident to start with the children as they determine the future dynamics in the morality question. Following the right approaches is what will yield the desired results.

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# The Impact of Hyperactivity on Children's Social Skills

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## Abstract

Attention Deficit Hyperactivity Disorder (ADHD) is a prevalent emotional and behavioural disturbance that can affect the scholastic and social functioning of school-age children. ADHD is characterized by developmentally inappropriate attention, impulsiveness and motor activity. Children with attention problems create a special population with diverse needs within an educational setting. Although there are a myriad of problems associated with children identified as having ADHD, social skill deficits have been concerned by many parents and school personnel. Topics addressed in the literature review include the definition and common interventions regarding ADHD, as well as the definition of social skills and social skill assessment and intervention programs. This study also clarified how ADHD is linked to social skill deficits in school-age children.

**Keywords:** Attention Hyperactivity Disorder (ADHD), Social Skills, Diagnosis, hyperactivity, learning.

## Introduction

Disorders of attention and activity are amongst the most prevalent of emotional and behavioural disorders affecting children and adolescents. They are also currently considered as the most controversial disorders in our society. Children with attention problems constitute a special population of students with a wide range of needs. The most commonly diagnosed childhood disorder among students is Attention Deficit Hyperactivity Disorder, also known as ADHD (Kronenberger & Meyer, 1996). ADHD is marked by developmentally inappropriate attention, impulsiveness and motor hyperactivity (Rosenhan & Seligman, 1995).

In general, ADHD is defined by the presence of socially disruptive behaviours, either attention or hyperactive before the age of seven, which persists for, at least, six months (Sue, Sue, & Sue, 1997). Characteristics of children who suffer from ADHD primarily include inattention, impulsivity, and deficits in rule-governed behaviour, not the restlessness or squirminess that has often been the focus of adults' concern. Those identified as having ADHD may show difficulty in focusing and sustaining attention, controlling impulsivity and showing appropriate motivation (Kauffman, 2001).

### **Common Problems Associated with ADHD**

Students with ADHD have attention problems that span several settings. ADHD is extremely apparent in a school setting and may have a grave impact on a child's educational experience. Traditional schools expect students to be patient, listen attentively, complete assignments, cooperate with pairs and pay close attention to the task at hand. These activities are difficult for children who have ADHD because they cannot control their behaviours. Behaviours that often accompany ADHD include the inability to "think before you act," take turns; wait in a line and excessive fidgetiness and restlessness. School children who have ADHD may have a hard time remembering to do tasks, constantly run late, and turn in homework that is unfinished or past its due date.

Students with ADHD may appear to be emotionally immature, quick-tempered, and easily frustrated (Kauffman, 2000). All of the above characteristics may make it difficult for children to function successfully in a school setting both academically and socially.

Recently, it has been discovered that students with ADHD may suffer from developmentally inappropriate social behaviours, which likely affects the development of friendships and relationships with peers. Many studies have found evidence that suggests that children with ADHD manifest social skills deficits with peers

because of the behaviours that often accompany ADHD disruptiveness and poor impulse control; poor development of social skills can have very serious negative side effects, which include long-term effects that may carry over into adulthood. Children who demonstrate problems with social and peer relationships at an early age often continue to have socialization problems later in life (Dumas, 1998).

In order to help students with ADHD participate positively in classroom and social settings, their academic and social deficits need to be addressed and accommodated.

Social skills deficits are not only experienced by students with ADHD, although it is predicted that fifty percent of students with ADHD experience relationship problems (Dumas, 1998). Low social functioning can be experienced by students with exceptional needs as well as regular education students. Poor social skill development for children can lead to adverse effects in the future. For example, poor social skills have been linked with a higher incidence of school dropouts, juvenile delinquency, a loss of jobs, disorderly conduct and law enforcement contacts (Landau & Milich, cited in Landau & Moore, 1991). Lack of adequate social skills can negatively affect the development of peer relationships, which can lead to having few friends. A study done by Weiss & Hechman (cited in Landau & Moore, 1991) indicated that students who have been identified as having ADHD are more likely to experience feelings of sadness and loneliness when compared to their non-ADHD peers. It also seems that students with ADHD are less involved in their communities as well as in school activities.

A person's social status greatly determines if an individual is accepted or rejected by their peers and determines if a person is acceptable in a group. Students who are labelled as hyperactive have a high incidence of being rejected by their same age peers. This negatively affects the hyperactive student's status as acceptable and makes it difficult for a student with ADHD to maintain healthy friendships (Landau & Milich, cited in Landau & Moore, 1991). A study conducted by Milich, Landau, Kilby, & Whitten suggested that children with hyperactivity are more unpopular and socially rejected than peers who are aggressive in nature (as cited in Landau & Moore, 1991). Social skills training can be integrated into learning disabled and regular education curriculum to help students learn the necessary skills to develop and maintain relationships in and out of a school setting. School-based interventions can be planned and implemented to help students with ADHD by positive relationships with peers and teachers (Evans, Axelrod, & Sapia, 2000).

To help students with ADHD to function appropriately in a classroom and at school in general they must be accepted and included by their peers and teachers. The opinions a teacher holds about a certain students is communicated and reinforced by the other children in the classroom. Teacher perceptions often influence how students respond to others, whether teachers are aware of this or not. It has been suggested that students who suffer from learning disabilities, including ADHD, are the recipients of more negative attention, less praise, and more disciplinary action by their teachers when compared with their non-disabled peers (Hepler, 1994). The previous literature has suggested that, along with other difficulties, students with ADHD suffer from social skill impairments. Attitudes and attention from a student's peers, whether negative or positive, can have a huge impact on a student's educational experience. It is pertinent that professionals within the field of education better understand the social deficits and needs of children with ADHD.

Therefore, the impact of social skill deficits of students who have been identified as having ADHD needs further exploration. By understanding student's social needs, we can ensure that students, who are identified as having ADHD, have the best possible opportunities to develop social skills that are socially desirable by others. In turn, this allows a better chance to be accepted and active in healthy peer relations, both in childhood and adulthood.

### **Social Skills**

A primary concern of educational professionals and parents of children who are identified with ADHD is the effects that ADHD has on a student's social functioning. As humans, almost everything we do is about the ability of interacting and communicating with others both verbally and non-verbally. The importance of successful communication is extremely apparent in an educational setting. Students must be able to interact successfully with teachers, and especially with their peers. Understanding the basic social rules of society and being able to put them into practice enables us to maintain healthy relationships with our peers as well as deems us socially competent and desirable (University of Cincinnati, 2001).

Social skills are complicated, observable behaviours that include problem-solving skills. They are usually developed through learning and involving with giving, receiving, and interpreting messages. Social skills also involve detailed verbal (speech, words, sentences) and nonverbal (posture, eye contact, voice, facial expressions) behaviours.

Social skills allow children to experience positive experiences in social situations (L.K. Elksnin, 1996; cited in Elksnin & Elksnin, 1998). Social skills can be divided into several categories. These categories are interpersonal behaviours, peer-related social skills, teacher-pleasing social skills, self-related behaviours, assertiveness skills, and communication skills.

### **Types of Social Skills**

*Interpersonal behaviours*, also called friendship-making skills, include behaviours such as introducing oneself, joining in activities, asking someone for a favour, offering oneself to help others, giving and accepting a compliment from others and the ability to apologize.

*Peer-related Social Skills*- are skills that are most valued by peers and classmates and lead to the acceptance by classmates. Peer-related social skills include working in cooperative groups, asking and receiving information from others, and identifying the emotions of others. *Teacher-pleasing Social Skills*- these behaviours are connected with success in an educational environment. These skills include following directions from teachers, obeying school rules, exerting your best effort while doing class work and homework and listening to teachers and peers while they are speaking.

*Self-related behaviour*- these skills help children to determine what a social situation entails and helps them to select the most appropriate and effective skills to use in the situation. Self-related behaviours consist of following through, dealing healthfully with stress, understanding the feelings of self and others and controlling anger and aggression.

*Assertiveness Skills*- these skills allow children to express their needs and feelings without using aggressive behaviours.

*Communication Skills*- Communication skills are made-up of appropriate listening responses, taking turns with others, maintaining attention during conversations and giving feedback to the person you are speaking to (Elksnin & Elksnin, 1998).

Developing effective social skills is an important milestone in a child development.

Previous research has shown that social and relationship problems in childhood directly correlate with problems in socialization and mental health difficulties in adulthood

(Strain & Odom, 1986; Elksnin & Elksnin, 1998). Social skills such as understanding the feelings of self and others, being able to control your emotions and making others feel comfortable, are important in predicting whether or not an individual will be socially successful in life. School performance and adequate social skill development also seem to be related.

It has been suggested in a study conducted by Gresham (1981) that students who have inadequate social functioning have more school-related problems. This puts students in a poor situation of social skills, at a higher risk of dropping out of school and achieving at lower rates when compared to their same age peers with appropriate social skills. Elksnin and Elksnin (1998) demonstrated that poor and lacking of social skills are also directly correlated to our nation's unemployment rates and underemployed population. Employer's value is well developed interpersonal skills in their employees and consistently ranks interpersonal skills as more valued than job preparedness skills. It was also reported in a study conducted by Johnson and Johnson (1990; cited in Elksnin & Elksnin, 1998) that ninety percent of lost jobs were related to social difficulties.

Social skills are very important for students in order to function successfully in a social environment. Social skills are especially critical for students who are identified with disability. Students who are identified as having an emotional or behavioural disorder (including ADHD) are consistently identified as lacking the pertinent social skills they need to be accepted by their peers. In general, students with emotional and behavioural disorders are the most who need of social skill development and training, compared to students in other disability categories (Elksnin & Elksnin, 1998). It is also important to recognize that social skill deficits seem to persist with age and will not improve by themselves as a child moves through each stage of development. The United States Department of Education (1996) reported that twenty-nine percent of students who graduated from a high school in 1995, required social skills training beyond that provided by their formal education. This demonstrates that social skills are skills that not only affect functioning as a student, but also as an adult in the world outside of the school.

### **Identifying Social Skills Deficits**

Identifying students who have social skill deficits can be achieved by many ways. A common avenue to assess the social skills of a child is through a rating scale. Rating scales, like the Social Skills

Rating System (SSRS), are especially useful when a large population of students is being assessed. Rating scales are also useful when one wants to gather information from a variety of sources. A rating system also allows one to pinpoint other behaviours that interfere with a student's ability to use and develop adequate social skills (Elksnin & Elksnin, 1998).

When administering a rating scale system, one should keep in mind the effects of the rater bias and minimize this effect by using several raters. A researcher should also be aware that rating scales do not typically allow the cause of the social skill deficit to be identified. Another limitation for the use of rating scales is that the results from the rating scale system may be different than what is observed in the student's environment (Elksnin & Elksnin, 1998).

Interviews with parents, teachers, counsellors, and peers are also a sufficient way to determine if a student lacks the social skills that are necessary to develop and maintain relationships. Using interview techniques is useful when one wishes to identify social skills that are less or more important to the individual interviewee. Interviews also allow researchers to determine the difference between a child's current social skill status and the desired skill level (Elksnin & Elksnin, 1998). Interviewing a student whose social skills are in question can be a helpful technique as well. Interviewing the student can make the researcher know the student's own level of self-awareness concerning his or her social skill deficits.

Through student interviews, one can also explore the child's willingness and motivation to learn necessary social skills. Student interviews also present the opportunity for the interviewer to conduct an on-site observation of the student. While conducting an interview, one can observe such social skills as the communication style, eye contact and the ability to hold a conversation (Elksnin & Elksnin, 1998). When deciding to conduct an interview, whether it is with a parent, teacher, counsellor or a student, a researcher must be aware of time-constraints. Interviewing individuals can be very time consuming. Researchers must also recognize that interviewees may provide unreliable information. To avoid collecting unreliable information it is important to keep the interview as structured as possible (Elksnin & Elksnin, 1998).

A behavioural observation is another excellent way to gather information about a student's social skill development. Behavioural observations directly determine if a student needs a direct instruction on how to develop his or her social skills. Observation of a child interacting with his or her peer group allows an observer to compare one student's social skills to another. Direct observation also allows a researcher to

see if the intervention that was implemented has improved the particular student's social skills. While observing a child in his or her natural setting is useful, one must recognize that it takes a significant amount of time and is not useful when assessing a behaviour that occurs infrequently (Elksnin & Elksnin, 1998).

### **Effects and direct Impact of ADHD on Social Skills**

It was stated earlier that approximately fifty percent of children identified with ADHD have social skill deficits and peer relationship problems (Dumas, 1998). Poor development of peer relationships has been a major predictor in future social adjustment problems and mental health problems in later life. Socialization problems, social incompetence and peer rejection are directly linked to low self-esteem, depressed mood and anti-social behaviour in childhood and beyond (Robbins, 1966; cited in Dumas, 1998).

Peer adjustment problems involving children with ADHD have also shown to have detrimental effects on a child's self-esteem (Wheeler & Carlson, 1994). Behavioural traits that accompany ADHD, such as poor impulse control, inattention to peers and intrusiveness put students with ADHD at-risk to develop social deficits. It seems that students with ADHD receive few, if any, positive peer nominations, such as "most liked," yet receive a disproportionate number of nominations as "least liked" (Erhardt & Hinshaw, 1994; cited in Dumas, 1998).

In a study conducted by King and Young (1982; Wheeler & Carlson, 1994) it was shown that students with ADHD are aware of their negative social status and their problems with social functioning. Another study conducted by Lahey (1982; cited in Wheeler and Carlson, 1994) showed that students with ADHD consistently rated themselves as being more depressed, having lower self-esteem, being less popular and having more behaviour problems than their non-ADHD peers. In the same study, students with ADHD also rated themselves as having more physical appearance concerns, anxiety, and general unhappiness compared to their non-disabled peers.

Another area, that is of social concern with children who have ADHD, is the affect

ADHD related behaviours have on others. Evidence has shown that students with ADHD can cause negative behaviours in teachers and peers that interact with them. For example, students who are non-disabled may exert more controlling behaviour on their peers, which, in turn, may escalate negative behaviours in students who have ADHD, thus leading to an overall more disruptive classroom. A study

conducted by Campbell, Endman, and Bernfeld (1977; cited in Wheeler & Carlson, 1994) also showed negative interactions with teachers. Classrooms that contained students with ADHD had higher rates of negative teacher-child interactions among all students.

## **Conclusion**

Children who have been identified as having ADHD also tend to be more disagreeable in nature and have more negative social interactions at school and at home.

Parents of children who have ADHD report that their child's behaviour often annoys others. The presence of an aggressive child with ADHD can also negatively affect social interaction. It was reported by Clark, Cheyne, Cunningham, & Siegel (1988; cited in Dumas, 1998) that children who are identified as having ADHD, tend to be more disruptive and domineering as well as quicker to resort to aggressive behaviour with peers. Children who have been identified as having ADHD are at risk to develop many problems related to socially unacceptable behaviour and social maladjustment, among other problems that accompany ADHD are disruptive behaviour disorders (conduct disorder), substance abuse, and academic underachievement (Dumas, 1998). A large percentage of children with ADHD appear to be at the risk of developing significant social and peer relationship deficits. Students with social deficits or social delays need to be identified and treated in order for these students to be successful in many social aspects of life (relationships, peers, employment). Schools and social institutions, and as educators we need to address the wide range of social issues that affect children with ADHD in order to improve the social functioning of these students. By addressing social skill deficits, educators can make school a more positive and friendly place for children with ADHD.

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