KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF ECONOMICS

THE EFFECTS OF DRUG ADVERTISING ON CONSUMER HEALTH BEHAVIOR

A THESIS SUBMITTED TO THE DEPARTMENT OF ECONOMICS, KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF PHYLOSOPHY IN ECONOMICS.

BY

EVANS NELSON-DZIWORNU

(PG5542411)

JUNE, 2013

DECLARATION

I declare that this thesis herein submitted is an original work I have personally done with the exception of references to other people's work which I have appropriately acknowledged.

……..……..…… **……**

EVANS NELSON-DZIWORNU **DATE**

(STUDENT)

I declare that I have personally supervised the student named above to undertake the study herein submitted and I confirm that the student has my permission to present it for assessment.

…….…….. **……**

MR. APPIAH NKRUMAH **DATE**

(1st INTERNAL EXAMINER)

…….…….. **……**

DR. (Sr) E. AMPORFU **DATE**

(2ND INTERNAL EXAMINER)

…….…….. **……..**

MR. APPIAH NKRUMAH **DATE**

(HEAD OF DEPARTMENT)

DEDICATION

To my dear parents Mr. Nelson Dziwornu and Mrs Dorothy Dziwornu , for their unflinching support, care and sacrifices throughout my educational life.

I also dedicate this thesis to my siblings; Frank Nelson Dziwornu, Daniel Nelson Dziwornu, and Mabel Nelson Dziwornu for their support.

Finally, I dedicate this thesis to my wonderful wife Georgina Asante and my lovely daughter Audrey Nelson-Dziwornu.

ACKNOWLEDGEMENTS

I am most grateful to the Almighty God for seeing me through my educational expedition and most especially this master's programme successfully. I owe my life and this thesis to him.

I am also very grateful to my supervisor, Mr. Appiah Nkrumah. When all hope was lost he helped me with this topic and successfully supervised to the end.

My postgraduate programme would not have been this successful without the supportive efforts and encouragement of my course mates. It would not have been complete without them. I also acknowledge my wonderful lecturers and all who have in diverse ways influenced my academic life. I am grateful.

Finally, I am grateful to all whose work were cited in this thesis

ABSTRACT

Presently, Ghana is characterized by various forms of drug (medication) adverts through various media, even though the Food and Drugs Board frowns on some of these adverts. This study seeks to examine the effects of drug (medication) advertising on consumer health behaviors using primary data. The convenient sampling method was used to administer questionnaires and a sample size of 500 respondents was used. The Logit regression model was used to analyze the data gathered and both descriptive and quantitative methods were used to interpret the results. The study revealed that drug advertising does not have any significant impact on exercise, consumption of healthy diet, and medical check-ups. The case of dissociation from high risk behaviors was the only health behavior that drug advertising affected significantly. The study showed that, drug advertising encouraged people to engage in risky health behaviors. On the other hand, drug advertising impacted positively on the demand for drugs and self-medication. This implies that, Ghanaians engage in high risk behaviors, purchase drugs, and self-medicate as a result of drug advertising. Health insurance also impacted negatively on the demand for drugs but insignificant. The study recommends that, food and drugs board should enforce laws concerning the advertisement of drugs. The Ghana health service should also skew advertisement to the essence of engaging in healthy behaviors instead of consuming medication and there should be proper monitoring of the activities of pharmaceutical companies to enhance the Ghana health system.

TABLE OF CONTENTS

CONTENT **PAGE**

LIST OF TABLES

TABLBE **PAGE**

CHAPTER ONE

INTRODUCTION

1.0 Background of the Study

Drug is any substance or mixture of substances manufactured, sold, or presented for in-vivo use in the diagnosis, treatment, mitigation or prevention of a disease disorder, abnormal physical state, or the symptoms thereof; or in restoring, correcting or modifying organic function(s) in man, but excluding mechanical devices and cosmetics, Food and Drugs Board (FDB, Ghana). This research however limits drug to only medication drugs which could be over the counter drug, prescription drug, pharmacist recommended drugs, herbal drugs, and specialist drugs.

According to the Food and Drugs Board (FDB), advertisement is the publicity of goods and description of all products (drugs); this includes any form of notices in circulars, handouts label wrappers, catalogue and price lists, newspaper, magazines, and many other documents made orally or otherwise or by means of projected light, sound recording, radio, presenter mentions, television, bill boards, mobile vans and writings once the product has been tested and approved by FDB. The Food and Drugs Board has been the sole regulator of the drug and food industry in the area of adverts, production and quality on the market. This is to ensure consumer safety in Ghana. Pharmaceutical industries however form an integral part of the health care system by making all forms of drugs available to consumers. Chemical sellers and pharmaceutical shops are the principal source of medicinal products for the Ghanaian (urban and rural) population. Chemical sellers are also recognized as the first-line or only source of consultation for 60% of people seeking health care in general, especially the rural population who lack health facilities.

There are over 8,000 licensed chemical sellers (LCS) in Ghana and perhaps 2,000 more that are unlicensed. Although many essential medicines are currently available in chemical sellers' shops, those that require prescriptions are provided illegally without the proper authorization of health authorities. Strategies for Enhancing Access to Medicines (SEAM, 2001).

In recent times, there has been massive advertisement of drugs, which to some extent can influence the health behaviors of Ghanaians. When drugs are not available it brings the whole health care system to a halt since consumers will not have access to drugs which are very important to curing and prevention of diseases but can be harmful when abused or when used inappropriately. The inappropriate use of drugs has medical, social, and economic implications on the healthcare system. In Ghana drugs are estimated to constitute 60% to 80% of the cost of healthcare, (Ministry Of Health, 2004.). Hence, it is the responsibility of the FDB to ensure that certain activities of the pharmaceutical sector of the healthcare system like drug advertisement are clearly defined and implemented in the right manner to ensure efficient and effective health care system in Ghana.

Recently, anyone who watches television or reads newspapers or magazines or listens to radio cannot help but notice the dramatic upsurge in the number of drug adverts. This is done not only for over the counter (OTC) drugs but also prescription drugs in Ghana. In the pharmaceutical sector in the U.S.A, drug advertising has been increasing since the late 1990s at a rate of about 30 percent compounded annually (IMS Health). The pharmaceutical companies spent about $905 million on direct-to consumer advertising (DTCA) in the first half of 1999 alone which represented 43 percent increase over spending levels a year earlier, according to IMS Health. It must be noted that advertising does not exist in isolation, but is closely interwoven with the

culture and traditions of the society in which it appears. The vast majority of both prescribed and OTC drugs consumed worldwide are mostly advertised. This is especially true in developing countries and in economies in transition, which Ghana is not an exception.

Over the past few decades, advertisement has been used in an attempt to affect various health behaviors in mass populations. Such campaigns have mostly been aimed at remedy and preventive services but have also addressed illicit drug use and many other health-related issues. Typical advertisement have placed messages in media that reach large audiences, most frequently via television or radio, but also outdoor media, such as billboards and posters which have been the major tool in adverts, and print media, such as magazines and newspapers. Exposure to such messages is generally passive, resulting from an incidental effect of routine use of media. Some adverts incorporate new technologies (eg the internet, mobile phones). Advertisement of drugs can be of short duration or may extend over long periods. They may stand alone or be linked to other organized program components.

Generally, drug advertisers are of the view that consumer's attitude towards choice of drug to consume is affected by adverts. In other words, it could be argued that if consumers have positive attitudes towards direct-to-consumer (DTC) advertising, they are more likely to adopt the specific advertised brand and vice versa (Ajzen and Fishbein, 1977). More recent research shows that consumers attitude towards an advert or a brand may not always be indicative of a consumer's final choice in decision making. In fact, in some cases consumers intentions and final brand choice may not necessarily be related at all (Biehal et al., 1992). Research also suggests that, the relationship between consumer attitudes and behavioral intentions might be more complex than originally believed (Biehal et al., 1992; Burton and Lichtenstein, 1988). As such,

consumers may develop a preference for a particular brand or product even when they do not have very favorable attitudes towards the advertisements for these products particularly in situations where consumers perceive greater risk levels (Biehal et al., 1992).

1.0.0 Definition of Terminologies

1.0.1 Advertising

The non-personal communication of information usually paid for and usually persuasive in nature, about products (goods and services) or ideas by identified sponsor through various media. (Arens, et al 2010). The purpose of advertising is to create interest and opinion in the favor of the product being presented in the adverts (Zikmund and D'amico 1999). Advertising messages are usually paid for by sponsors and viewed via various traditional media; including mass media such as newspaper, magazines, television commercials, radio advertisement, bill boards, mobile vans and writings, outdoor advertising or direct mail; or new media such as websites and text messages. The current spectrum of drug advertisements aimed at consumers is falls into three categories. According to Lynette Bradley and Julie Zito (1989), these are;

I. Health-seeking advertisements that educate consumers about a disease or medical condition.
II. Reminder advertisements provide the name of the drug and other minimal information but say nothing about the drug's use, effectiveness, or safety.
III. Product-specific advertisements mention a drug therapy by name, describe its therapeutic use(s), and make representations about its safety and effectiveness.

The vast majority of advertisements fall within the third category under which the major problem of self- medication is in Ghana.

Drug means a substance or mixture of substances manufactured, sold, or presented for in-vivo use in the diagnosis, treatment, mitigation or prevention of a disease disorder, abnormal physical state, or the symptoms thereof; or in restoring, correcting or modifying organic function(s) in humans, but excluding mechanical devices and cosmetics, (FDB, Ghana). These can be grouped as follows.

a. Over-the-counter drugs (OTC)

According to Ghana's Ministry of Health (MOH), Over the Counter Drugs (OTC) are drugs that are generally regarded as safe for the consumer for use by following the required label directions and warnings. They may be purchased without a prescription. These drugs are very common on the market.

b. Prescription Only Drugs

Prescription only drugs are drugs that can only be made available to the consumer through a written order signed by a duly qualified and registered prescriber and dispensed by a registered pharmacist.

c. Specialist Drugs

Specialist drugs refer to drugs or medications that are restricted for use by qualified specialists (consultants) who may request for them. eg. Anti -cancer drugs.

d. Herbal drugs

These are drugs that are manufactured from the herbs and serve the purpose of both over the counter and medication drugs.

e. Healthy behavior

A healthy behavior is an action taken by a person to maintain, attain, or regain good health and to prevent illness. Health behavior reflects a person's health beliefs. Some common health

behaviors are exercising regularly, eating a balanced diet, and obtaining necessary inoculations. (Mosby's Medical Dictionary, 2009)

1.1 Problem Statement

Aiming drug adverts at consumers means big business for drug companies, but its effect on consumer behavior is not yet known. Drug advertising of prescription drugs as well as over the counter drugs in some cases, is affecting patients, doctors, and health care organizations in profound but not always predictable ways (wilkes et la., 2000). This may result in overdose, adverse effects, and sometimes avoidable deaths which occur as a result of self-medication.

Food And Drugs Board law 1992 (PNDCL 305B) stipulates that, there shall be no advertisement permitted for drugs and herbal medicines specified in schedule 2 of the PNDCL 305B. Which outlines the diseases for which advertisement for treatment, prevention or cure are prohibited. These diseases include sexually transmitted diseases, other forms of Genito-uninary diseases. Acquired immune deficiency syndrome (AIDS) or diseases connected with the human reproductive functions. Some of which are; amenorrhoea, arterio-sclerosis (stroke), bladder stones, blindness, cancer, deafness, diabetes, diphtheria, epilepsy or fits, erysipelas, gallstones, goiter, heart diseases (hypertension), hernia or rupture, kidney stones, and many more. All drugs for these diseases are prohibited from advertisement but that is not what is going on due to the enormous lorry park and radio advertisement on such diseases most of which are herbal drugs.

Due to the difficulty in studying human behavior, there is the need for individuals to express their views and experiences on drug advertisement and its effect on their health behaviors. This is necessary because the primary objective of many drug adverts is to influence individual recipients by affecting their views and knowledge about particular brands which affects their

decision making process. Hence making it relevant to find out whether these drugs advertised have any effect on consumer health behavior.

1.2 Objectives of the study

The primary objective of the study is to ascertain how drug advertising has impacted on the health behavior of consumers in Kumasi. The study examines whether advertising has any impact on the habit of people in terms of drug consumption, exercises, engagement in risky behaviors and others as stipulated by the Grossman model. Specifically, the study seeks to

- Investigate consumer awareness of drugs advertised.
- Examine the effect of NHIS on the demand for advertised drugs.
- Ascertain the effect of drug adverts on health consumption.
- Determine whether consumers self- medicate as a result of drug adverts and the consequence.

1.3 Hypothesis

H_0: Advertisement does not affect consumer health behavior

H_1: Advertisement affects consumer health behavior

H_0: Advertisement does not affect consumer's choice to self-medicate

H_1: Advertisement affects consumer's choice to self-medicate

H_0: Advertisement does not affect consumer demand for drugs

H_1: Advertisement affects consumer demand for drugs

H_0: Health Insurance does not affect consumer demand for drugs

H_1: Health Insurance affects consumer demand for drugs

1.4 Methodology

The study employed the use of primary data which was obtained through the administration of Questionnaires and personal interviews. The convenient sampling technique was used for the study. According to Boxill et al (1997) convenient sampling is a type of non-probability sampling which involves the sample being drawn from that part of the population which is close to hand. That is, a sample population selected because it is readily available and convenient. This convenience can be in the form of stopping people on the street and passerby to interview.

A sample size of 500 was used for the study and distributed for entire Kumasi based on Yamane (1967) sample size calculation method which was chosen over other sample calculation methods because it takes into consideration the population size and gives allowable error. The limited dependent variable regression model (Logit) was employed to analyze data gathered. The logit model is used when the dependent variable is categorical or limited in the sense that it takes on a finite number of discrete values, which can represent nominal categories.

$$Li = \ln (Pi /1 - Pi) = b1 + biXi$$

These equations and an in-depth explanation of the logistic model can be found in Gujarati (2003), which is where this discussion was drawn. L, which is the log odds ratio, is linear in X and also linear in the parameters. Li is the logit model, which is commonly used to estimate models with limited dependent variables. Qualitative and quantitative methods were used for the data analysis in this study.

1.5 Justification of the Study

There are several adverts on television, radio, lorry parks and all forms of media in Ghana but not much has been done concerning the effects of these drug advertisements on consumer health behavior. This study will however serve as a source of information to the public, policy makers (Food and Drugs Board), and healthcare institutions on the effects of these drugs advertised on consumer health behavior in the Kumasi metropolis.

This study will also serve as future references for academia, civil society groups, as well as government, agencies responsible for health care in Ghana to ascertain how drug advertising affect consumers health behavior in terms of consumption. This will help policy makers to ensure effective and quality health care system in Ghana.

1.6 Scope of the study

The study was undertaken in Kumasi which is the regional capital of the Ashanti region. The reason simply being that, the location of Kumasi and the characteristics of people living in Kumasi make it a cosmopolitan, hence making Kumasi an ideal study area. They are also exposed to a lot of advertisement through both electronic as well as print media. Kumasi is also chosen because of proximity to the study, resource constraint encountered in the study and the familiarity of the researcher to the city. In total, a sample population of 500 was used to represent the people of Kumasi.

1.7 Organization of the Study

The study would be grouped into five main chapters. Chapter one contains the introduction and background of the study, chapter two reviews the relevant literature on the topic. The chapter three contains the methodology. The chapter four presents the results of the study and its

analysis. The chapter five looks at the findings of the study as well as our recommendations, policy implications of the study, and conclusion.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews both theoretical and empirical literature on the effects of drug advertisement on consumer health behavior. The mass media is a powerful tool in promoting health interms of giving information to the population through their campaigns. Unfortunately not all countries have proper and effective regulation in the health care market when it comes to the role of the mass media. Currently about 20% of countries have well developed and operational medicines regulation. Of the rest, approximately half have regulation of varying capacity and level of development, and 30% have either no or very limited medicines regulation. The reality is that many low-income countries cannot ensure the safety, efficacy and quality of medicines circulating on their markets (WHO, 2003). The situation is not different in Ghana whose regulatory system is very weak. Lack of proper regulation has promoted advertisement of drugs not only in Ghana but also in other low income countries.

2.1 Theoretical Review

Solomon, Bamossy et al (2006), defined Consumer behavior as the study of the processes involved when individuals or groups select, purchase, use or dispose of products, services, ideas or experiences to satisfy needs and desires. A study by Foxall (1990) revealed there are several different approaches adopted in the study of decision making, drawing on differing traditions of psychology among consumers. The theory of consumer behavior has been grouped under five major topics by writers namely; Economic Man, Psychodynamic, Behaviourist, Cognitive, and Humanistic approaches to consumer behavior. Schiffman et al (2007), reported that, in order to

behave rationally in the economic sense, as the economic man approach suggests, a consumer would need to have adequate information on all available consumption options, be capable of correctly rating each alternative and be available to select the optimum course of action. These steps are no longer seen to be a realistic account of human decision making, as consumers rarely have adequate information, motivation or time to make such a 'perfect' decision and are often acted upon by less rational influences such as social relationships and values as stipulated by Simon (1997). This implies that, a consumer decision making can be influenced by information available to the consumer. The cognitive approach refers to observed action (behavior) to intrapersonal cognition. According to Ribeaux et al (1978), the individual is viewed as an information processor. Stewart (1994) also brought to light that, the intrapersonal causation clearly challenges the explicative power of environmental variables suggested in Behavioral approaches, however an influential role of the environment and social experience is acknowledged, with consumers actively seeking and receiving environmental and social stimuli as informational inputs aiding internal decision making. This implies that, there is the likelihood for drug adverts to also influence consumer health behaviors.

Grossman (2000) focused on how individuals allocate their resources to produce health in his theory of demand for health. His theory looks at individuals as the producers and consumers of their health and introduces the idea of investing in human capital not only to improve outcomes in the market (work) but also in the non-market (household) sector. According to Grossman; Let the inter temporal utility function of a typical consumer be;

$U = U (Ht, Z_t), t = 0, 1 .. , n, ...$ ..... (1)

Where Ht is the stock of health at age t or in time period t, t is the service flow per unit stock, and Zt is consumption of another commodity. The stock of health in the initial period (H0) is

given, but the stock of health at any other age is endogenous. The length of life as of the planning date (n) also is endogenous. In particular, death takes place when Ht < Hmin. Therefore, length of life is determined by the quantities of health capital that maximize utility subject to Production and resource constraints. By definition, net investment in the stock of health equals gross investment minus depreciation:

$H_{t+1} - H_t = I_t - \sigma_t H_t$ …… (2)

where It is gross investment and σt is the rate of depreciation during the t period ($0 < t < 1$). The rates of depreciation are exogenous but depend on age. Consumers Produce gross investment in health and the other commodities in the utility function according to a set of household production functions:

$I_t = I_t(M_t, TH_t; E)$,…….. (3)

$Z_t = Z_t (X_t, T_t; E)$…… (4)

In these equations Mt is a vector of inputs (goods) purchased in the market that contribute to gross investment in health, example is medical care. Xt Is a similar vector of goods inputs that contribute to the production of Zt which is the consumption of other commodities, THt and Tt are time inputs, and E is the consumer's stock of knowledge which could be determined from the level of one's education according to Grossman or human capital exclusive of health capital and it is also assumed to be exogenous or predetermined. The semicolon before it highlights the difference between this variable and the endogenous goods and time inputs. The Grossman (2000) model, assumes that increase in knowledge of the consumer leads to an increase in the efficiency of the production of health. Hence the model implies that, individuals can invest in their health through the consumption of health through healthy behaviors and the purchases of vector inputs such as medical care to help enhance one's health status.

In Ghana, the FDB has been the main regulatory body in the food and drug industry. Adverts have to be approved by the board. The board's laboratory can test 50 to 70 drug samples per month. In 2000, 880 drug samples were analyzed from customs, field complaints, local manufacturers, and central medical stores (CMSs). Of these samples, 124 failed quality testing, for a variety of reasons. The laboratory has a staff of two pharmacists, four diploma laboratory technicians (three years of training), and one certificate laboratory technician (two years of training). In order to have effective regulation, the FDB doubled this capacity at the end of 2002 with additional equipment and personnel (FDB, 2000).

The demand for pharmaceutical products in Ghana is clearly competitive, with many retailers and has been influenced by economic factors such as incomes and increasing populations and specific government policies since independence in 1957. Recently, manufacturers and importers of drugs have resorted to adverts to increase demand for their products Anum et al (2010). The government through FDB has tried various reforms to improve standard and control of disseminating information to people on drugs. Still reforms are regarded to be substandard. Adverts are on the surge which has increased drug consumption.

Most studies have focused on the effects of drug advertising on physician prescriptions. Izuka and Jin (2005) did a study on the effect of direct-to-consumer advertising (DTCA) on doctor choice of prescription drugs. They showed that, DTCA has a small and insignificant effect on the choice of brand despite the massive DTCA expenditure incurred in advertisement. In contrast, direct-to-physician advertising has a larger and long-lasting effect on prescription choice. These results support the view that DTCA is effective in increasing the number of outpatient visits per therapeutic class but has little impact on the choice of prescription once the patient arrives at the physician office. In this paper, we examine the immediate demand effects of

advertisement on the part of the consumer and whether drug advertisement affects consumer's health behaviors and not that of physicians.

One can also relate drug adverts to a broader literature in moral hazard. Economists have argued that regulations that intend to enhance product safety may also motivate consumers to engage in riskier behavior or to become less cautious about safety. As a result, the benefit of a safer product design may be offset by the consumers' riskier behavior. This argument has found empirical support in several contexts.

Peltzman (1975), for example, studied the highway fatality rate before and after the National Traffic and Motor Vehicle Safety Act of 1966 in US. He found that the regulation did not decrease highway fatality at all. Viscusi (1985) examined the number of home accidents before and after the establishment of the Consumer Product Safety Commission. Like Peltzman, he found no change in the number of accidents. His case study on protective bottle caps suggested that the advertisement may have a lulling effect on consumer behavior, parents had less incentive to reduce children access to drugs and many safety cap bottles were left open.

In fact, by 1995, drug companies had tripled the amount of money they formerly allotted to consumer-directed advertising, according to Gary Null in Death by Medicine (2008). Since then, pharmaceutical advertising has grown to an entirely new level. In 2000, pharmaceutical companies spent $2.5 billion on mass media pharmaceutical advertisements, according to Fillon (2005). This figure increased to over $3 billion in 2003; according to Dr. John Abramson's book Overdosed America, in his book, Death by Prescription, Ray D. Strand looks at these high figures and poses the question: "Why?" Why do pharmaceutical companies spend billions of dollars on drug advertising, pharmaceutical companies wouldn't spend billions of dollars on drug advertising if it didn't work. In fact, the advertisements are working too well, Fillon (2005)

writes, "The average number of prescriptions per person in the United States increased from 7.3 in 1992 to 10.4 in 2000. Along with this increase in demand, there has been a shift towards the use of more expensive medications. It's more than a coincidence that many of the most expensive medications happen to be those medications that are most heavily advertised." In fact, between 1999 and 2000, prescriptions for the 50 most heavily advertised drugs rose six times faster than prescriptions for all other drugs, according to Katharine Greider (2003)

Health behaviors have been defined in various ways. For example, Conner and Norman (1996) define them as any activity undertaken for the purpose of preventing or detecting disease or for improving health and wellbeing. Gochman (1997) in the Handbook of Health Behavior Research defines them as `behavior patterns, actions and habits that relate to health maintenance, to health restoration and to health improvement. Behaviors within this definition include medical service usage (e.g., physician visits, vaccination, screening), compliance with medical regimens (e.g., dietary, diabetic, antihypertensive regimens), and self-directed health behaviors (e.g., diet, exercise, smoking, alcohol consumption). All have received considerable attention from social and behavioral researchers and we now have a good understanding of the factors influencing how and why individuals engage in such behaviors.

In defining health behaviors, there are also behaviors which enhances one's health such as exercise, balanced diet, and condom use to avoid sexually transmitted diseases and one that deteriorates one's health such as smoking, excessive alcohol consumption, and high dietary fat consumption. Numerous studies have examined the relationship between health behaviors and health outcomes Blaxter (1990) and have demonstrated their role in both morbidity and mortality. One of the first such studies identified seven features of lifestyle which were

associated with lower morbidity and higher subsequent long-term survival: not smoking, moderate alcohol intake, and sleeping seven to eight hours per night, exercising regularly, maintaining a desirable body weight, avoiding snacks, and eating breakfast regularly (Belloc and Breslo 1972). Health behaviors also impact on individuals' quality of life, by delaying the onset of chronic disease and extending active lifespan. Smoking, alcohol consumption, diet, gaps in primary care services and low screening uptake are all significant determinants of poor health, and changing such behaviors should lead to improved health. The US Department of Health and Human Services (USDHHS, 1990) listed increased in physical activity, changes in nutrition and reductions in tobacco, alcohol and drug use as important for health promotion and disease prevention.

2.2 Empirical Review

This section reviews scholarly and empirical works done concerning the topic in question. Iizuka and Jin (2007) did a study on drug advertising and health habit using combined data sets on individual health habits from a national representative survey, the National health insurance survey (NHIS 1997-2001) and DTCA data (1996-2001) to analyze the impact of DTCA on health habit in the united states. The sampling method used by The National Center for Health Statistics (NCHS) follows a multistage area probability to achieve a representative sample of households in the United States. In their sampling they used data on NHIS and interviewed individuals that had valid data on height, weight, and whether they have any of the four condition namely; diabetes, high cholesterol, overweight, and hypertension which reduces the probability of engaging in moderate exercise. Because emotional feeling has important power explaining exercise propensity, they further restricted the sample to the individuals that answer to the question of whether they feel sad, helpless, or worthless in all or most of the time in the past 30

days. This results in the final sample of 76,792 individuals throughout 1997-2001. Iizuka and Jin (2007) however, adopted the linear probability specification as their base model and considered an individual choosing to exercise or not in order to maximize his total utility of life:

$$\mathbf{U} = \sum_{t=0}^{T-age} \sigma^t ut(rt, qt, et)$$

where t denotes time (t = 0 for present), T denotes expected life expectancy, σ is the annual discount rate, r is the perceived risk of contracting diseases, q is the quality of life, and e is exercise intensity (a dummy variable in their case). In the short run, exercise may generate disutility as it costs time and money. In the long run, exercise may reduce the probability of contracting certain diseases (r) thus increasing life expectancy (T) and the quality of life (q).

A rational consumer would choose a sequence of et so that it will maximize U. A DTCA of drug treatment may affect the total utility of the consumer thus the choice of exercise in many ways. First, consider a healthy individual who currently does not suffer any "lifestyle diseases" such as diabetes, high cholesterol, high blood pressure, and overweight. On the other hand, a DTCA of drug treatment may tell her that there is a new treatment should she get sick, so life expectancy (T) and the quality of future life (q) would remain high even if she does not exercise today. In this case, the expected drug treatment communicated by DTCA serves as a substitute for physical exercise, and a higher DTCA may result in lower exercise intensity. On the other hand, by communicating various medical problems that one might suffer, a DTCA may increase the perceived risk of contracting the targeted disease (r). If so, DTCA may encourage the person to do more exercise.

Their results showed that, DTCA may affect consumers even more broadly by changing their daily routines and that DTCA may encourages unhealthy habits and may have effect on the nation's health status and overall healthcare expenditure. The criticism leveled against the study

is the fact that the study did not consider the mechanism through which DTCA affect health habits and the content of the DTCA.

In a related study, Singh and Smith (2005) examined direct-to-consumer prescription drug advertising: a study of consumer attitudes and behavioral intentions. Their main objective was to find out whether drug advertising influences consumers behavioral intentions. They gathered data from 288 individuals using pencil and paper mail survey. They asked respondents about their knowledge and behavior towards prescription drugs. Their findings indicated that consumers have knowledge about prescription drug advertising and their behavioral intentions were affected by increased awareness of specific brands through advertisement and consumers feel empowered through the information they get from the direct to consumer advertising of prescription drugs. Consumers are however motivated to demand branded drugs which is affected by factors related to the quality of advertisements, trust in their physician, and personal competence. Their results also indicated that, consumer interest in advertised drugs may also depend on the strength of the relationship between consumers and their physicians. The major limitation to their study was that, data was collected from a homogeneous sample based on ethnicity and it is possible to have different results when a heterogeneous sample is considered. As a result, making it difficult to generalize the results of their findings.

Calfee et al (2003) investigated the direct-to-consumer advertising and the demand for cholesterol-reducing drugs. They estimated the effect of direct-to-consumer advertising on demand using data from 1995 to 2000 of the market of the statin class of cholesterol-reducing drugs following the reinterpretation of advertising regulations by the FDA in August 1997. Their results indicated no statistically significant effect from any form of advertising and promotion of new statin prescription or renewals and no evidence of adverse market effects from advertising

or the reinterpretation of regulation by FDA. The findings of their study showed that, television advertising increased the proportion of cholesterol patients who had been treated successfully, which confirms the fact that advertising reinforces compliance with drug therapy.

Chiou and Tucker (2010) did a study on how pharmaceutical advertising affect consumer search. Their study however sought to find out how restricting pharmaceutical advertising search
Affect the type of information individuals seek online about pharmaceutical drugs. They however examined how consumers search patterns changed after the warnings issued by FDA on march 26, 2009, to pharmaceutical companies restricting their use of internet search advertising that included keyword searches on Google and other search engines. The FDA did this because they found out most of these advertising were misleading and did not include risk and side effects of drugs advertised. They found out that, after the warning which reduced pharmaceutical search advertising, consumers were more likely to seek information from websites which are user-generated content and websites not regulated by the FDA such as Canadian pharmacies and herbal remedies. The major limitation of their work was the time frame the research was carried out, it was done just after the warning by FDA hence it was in the short-run and things might be different in the long-run because most search engines were even working on updating their websites when the research was carried out.

Donohue and Berndt (2004) did a study on the effects of direct-to-consumer advertising on medication choice: the case of antidepressants. They used data from July 1, 1997 to December 31 2000 on all claims for six study drugs file in the MarketScan database because drug choice is likely to be affected as a result of what consumers experienced previously with particular medications and used the conditional logit model to analyse their data. They however found out that DTCA for antidepressant has little impact on drug choice even though their results also

showed that consumers with anxiety disorders was influenced by DTCA spending, the magnitude of the effect was minimal compared to that of detailing. Their findings were however consistent with other works that had examined the impact of DTCA on medication choice and found little or no effect of consumer-directed advertising on treatment choice (Iizuka and Jin 2003; Wosinska 2002). Several studies suggested that, mass media advertising motivates patients to visit their physicians for previously untreated conditions. For example, two studies found out that, DTCA for cholesterol lowering medications was associated with an increase in diagnoses of hyperlipidemia (Iizuka and Jin 2003; Zachry et al. 2002). Rosenthal et al (2003) found out that, DTCA increases drug sales primarily through expanding total class sales rather than moving market share.

Peltzman (2002) investigates the impact of the development of antibiotics on mortality and finds that the development increased the mortality risk among age groups and in regions that were most likely to benefit from the innovation. He interprets this as suggestive evidence of setting behavior where individuals adopt risky health behaviors in response to the availability of a curative product.

Daysal and Orsini (2012) investigated the spillover effects of drug safety warnings on health behavior. They examined the impact of new medical information on drug safety on preventive health behavior. Their results however indicated statistically significant small negative spillover on post-menopausal women's likelihood of having an annual checkup and substantial negative spillovers on their likelihood of smoking. Their results also indicated that, the relative change in the utilization of Hormone Replacement Therapy (HRT) was similar among low and high-educated post-menopausal women but the spillover effects on preventive behavior were entirely driven by those with a high school degree or less.

An empirical study done by Afolabi (2008) on the factors influencing the pattern of self-medication in an adult Nigeria population using descriptive as well as chi-square test found that self-medication patterns among market women in Nigeria was influenced by literacy and public health education.

A study done by Shveta and Jagmohan (2011) on self-medication pattern in Punjab with a sample of 300 nuclear families from 5 different districts of Punjab were randomly selected for the study. Their research found that self- medication was high with educated group than the uneducated group and self-medication was mostly for pain, cough, fever, and cold. They also found out that most consumers go for the dose without proper knowledge of the dose, adverse drug reaction, and drug interaction. They however, concluded that, most drug Information for self-medication was mostly from pharmacists or chemists followed by friends and advertisement.

A study done by Rohit et al, (2010) on evaluation of self-medication among professional students in north India. They however used a Samples of 1175 young students belonging to different regions of North India for heterogeneity in sample were selected randomly from two institutions of U. P. Technical University for the study. They however, concluded that student source of information for self-medication is through advertisement and pharmacists.

A study by Gupta et al (2011) on determinants of self-medication practices in an urban slum community in India using a systematic random sampling method for 760 select households. They found that, the prevalence of self-medication in the community was 55.9% with significant percentage among females, younger age, low income class, and those with low levels of education. They however concluded that, monetary constraints was the major reason for self-medication

In conclusion, the various studies reviewed, indicate that educational level, advertisement, information from chemists or pharmacists, and financial constraints influences consumers health behaviors. This study therefore seeks to find the extent of the effect of advertisements on consumer health behavior in the face of national health insurance.

CHAPTER THREE
METHODOLOGY

3.0 Introduction

This chapter focuses on the methodological framework employed in the study. It looks at the method of data collection and the design of the empirical methods to find out whether drug advertising has any effect on consumer health behavior. Neuman, (2006) defined research methods as a sets of specific techniques for selecting cases, measuring and observing aspects of social life, gathering and refining data, analyzing the data and reporting on results. Descriptive and quantitative methods are designed for the data analysis. The study used logit regression as the empirical method of estimation for the quantitative method and tables and charts for the qualitative method.

3.1 Method of Data Collection

Primary data was used for the study and was obtained through the administration of questionnaires. The convenient sampling technique was used for the study. According to Boxill et al. (1997), convenient sampling is a type of non-probability sampling which involves the sample being drawn from that part of the population which is close to hand. That is, a sample population is selected because it is readily available and convenient. This convenience can be in the form of stopping people on the street and passerby to interview. A sample size of 500 was used for the study and the convenient sampling method was used to collect data. The study is undertaken in Kumasi which is the regional capital of Ashanti region. The reason simply being that, the location of Kumasi and the characteristics of people living in Kumasi make it a cosmopolitan city, hence making Kumasi an ideal study area. They are also exposed to a lot of

advertisement through both electronic as well as print media. Kumasi is also chosen because of proximity to the researcher, resource constraint encountered in the study and the familiarity of the researcher to the city. The sample size was arrived at based on the formula proposed by Yamane[1] (1967). Yamane's sample calculation method was chosen over other sample calculation methods because it takes into consideration the population size and gives allowable error in the calculation of the sample size. The study used a sample size of 500.

The questions however centered on the effects of health insurance on treatment seeking behavior of consumers of health care, sources of information for drugs, whether consumers with or without health insurance self-medicate, whether drug advertising affects consumers health behavior. According to Berg (2007) Qualitative research seeks answers to questions by examining the various social settings and individual who inhabits those setting. Qualitative research such as questionnaire provides a means of assessing the unquantifiable facts about the actual people's research. Veal (2006) showed that qualitative research is often based on the believe that, the people personally involved in a particular situation are best placed to describe and explain their experiences or feeling in their own words. Qualitative methods are ideal for exploring attitudes, meanings and perceptions about a situation. This affirms the relevance of the use of questionnaires in this study.

3.2 Data Analysis

Qualitative and quantitative methods were used in analyzing the data obtained from the field. Qualitative or descriptive methods provide an easy understanding of variables explained in this study since they give visual impressions of the variables they represent. This enables people to

[1] Yamen (1967) $n = \frac{N}{1+N(e)^2}$, where; N=Population size, n=sample size, e= error level allowed in the study.

understand, read meanings into phenomena explained, and interpret results with ease. By descriptive statistics, the study uses tables and percentages to describe the data on effects of advertisement on consumer health behaviors.

According to Patton (2002), quantitative study is usually based on causal relationships between variables and the use of standardized measures to produce qualified data that can be statistically analyzed for making inferences. Strauss and Corbin (1990) relayed that, quantitative methods are useful to unveil knowledge and to facilitate our understanding on phenomenon that little is known about. This reveals the relevance of the use of both quantitative and qualitative methods to this study.

3.3 Empirical Estimation

Logit regression model was employed by the study to determine the likelihood of consumers engaging in healthy behaviors among the sample population in the face of drug advertising. According to Bhandari and Joensson (2009) logistic regression or logit regression is a type of regression analysis used for predicting the outcome of a categorical dependent variable. Frequently, logistic regression is used to refer specifically to the problem in which the dependent variable is binary that is, the number of available categories is two and problems with more than two categories are referred to as multinomial logistic regression or, if the multiple categories are ordered, as ordered logistic regression. Logistic regression measures the relationship between a categorical dependent variable and usually (but not necessarily) one or more continuous independent variables, by converting the dependent variable to probability scores. This study used the logistic regression model since dependent variables are binary and deals with human behavior. Hence probabilities can be used to explain human behavior better

The study uses the responses of the sampled population to determine whether they have engaged in health behaviors like exercise, healthy diet, medical checkups and dissociation from high risk behaviors such as promiscuity, use of alcohol, and smoking in the immediate past, whether consumers self-medicate as a result of drug advertising and the factors that influence the demand for advertised drugs.

Let Y_i (Binary variable) represents the observed response of each sample population (ith observation) and X_i represents the independent variables used in the study.

It follows that:

$Y_i = g(X_i)$

Where '$Y_i = g(X_i)$' is the functional form of the model. This shows the relationship between healthy behaviors and others factors affecting consumer health behaviors. This is specified as shown in Gujarati (2003) and Stock and Watson (2007) are expressed as follows;

3.4.1 Exercise

$$Y_i = \ln\frac{p}{1-p} = \beta_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \varepsilon_i$$

Where Y_i = Qualitative dependent variable: 1 if engaging in exercise and $Y_i = 0$ if Otherwise.

X_2 = Age

X_3 = Monthly Income

X_4 = Dummy variable (X_4= 1 if female, X_4= 0 if male)

X_5 = Dummy variable (X_5= 1 if basic education, X_5= 0 if otherwise)

X_6 = Dummy variable (X_6= 1 if senior high education, X_6= 0 if otherwise)

X_7 = Dummy variable (X_7= 1 if tertiary education, X_7= 0 if otherwise)

X_8 = dummy variable (X_8= 1 if influence by advertisement, X_8 = o if otherwise)

ε_i = Stochastic error term.

3.4.2 Healthy Diet

$$Y_i = \ln\frac{p}{1-p} = \beta_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \varepsilon_i$$

Where Y_i = Qualitative dependent variable: 1 if consume healthy diet and Y_i = 0 if Otherwise.

X_2 = Age

X_3 = Monthly Income

X_4 = Dummy variable (X_4= 1 if female, X_4= 0 if male)

X_5 = Dummy variable (X_5= 1 if basic education, X_5= 0 if otherwise)

X_6 = Dummy variable (X_6= 1 if senior high education, X_6= 0 if otherwise)

X_7 = Dummy variable (X_7= 1 if tertiary education, X_7= 0 if otherwise)

X_8 = dummy variable (X_8= 1 if influence by advertisement, X_8 = o if otherwise)

ε_i = Stochastic error term.

3.4.3 Medical Check-Up

$$Y_i = \ln\frac{p}{1-p} = \beta_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \varepsilon_i$$

Where Y_i = Qualitative dependent variable: 1 if consume medical check-up and Y_i = 0 if Otherwise.

X_2 = Age

X_3 = Monthly Income

X_4 = Dummy variable (X_4= 1 if female, X_4= 0 if male)

X_5 = Dummy variable (X_5= 1 if insured, X_5= 0 if uninsured)

X_6 = Dummy variable (X_6= 1 if basic education, X_6= 0 if otherwise)

X_7 = Dummy variable (X_7= 1 if senior high education, X_7= 0 if otherwise)

X_8 = Dummy variable (X_8= 1 if tertiary education, X_8= 0 if otherwise)

X_9 = dummy variable (X_9 = 1 if influence by advertisement, X_9 = o if otherwise)

ε_i = Stochastic error term.

3.4.4 Dissociation from High Risk Behaviors (DHRB)

$$Y_i = \ln\frac{p}{1-p} = \beta_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \varepsilon_i$$

Where Y_i = Qualitative dependent variable: 1 if DHRB Y_i = 0 if Otherwise.

X_2 = Age

X_3 = Monthly Income

X_4 = Dummy variable (X_4= 1 if female, X_4= 0 if male)

X_5 = Dummy variable (X_5= 1 if insured, X_5= 0 if uninsured)

X_6 = Dummy variable (X_6= 1 if basic education, X_6= 0 if otherwise)

X_7 = Dummy variable (X_7= 1 if senior high education, X_7= 0 if otherwise)

X_8 = Dummy variable (X_8= 1 if tertiary education, X_8= 0 if otherwise)

X_9 = dummy variable (X_9 = 1 if influence by advertisement, X_9 = o if otherwise)

ε_i = Stochastic error term.

3.4.5 Demand for advertised drugs

$$Y_i = \ln\frac{p}{1-p} = \beta_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \varepsilon_i$$

Where Y_i = Qualitative dependent variable: 1 If consumers demand advertised drugs and Y_i = 0 if otherwise

X_2 = Age

X_3 = Monthly Income

X_4 = Dummy variable (X_4= 1 if female, X_4= 0 if male)

X_5 = Dummy variable (X_5= 1 if insured, X_5= 0 if uninsured)

X_6 = Dummy variable (X_6= 1 if basic education, X_6= 0 if otherwise)

X_7 = Dummy variable (X_7= 1 if senior high education, X_7= 0 if otherwise)

X_8 = Dummy variable (X_8= 1 if tertiary education, X_8= 0 if otherwise)

X_9 = dummy variable (X_9 = 1 if influence by advertisement, X_9 = o if otherwise)

ε_i = Stochastic error term.

3.4.6 Self-medication

Self-medication is use of a drug with therapeutic intent but without professional advice or prescription

$$Y_i = \ln\frac{p}{1-p} = \beta_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \varepsilon_i$$

Where Y_i = Qualitative dependent variable: 1 if self-medicate; 0 if no self-medication

X_2 = Age

X_3 = Monthly Income

X_4 = Dummy variable (X_4= 1 if female, X_4= 0 if male)

X_5 = Dummy variable (X_5= 1 if insured, X_5= 0 if uninsured)

X_6 = Dummy variable (X_6= 1 if basic education, X_6= 0 if otherwise)

X_7 = Dummy variable (X_7= 1 if senior high education, X_7= 0 if otherwise)

X_8 = Dummy variable (X_8= 1 if tertiary education, X_8= 0 if otherwise)

X_9 = dummy variable (X_9 = 1 if influence by advertisement, X_9 = o if otherwise)

ε_i = Stochastic error term.

3.5 Expected signs of the estimated parameters

The study expects age (X_2) to predict positively about the likelihood of people engaging in some health behavior like medical checkups, and healthy diet, but will predict negative for exercise because as one advances in age, the physical strength to engage in exercise deteriorates and makes the aged resort to the consumption of medications than to engage in exercising as a result of drug advertising. This implies that, the young adult are likely to be engaging in unhealthy behaviors as compared to the aged. The implication is that the older are likely to fall sick because of deteriorating health, so in order to maintain healthy life, they are likely to engage healthy behaviors as compared with the younger population. The younger population is unlikely to fall sick therefore consumes less of health care.

The study expects income (X_3) to predict negatively about the likelihood of consumers engaging in healthy behaviors among the sample respondents. A negative sign of β_3 suggests that an increase in income decreases the tendency for the individual to engage in a healthy behavior. According to Grossman (2000), increases in income leads to a reduction in the time spent to engage in healthy behaviors hence consumers resort to self-medication since that will take less time simply because the opportunity cost of engaging in a healthy behavior has increased due to the rise in income.

Females (X_4) are expected to predict positive about the likelihood to engage in a healthy behavior and negative for high risk behaviors. It is part of this reason that life expectancy amongst women is 62.73 years whereas the case of men is 60.22 years in Ghana, According to Central Intelligent Agency (CIA 2012).

The relationship between those insured and their likelihood to engage in a healthy behavior could be either positive or negative. Therefore the expected sign could be negative because people who

are insured are likely to attend hospital since the cost of treatment is virtually zero. Thus, if they engage in any healthy behavior like exercise, they do so at their own cost. Some individual will still engage in high risk behaviors once they are insured because they will not bear the cost when they fall sick, but the pain people go through when they are sick will also deter them from engaging in risky health behaviors. On the other hand, individuals who are not insured are likely to engage in healthy behaviors to prevent them from visiting the hospitals when they fall sick, but are however likely to self-medicate. Coincidence or accident can also make those insured get sick. Hence one cannot conclude whether health insurance affects consumer health behavior positively or negatively, it is indeterminate.

Health care consumers with basic education, senior high education and tertiary education are expected to have less incentive to engage in self-medication behavior than those without any formal education (control group). Therefore the expected sign of basic education level, senior high education level and tertiary education level are negative. This implies that, people with formal education have high opportunity cost of indulging in self-medication and high risk behaviors, recalling the investment they have made in their education. In other words, most people without any formal education have low opportunity cost, and are likely to engage in self-medication and other high risk behaviors.

Advertisement is likely to impact positively on the likelihood of people engaging in self-medication. Therefore the coefficient is expected to be positive. The reason being that, as drugs are advertised through the various mediums, it influences people's decision to purchase drugs, thereby increasing the rate of self-medication among the population. In other words, drugs being advertised are likely to influence people to engage in self-medication rather than going to the hospital to access professional care. When a symptom of which drugs can cure is advertised and

it is in commensurate with a symptom of a particular person, they opt to purchase those drugs rather than see their physician. Advertisement is also expected to predict positive for demand for drugs since drugs even used for self-medication are purchased. Advertising is also expected to predict negative for the various healthy behaviors since consumers may tend to substitute advertised drugs for that of a healthy behavior. A study by Iizuka and Jin (2007), revealed that increase in drug advertising will lead to a reduction in physical exercise because consumers will substitute the advertised drug for physical exercise

CHAPTER FOUR

ANALYSIS AND INTERPRETATION OF RESULTS

4.0 Introduction

This chapter is divided into two main sections. Section 4.1 deals with the descriptive analysis of the data while 4.2 analyses the data set quantitatively. Descriptive analysis uses tables and percentages whiles the quantitative method used the logit regression to analyses data.

4.1 Descriptive analysis

The descriptive aspect deals with the use tables to show the frequency of variables, their mean, and their percentage in terms of the sample size used. The variables used include the type of drugs consumers purchase, the medium through which advertisement was heard, the sources of information on drugs purchased, the consequences of self-medication, the disease that normally influence people to self-medicate

Table 4. 1 Summary of Age and Income

Variable	Mean value	Standard deviation	Minimum value	Maximum value
Age (years)	33.338	11.85144	18	67
Income(monthly)	510.04	486.0606	40	5000

Source; field's survey 2013

Table 4. 2 Summary of Relevant Variables used in the Regressions

VARIABLE	PERCENT (%)
Self-medication	86.00
Female	49.20
Insurance	77.00
Basic education	14.20
Senior high school	27.60
Tertiary education	43.20
Advert awareness	100

Source; field's survey 2013

Table 4.1 and 4.2 above summarize the demographic and socio-economic characteristics of the respondents in the study area and other variables used in the study. The age structure of the sampled respondents ranged from 18 to 67 years with the mean age of 33 years. The minimum and the maximum monthly income of the sample population were ¢40.00 and ¢5000 respectively with the average income of ¢510.04.

About 49.20% of respondents in the sample population were females and the remaining 50.80% were males (control group). Also 77% of the sampled respondents were insured under the NHIS while 23% were uninsured. On educational level, people with basic education, senior high education and tertiary education were 14.20%, 27.60% and 43.20% of the sample population

respectively and 15% of the sampled respondents were people without any formal education, that is uneducated. The study also revealed that, all respondents were aware of the advertisement of drugs.

Table 4. 3 Mediums through which Advert was Heard or Seen

Medium	Percent (%)
Television	65.00
Radio	74.40
Billboard	26.00
Mobile Van	30.60
Drug Hawkers	44.20

Source; field's survey 2013

Table 4.3 above also shows the various mediums through which advertising was made and heard or seen. The study revealed that all respondents were aware or have heard of drug advertisement through several mediums because advert awareness recorded 100% according to the sample respondents. The respondents that heard advertisement through radio and television were 74.40% and 65.60% respectively. The sample population that also heard it through drug hawkers and mobile vans were 44.20 and 30.60 respectively. Those who read on billboards however recorded 26.00%. These results however showed that radio advert recorded the highest medium through which advertisement was heard and followed by television and billboard being the least medium through which advert was heard

Table 4. 4 Information that Influences People to Purchase Drugs

Information	Freq.	Percent
Physician Prescription	245	49
Advert	373	74.60
Past prescription	173	34.60
friends	211	42.28

Source; field's survey 2013

The result in Table 4.4 shows sources of information that normally influences the health care of consumers to purchase drugs. Physician prescription according to the sample population revealed that 245 respondents get their information from physicians representing 49% of the sample population, 373 respondents representing 74.60% of the respondent get their information through drug advertising,173 respondents representing 34.60% of the sample population respondents purchased prescriptions, and 211 respondents representing 42.28% of the respondent purchased drugs based on the influence from friends.

It is obvious that, the medium that highly influenced respondents to purchase drugs was through adverts followed by physicians prescriptions. Some appreciable number of respondents also purchased drugs based on friends but past prescription recorded the least source of information for drugs purchased.

Table 4. 5 Types of Drugs Purchased

DRUG TYPE	Frequency	Percentage
Prescription Drugs	278	55.60
Over the Counter Drugs	328	65.60
Herbal Drugs	286	57.20

Source; field's survey 2013

Table 4.5 above summarizes the type of drugs purchased by sample population. The study revealed that, 328 respondents representing 65.60% of the population purchased over the counter drugs, 286 respondents representing 57.20% of the population sample purchased herbal drugs, and 278 respondents representing 55.60% purchased prescription drugs. However, over the counter drugs was the drug that was purchased most among the sample population followed by herbal drugs, with the least being prescription drugs.

Table 4. 6 Diseases that Influence People to Self-Medicate

Disease	Freq.	Percent
Pains	270	54.00
malaria	318	63.73
Cough	96	19.20
Other	15	3.00

Source; field's survey 2013

Table 4.6 above summarizes the kind of diseases that normally influenced the sample respondents to self-medicate. The study revealed that, 270 respondents representing 54% of the population sample said they self- medicate because they had pains, 318 respondents representing 63.73% of the sample population said they self-medicate because of malaria, and 96 respondents representing 19.20% of the sample population said they self-medicate for the reason being that

they cough. There were 15 other respondents representing 3% who specified other diseases that influence them to self-medicate, these are piles, diarrhea, diabetes, rashes, asthma, rheumatism, infertility, menstrual disorders, pimples, and eye problems. It is however obvious from the table above that, malaria was the disease that highly influenced consumers of health care to self-medicate in the sample population with cough being the least disease that influence people to self-medicate.

Table 4. 7 Consequences of Self-Medication

Consequence	Frequency	Percentage
Disease cured with no bad effects	380	76.00
Disease cured with bad effects	24	4.80
Disease not cured with bad effects	55	11.00
Disease not cured with no bad effects	9	1.80

Source; field's survey 2013

The table above summarizes the consequences of self-medication of the sample population. The study showed that, 380 respondents representing 76% had no bad effects with the medications they took even though they did not visit the hospital and their diseases were cured successfully, 24 respondents representing 4.80% also complained of bad effects as a result of drugs taken but the disease for which they took the drugs were cured, 55 respondents also representing 11.00% of the respondents experienced bad effects with the disease not cured, and 9 respondents representing 1.80% also experienced no bad effects and their disease was not cured. These responses showed that a greater percentage of the respondents had their diseases cured with no bad effects, and some other people in the sample population also had their diseases not cured but

with bad effects. Some of the effects listed by respondents include; skin rashes, heart burns, itches, running stomach, vaginal discharge, dizziness, vomiting, and reddened eyes.

Table 4. 8 Health behaviors

Health behavior	Freq.	Percent
Exercise	234	46.80
Healthy Diet	465	93.00
Medical check-up	130	26.00
DHRB	386	77.20

Source; field's survey 2013

The Table 4.8 summarizes the various health behaviors respondents engage in. The study revealed that 234 respondents representing 46.80% engaged in physical exercise, 465 respondents representing 93.00% consumed healthy diet, 130 respondents also representing 26.00% of the respondents who go for medical check-ups and 386 respondents representing 77.20% also dissociated from high risk behaviors. It is obvious the results that medical check-ups recorded the least consumed health input and healthy diet consumption is the input that recorded the highest.

4.2 Quantitative analysis

The quantitative aspect however employs Logit regression estimates to analyze the effect of drug advertisement on consumer health behaviors among the sample population, the demand for advertised drugs in the face of health insurance, and self-medication in de face of health insurance. Also, estimates from the logit regressions are used for the analysis of the demographic and socio-economic characteristics of the respondents on health behaviors, and factors that influence people to demand advertised drugs in the face of NHIS

4.2.1 Exercise

$Y_i = \ln\frac{p}{1-p} = \beta_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \varepsilon_i$ is presented as follows in the table below;

Table 4. 9 Dependent Variable: Exercise

Explanatory Variable	Coefficient	Marginal effect	Standard Error	P-Value
Constant	1.328529	-	0.5196481	0.011***
Age	-0.0493193	-	.0105363	0.000***
Income	-0.0002551	-	.0002459	0.300
Gender		-		
Male	-	-	-	-
Female	-1.071347	-	0.2067069	0.000***
Educational Level		-		
Uneducated	-	-	-	-
Basic Education	0.7285594	-	0.4149639	0.079
Senior High Education	.7749414	-	.3731002	0.038
Tertiary Education	1.49381	-	0.3620961	0.000***
Advertisement	-0.2420181	-0.0601723	0.2392309	0.312

Source; field's survey 2013

Likelihood Ratio (LR Statistic) = -290.9693

Number of Observations = 500

Probability > chi2 = 0.000

The overall test for significance shows that the model is statistically significant because its p-value of 0.000 is less than 0.05 this implies that the overall regression is significant. Each regression coefficient measures the partial effect that the independent variables have on the dependent variable.

4.2.2 Interpretation of coefficients of exercise regression

The coefficients of income, female, age, and advertising have negative impact on people's likelihood to engage in exercise but with different coefficients. The signs were not different from a priori expectation though some of the variables are insignificant at 5% significant level. Also uneducated and males are the control group representing male who are uneducated. Only age, females, and tertiary education were significant at 5% significant level. Income, basic education, senior high educational level, and advertisement were insignificant at 5% significant level.

The negative sign of age on exercise measures the impact age has in the estimated logit on exercise for changes in the age of the respondents. If age increase the estimated logit would decrease, suggesting that there is a negative relationship between age and exercise. As one advances in age the tendency to engage in exercise reduces. Age is significant at 5% significant level. This implies that people's age have much impact on the likelihood to engage in exercise.

The negative sign of income on exercise measures the change in estimated logit (exercise) for changes in the level of income. If the level of income increases, the likelihood that people will engage in exercise reduces, this suggests the negative relationship between income and exercise. As levels of income of people increases, they tend to reduce their consumption of exercise. Income is insignificant. This implies that respondent's income level does not have impact on people likelihood to engage in exercise. This is consistent with expectation and consistent with

the model by Grossman (2000) which stipulates that, as ones income increases the likelihood to invest in one's health by consuming more health reduces due to the increase in the opportunity of engaging physical exercise.

The negative sign of advertisement on exercise measures the change in estimated logit (exercise) for changes in the rate of advertisement. If the rate of advertisement increases by a unit, people will reduce their consumption of exercise by 0.06 units. As the rate of advertisement increases, people tend to engage in less exercise. This is consistent with a study by Iizuka and Jin (2007), which concluded that increase in drug advertising will lead to a reduction in physical exercise because consumers will substitute the advertised drug for physical exercise. Advertisement is however insignificant at 5% error level. This implies that, the rate of advertisement have no impact on the likelihood of respondent to engage in physical exercise in Kumasi, though the sign predicts a negative relationship which is consistent with a priori expectation.

The negative sign of female on exercise measures the change in estimated logit (exercise) for a unit change in the likelihood of being a female. Hence increase in the number of females will lead to a reduction in exercise among the sample population. Female is significant at 5% error level. This implies that, females do less exercise among the sample population.

The positive sign of tertiary education on exercise measures the change in estimated logit (exercise) for a unit change in the likelihood of being a tertiary student. If the number of tertiary educated increases by a unit the estimated logit would increase, suggesting that there is positive relationship between tertiary education and physical exercise. This implies that, as one attains a higher level of education the likelihood for the person to engage in physical exercise increases.

Tertiary education is significant at 5% error level. This implies that, education has an impact on the likelihood for one to engage in physical exercise among the sample population.

4.2.3 Healthy Diet

$Y_i = \ln\frac{p}{1-p} = \beta_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \varepsilon_i$ is presented as follows in the table below;

Table 4. 10 Dependent variable: Healthy Diet

Explanatory Variable	Coefficient	Marginal effect	Standard Error	P-Value
Constant	-3.425784	-	2.084515	0.100
Age	0.1213337	-	0.0814233	0.136
Income	0.0071683	-	0.0025842	0.006***
Gender		-		
Male	-	-	-	-
Female	0.7954051	-	0.4224927	0.060
		-		
Educational Level		-		
Uneducated	-	-	-	-
Basic Education	1.380102	-	0.9658194	0.153
Senior High Education	1.390592	-	0.872307	0.111
Tertiary Education	0.468979	-	0.8134277	0.564
Advertisement	-0.3393206	-0.0017195	0.410802	0.409

Source; field's survey 2013

Likelihood Ratio (LR Statistic) = -87.638812

Number of Observations = 500

Probability > chi2 = 0.000

The overall test for significance shows that the model is statistically significant because its p-value of 0.000 is less than 0.05 this implies that the overall regression is significant. Each regression coefficient measures partial effects that independent variables have on dependent variable.

4.2.4 Interpretation of coefficients of healthy diet regression

The coefficients of income, female, age, and educational level have positive impact on people's likelihood to consume healthy diet but with different magnitude of coefficient. The signs are not different from a priori expectation though most of the variables are insignificant at 5% significant level. Also uneducated and males are the control group representing male who were uneducated. Only income is significant at 5% significant level. Age, basic education, senior high educational level, advertisement, and females were insignificant at 5% significant level.

The positive sign of income on healthy diet measures the change in estimated logit (healthy diet) for changes in the level of income. If the level of income increases, the likelihood that people will eat healthy diet increases, which suggest that, there exist a positive relationship between income and healthy diet. As people's income increases, they tend to increase their consumption for healthy diet. Income is significant at 5% error level. This implies that respondent's income level have impact on people likelihood to eat healthy diets. This is consistence with expectation and economic theory.

The negative sign of advertisement on healthy diet measures the change in estimated logit (healthy diet) for a unit change in the rate of advertisement. If the rate of advertisement increases by a unit, people will reduce their consumption of healthy diet by 0.002 units. As the rate of

advertisement increases, people tend to consume less healthy diet. This could be as a result of the increased advertisement on food supplements which when consumed replenishes lost nutrient needed by the human body, even though they need to be prescribed by physicians before consumption. This is consistent with a study by Iizuka and Jin (2007), who concluded that increase in drug advertising will lead to a reduction in healthy diet consumption if the drugs advertised are food supplements. Advertisement is however insignificant at 5% significant level. This implies that, the rate of advertisement have no impact on the likelihood of respondent to reduce their consumption of healthy among the sample population. This implies that H_0 hypothesis is accepted and the H_1 rejected at 5% error level. It therefore means that, advertisement has no significant impact on people's likelihood to consume healthy diet

The positive sign of female on healthy diet measures the change in estimated logit (healthy diet) for a unit change in the likelihood of being a female. Hence increase in the number of females will lead to an increase in the consumption of healthy diet among the sample population. Female is insignificant at 5% significant level. This implies that, females have insignificant impact on the healthy diet consumption among the sample population.

The positive sign of education at all levels on healthy diet consumption measures the change in estimated logit (healthy diet) for a unit change in the likelihood of being at the basic level, senior high, or tertiary education level. If the number of respondents at these levels of education increases, there will also be an increase in the consumption of healthy diet. Education is insignificant at all the levels. This implies that, education has no impact on the likelihood for one to consume healthy diet among the sample population

4.2.5 Medical Check-Ups

$Y_i = \ln\frac{p}{1-p} = \beta_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \varepsilon_i$ is presented as follows in the table below;

Table 4. 11 Dependent variable: Medical Check Ups

Explanatory Variable	Coefficient	Marginal effect	Standard Error	P-Value
Constant	-3.50065	-	0.5928342	0.000
Age	0.0359755	-	0.01077	0.001***
Income	0.0001339	-	0.000216	0.536
Gender		-		
Male	-	-	-	-
Female	0.5525716	-	0.2145252	0.010***
NHIS	0.0967106	-	0.2646789	0.715
Educational Level		-		
Uneducated	-	-	-	-
Basic Education	0.2284757	-	0.4253392	0.591
Senior High Education	0.2858314	-	0.3946603	0.469
Tertiary Education	1.058681	-	0.3577768	0.003***
Advertisement	0.2332697	0.0414604	0.2784924	0.402

Source; field's survey 2013

Likelihood Ratio (LR Statistic) = -266. 25695

Number of Observations = 500

Probability > chi2 = 0.0000

The overall test for significance shows that the model is statistically significant because its p-value of 0.0000 is less than 0.05 this implies that the overall repression is significant. Each regression coefficient measures partial effects that independent variables have on dependent variable.

4.2.6 Interpretation of coefficients of medical check-ups regression

The coefficients of all variables in this model predicted positive in the logistic regression on people's likelihood to go for medical check-ups but with different magnitude of coefficient. The signs were not different from a priori expectation though some of the variables were not significant at 5% significant level. Also uneducated and males are the control group representing male who are uneducated. Only age, females, and tertiary education are significant at 95% confidence. Income, basic education, senior high educational level, NHIS, and advertisement were not significant. This implies that the H_0 hypothesis is accepted and the H_1 is rejected. It therefore means that, advertisement has no significant impact on people's likelihood to go for medical check-ups.

The positive sign of age on medical check-ups measures the impact age has in the estimated logit (medical check-ups) for changes in the age of the respondents. If age increase the estimated logit is likely to increase, suggesting that there is a positive relationship between age and medical check-ups. This however implies that, the aged are more likely to go for medical check-ups than the younger generation. Age is significant at 5% error level. This implies that people's age have much impact on the likelihood to go for medical check-ups.

The positive sign of income on medical check-ups measures the change in estimated logit (medical check-ups) for a unit change in the level of income. If the level of income increases, the

likelihood that people go for medical check-up increases. As levels of income of people increases, they tend to increase their consumption of medical check-ups. Income is not significant at 5% error level. This implies that respondent's income level does not have significant impact on people's likelihood to go for medical check-ups.

The positive sign of female on medical check-ups measures the change in estimated logit (medical check-up) for a unit change in the likelihood of being a female. Hence increase in the number of females will lead to an increase in the number of people going for medical check-ups among the sample population. Female is significant at 5% error level. This implies that, being a female has significant impact on the likelihood of going for a medical check-up.

The positive sign of tertiary education on medical check-up measures the change in estimated logit (medical check-up) for a unit change in the likelihood of being a tertiary educated person. If the number of tertiary educated increases the estimated logit would increase, suggesting that there is positive relationship between tertiary education and the likelihood of going for a medical check-up. This implies that, as one attains a higher level of education the likelihood the person goes for medical check-ups increases. Tertiary education is significant at 5% error level. This implies that, education have a significant impact on the likelihood for one to go for a medical check-up among the sample population.

4.2.7 Dissociation From High Risk Behavior (DHRB)

$$Y_i = \ln\frac{p}{1-p} = \beta_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_{9+} \varepsilon_i$$

Table 4. 12 Dependent variable: Dissociation From High Risk Behavior

Explanatory Variable	Coefficient	Marginal effect	Standard Error	P-Value
Constant	0.3978046	-	0.5160526	0.441
Age	-0.0069625	-	0.118596	0.557
Income	0.0002184	-	0.0003548	0.538
Gender				
Male	-	-	-	-
Female	0.8399923	-	0.2343262	0.000***
NHIS	0.5804376	-	0.3728495	0.033***
Educational Level				
Uneducated	-	-	-	-
Basic Education	0.5635125	-	0.387884	0.146
Senior High Education	0.7551331	-	0.3535718	0.033***
Tertiary Education	1.250653	-	0.3558966	0.000***
Advertisement	-0.7856451	-0. 11217	0.3448219	0.023***

Source; field's survey 2013

Likelihood Ratio (LR Statistic) = -242.283

Number of Observations = 500

Probability > chi2 = 0.0000

4.2.8 Interpretation of coefficients of DHRB regression

The coefficients of age and advertising have negative impact on people's likelihood to dissociate from high risk behaviors (DHRB) but with different magnitude of effects. The coefficients of

income, female, NHIS, basic education, senior high education, and tertiary education all have positive signs but also with different magnitude of effect. They are not different from a priori expectation though some of the variables are not significant at 5% significant level. Also uneducated and males are the control group representing male who are uneducated. Only advertising, females, NHIS, senior high education, and tertiary education are significant at 95% confidence. Income, age, and basic education were not significant at 5% significant level.

The positive sign of income on DHRB measures the change in estimated logit (DHRB) for a unit change in the level of income. If the level of income increases, the likelihood that people will DHRB increases, this suggests the positive relationship between income and DHRB. This implies that, as levels of income of the sample population increases, they tend to increase dissociation from high risk behaviors. Income is not significant. This implies that respondent's income level does not have impact on their likelihood to DHRB.

The negative sign of advertisement on DHRB measures the change in estimated logit (DHRB) for a unit change in the rate of advertisement. If the rate of advertisement increases by a unit, people will reduce their act of dissociating themselves from high risk behavior by 0.11 units. This implies that, as the rate of drug advertisement increases, people tend to increase their engagement in high risk activities. This is consistent with a study by Iizuka and Jin (2007), Their results showed that, DTCA may affect consumers even more broadly by changing their daily routines and that DTCA may encourages unhealthy habits and may have effect on the nation's health status and overall healthcare expenditure. Advertisement is however significant at 5% error level. This implies that, the rate of advertisement has impact on the likelihood of respondent to engage in high risk behaviors. This implies that H_0 hypothesis is rejected and

instead the H_1 accepted at 5% error level. It therefore means that, advertisement has significant impact on people likelihood to engage in high risk behaviors.

The positive sign of female on DHRB measures the change in estimated logit (DHRB) for a unit change in number of females. Hence increase in the number of females will lead to an increase in the number of people DHRB among the sample population. Female is significant at 5% error level. This implies that, females DHRB among the sample population. This could be the reason why life expectancy is higher amongst females in Ghana. Life expectancy is 62.73 years for females whereas the case of males is 60.22 years CIA (2012).

The positive sign of basic education, senior high education, and tertiary education on DHRB measures the change in estimated logit (DHRB) for a unit change in the likelihood of being a basic, senior high, or tertiary educated person. If the number of basic, senior high, or tertiary educated people increases by a unit the estimated logit would increase, suggesting that there is positive relationship between basic, senior high, or tertiary student on DHRB. This implies that, as one attains a higher level of education the likelihood for the person to DHRB increases. Senior high level and Tertiary education are significant at 5% error level, but basic education is not significant. This implies that, education level has an impact on the likelihood for one to DHRB among the sample population.

The positive sign of NHIS on DHRB measures the change in estimated logit (DHRB) for a unit change in number of respondents with NHIS. Hence increases in the number of respondents with NHIS will lead to an increase in the number of people DHRB among the sample population. NHIS is significant at 5% error level. This implies that, NHIS has a significant impact on the likelihood for the sample respondents to DHRB among the sample population. This does not

conform to expected sign of insurance on DHRB. Hence by intuition, it is obvious the Ghana health insurance system has suffered some set-backs and certain health facilities even ignore patients with insurance. This has reduced the confidence individuals have in the health insurance system and are willing to dissociate from high risk behaviors to be on the safer side.

4.2.9 Demand For Advertised Drugs

$Y_i = \ln\frac{p}{1-p} = \beta_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \varepsilon_i$ is presented as follows in the table below;

Table 4. 13 Dependent variable: Demand For Drugs

Explanatory Variable	Coefficient	Marginal effect	Standard Error	P-Value
Constant	-0.8584296	-	1.368706	0.531
Age	0.0975188	-	0.618177	0.115
Income	-0.0010317	-	0.0006946	0.137
Male	-	-	-	-
Female	0.6202875	-	0.6468933	0.338
NHIS	-0.215403	-	0.739633	0.771
Uneducated	-	-	-	-
Basic Education	-0.8422899	-	1.433469	0.557
SHS	1.194695	-	1.200575	0.320
Tertiary Education	1.132665	-	1.185146	0.339
_Advertisement	3.922568	0.0613451	1.222444	0.001***

Source; field's survey 2013

Likelihood Ratio (LR Statistic) = -42.032236

Number of Observations = 500

Probability > chi2 = 0.0000

The overall test for significance shows that the model is statistically significant because its p-value of 0.0000 is less than 0.05 this implies that the overall repression is significant. Each regression coefficient measures partial effects that independent variables have on dependent variable.

4.3.10 Interpretation of coefficients of demand for advertised drugs

The coefficients of age, female, senior education, tertiary education, and advertising all have the positive impact on people's likelihood to buy drugs but with different coefficient. The signs of NHIS, basic education, and income also predict negative on the likelihood of respondents to purchase drugs. Age, income, female, NHIS, basic education, senior high education, and tertiary education were all not significant. However, only advertising is significant at 5% significant level.

The negative sign of NHIS on demand for drugs measures the change in estimated logit (demand for drugs) for changes in number of respondents with NHIS. Hence increases in the number of respondents with NHIS will lead to a decrease in the likelihood of demanding drugs. NHIS is not significant. It therefore means that, NHIS has insignificant impact on people likelihood to demand drugs.

The positive sign of advertisement on demand for drugs measures the change in estimated logit (demand for drugs) for a unit change in the rate of advertisement. If the rate of advertisement increases by a unit, people will increase their demand by 0.06 units. This implies that, as the rate of drug advertisement increases, people tend to purchase more drugs. This implies that H_0

hypothesis is rejected and instead the H_1 accepted at 5% error level. It therefore means that, advertisement has significant impact on people likelihood to demand drugs.

4.2.10. Self-Medication

$Y_i = \ln\frac{p}{1-p} = \beta_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \varepsilon_i$ is presented as follows in the table below;

Table 4. 14 Dependent variable: Self-medication

Explanatory Variable	Coefficient	Marginal effect	Standard Error	P-Value
Constant	1.546756	-	0.9644476	0.109
Age	0.0486046	-	0.0175063	0.005***
Income	-0.0005738	-	0.0002212	0.009***
Male	-	-	-	-
Female	-0.1496674	-	0.2690597	0.578
NHIS	-0.5206522	-	0.3670174	0.156
Educational Level		-		
Uneducated	-	-	-	-
Basic Education	-0.4859361	-	0.7773143	0.532
SHS	-1.132633	-	0.6891667	0.100
Tertiary Education	-1.177624	-	0.6533533	0.071
Advertisement	0.8001347	0.0906773	0.2866748	0.005***

Source; author's own estimates

Likelihood Ratio (LR Statistic) = -42.032236

Number of Observations = 500

Probability > chi2 = 0.0062

The overall test for significance shows that the model is statistically significant because its p-value of 0.000 is less than 0.05 this implies that the overall regression is significant. Each regression coefficient measures partial effects that independent variables have on dependent variable.

4.2.11 Interpretation of coefficients of self-medication regression

The coefficients of income, female, education at all levels, and NHIS have negative impact on people's likelihood to engage in self-medication but with different coefficient. Most of the signs were not different from a priori expectation. Also uneducated and males are the control group representing male who are uneducated. Only Advertisement, age, and income were significant at 5% significant level. Female, NHIS, education at all level are however insignificant at 5% error level, therefore they do not have any significant impact on self-medication.

The positive sign of age on the dependent variable self-medication measures the impact in estimated logit (self-medication) for changes in the age of people. If age increase by a year the estimated logit would increase, suggesting that there is positive relationship between age and self-medication. As the age of people increases, they tend to engage in self-medication. Age is significant at 5% error level. This implies that people's age have impact on people likelihood to engage in self-medication. This is consistent with expectation and also consistent with earlier finding by Michael et al (2004), when they found that older people were likely to increase the number of prescriptions and non-prescription medication consumed.

The negative sign of income on the dependent variable self-medication measures the change in estimated logit (self-medication) for a unit change in the level of income. Income is significant at 5% error level. If the level of income increases, the likelihood that people would indulge in self-

medication decreases, suggesting that there is negative relationship between income and self-medication. This implies that the income level of the people have impact on people likelihood to engage in self-medication. This was not consistent with expectation but consistence with the model by Chang and Trivedi (2003), who argued that professional care is a normal good and self-medication is an inferior good. Therefore, the indulgence in self-medication should fall as income increases. Hence informing the negative relationship between income and self-medication.

The positive sign of advertisement on the dependent variable self-medication measures the change in estimated logit (self-medication) for a unit change in the rate of advertisement. If the rate of advertisement increases by a unit, people will increase their act of self-medicating by 0.091 units. Advertisement is significant at 5% error level. This implies that, the rate of advertisement has much impact on people likelihood to engage in self-medication. This is consistent with expectation. It therefore means that, advertisement has much impact on people likelihood to engage in self-medication.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.0 Introduction

This chapter therefore reviews the major findings from the data analysis on whether drug advertisement affects the likelihood for people to engage healthy behaviors and the overall conclusion of the study after which recommendations are made.

5.1 Summary of major findings

The study revealed that, the various media through which advertisement was heard or seen were radio, television, billboards, mobile van, and drug hawkers. Respondent have heard advert through all the above mentioned mediums, but the medium through which adverts are mostly heard according to the sample population was through the radio which recorded 74.40% of the sample population. Billboard however, recorded 26.00% and was the least medium through which advertisement was seen.

The study also revealed that, advertisement was the major source of information that influenced people to purchase drugs that impacting on their healthy behaviors and also making them self-medicate. The study recorded 74.60% of the respondent saying advertisement influenced their choice of drugs. Past prescription also recorded 34.60% of the sample respondents and was the least source of information that influenced respondents to purchase drugs.

Also, among the types of drugs used in this research, over the counter drugs was the highly purchased drug. 65.60% of the respondent purchased over the counter drugs, 57.20% purchased

herbal drugs and 55.60% purchase prescription drugs. Prescription drugs, even though was least purchased among the sample population had appreciable percentage.

The study also found that, the disease that mostly influenced respondents to engage in self-medication is malaria. The respondents that purchased drugs as a result of malaria were 63.73% of the sample population, while 54.00% of the respondents said they engaged in self-medication due to pains. Furthermore, 3.00% of the respondents said other (piles, diarrhea, diabetes, rashes, asthma, rheumatism, infertility, menstrual disorders, pimples, and eye problems) diseases cause them to engage in self-medication, 19.20% also self-medicated as a result of cough. This makes malaria the most pronounced disease responsible for self-medication among the sample population.

Furthermore, the study looked at the consequences of self-medication and found out that, 76% of the sample population self-medicated and had their diseases cured with no bad effects and 11.00% of the sample population also self-medicated and their diseases was not cured but suffered some bad effects. Also 4.80% of the sample respondents also reported that their disease was cured but they still suffered some bad effects. Some of the bad effects suffered by respondents include; skin rashes, heart burns, itches, running stomach, vaginal discharge, dizziness, vomiting, and reddened eyes. Furthermore, 1.80% of the sample population also reported that, their diseases were not cured and they suffered no bad effects. This shows that, regardless of the large number of respondents who self-medicated as a result of the various diseases mentioned above, there was still a proportion of the sample population that suffered some complications because they self-medicated. This could be as a result of irresponsible self-medication. It was however advised by WHO (2009) that, the use of responsible self-medication

practices should be encouraged so as to reduce the burden on facilities and health care personnel in the developing economies.

Also, the study shows that income level, advertising, and basic education does not have much impact on the likelihood of people to engage in exercise. Though, income and advertisement are insignificant in influencing people to engage in physical exercise. They both show negative relationship on the likelihood for people to engage in exercise which is consistent with theory. Increase in the rate of advertising has the likelihood of reducing the rate at which people engage in physical exercise according to the sample population, this is consistent with the study by Iizuka and Jin (2007), they found out that, increase in drug advertising will lead to a reduction in physical exercise because consumers will substitute the advertised drug for physical exercise . Age, female, and educational level (senior high and tertiary level) all have significant impact on the likelihood to engage in physical exercise. It therefore follows that, as one advance in age there is a reduction in exercise since age and exercise are negatively related. The aged are less likely to engage in physical exercise as compared to that of the younger age group. The relationship between exercise and females is also negative. This implies that females do less exercise among the sample population and increase in the number of females will lead to a reduction in the consumption of physical exercise. The educational levels; senior high and tertiary education are both significant and have a positive impact on the likelihood to engage in exercise but tertiary education tends to be highly significant as compared to that of the senior high education level. This implies that, the higher the level of one's education the higher will be the likelihood to engage in physical exercise.

The study further reveals that, income level, advertising, health insurance, basic education, senior high education do not have any significant impact on the likelihood of people to go for

medical check-ups. Though, income, insurance and advertisement are insignificant in influencing people to go for medical check-ups, they all show positive relationship on the likelihood for people to go for medical check-ups. The positive sign of insurance shows that, an increase in the number of people with health insurance will lead to the consumption of medical check-up among the sample population. Age, female, and tertiary education level all have significant impact on the likelihood of respondents to go for medical check-ups. This implies that, the aged are more likely to go for medical check-ups which could be due to the deterioration in their health status. Females also have a significant impact on the likelihood to go for medical check-ups. The positive relationship between females and medical check-up implies that, increase in the number of females among the sample population will lead to an increase in the consumption of medical check-up. The significance of tertiary educational level implies that, the higher the level of one's education the higher will be the likelihood to go for medical check-ups among the sample population.

In terms of dissociation from high risk behaviors, the study revealed that females, health insurance, senior high education, tertiary education, and advertisement are the variables that have significant impact on the likelihood of respondents to dissociate themselves from high risk behaviors. Females impacted negatively on the likelihood to dissociate from high risk behaviors. This implies that females among the sample population dissociate themselves from high risk behaviors as compared to the control group (males). Hence an increase in the number of females will lead to an increase in the likelihood to dissociate from high risk behaviors. Adverts also predicted a negative impact on the likelihood to dissociate from high risk behaviors, increase in advertising leads to a reduction in the likelihood to dissociate from high risk behaviors. This implies that, alcoholism, smoking, and promiscuity are the high risk behaviors that increase if the

rate of drug advertisement that increases. If the drug advertised can cure the consequence of engaging in such behaviors, it will lead to an increase in the likelihood of the sample respondents to engage in such high risk behaviors.

Education at the senior high level and tertiary level both predicted a positive impact on the likelihood to dissociate from high risk behaviors. This implies that, increase in the level of education will lead an increase in the likelihood to dissociate from high risk behaviors.

Health insurance also predicted positive on the likelihood to dissociate from high risk behaviors. This implies that, increase in the number of NHIS holders will lead to an increase the likelihood for one to dissociate from high risk behaviors. This result is consistent with the findings by Peltzman (2002) investigates the impact of the development of antibiotics on mortality and finds that the development increased the mortality risk among age groups and in regions that were most likely to benefit from the innovation. He interprets this as suggestive evidence of certain behavior where individuals adopt risky health behaviors in response to the availability of a curative product.

Also, with respect to the consumption of healthy diet, the study revealed that, only income was significant at the 5% error level and impacted positively on the likelihood to consume healthy diet. If the level of income increases, the likelihood that people will eat healthy diet increases. This implies that respondent's income level has a significant impact on their likelihood to eat healthy diets which is consistent with a priori expectation.

Furthermore, the study revealed that, only advertising was significant with respect to the likelihood to purchase drugs. Advertising predicted positive on the likelihood to purchase drugs. This implies that, increase in the rate of advertising will increase the likelihood to purchase

drugs. This implies that, advertising has a significant impact on people's likelihood to purchase drugs.

Finally, in terms of self-medication, the study revealed that, age, income and advertising have significant impact on the likelihood to self-medicate. Age and advertising predicted positive on the likelihood to engage in self-medication. Hence as one advances in age the likelihood to engage in self-medication is high. Advertising also predicting positive implies that, increase in drug advertising will lead to an increase in the likelihood to engage in self-medication. Income showed a negative relationship with self-medication, this implies that, an increase in one's income will lead to a reduction in the likelihood to engage in self-medication. This is consistent with a study by Chang and Trivedi (2003), they however argue that professional care is a normal good and self-medication is an inferior good, hence increase in income will reduce the likelihood to self-medicate.

5.2 Conclusions

It can be concluded from the findings that, all the sample respondents have heard of drug advertising but it only influenced 74.60% of the sample respondents' healthy lifestyles. Drug advertising does not have any significant impact on exercise, consumption of healthy diet, and medical check-ups. The case of dissociation from high risk behaviors was the only health behavior that drug advertising affected significantly. The study showed that, drug advertising encouraged people to engage in risky health behaviors. The demand for drugs and self-medication all had drug advertising impacting negatively on them. This implies that, Ghanaians engage in high risk behaviors, purchase drugs, and self-medicate as a result of drug advertising. Health insurance also impacted negatively on the demand for drugs but insignificant.

From the above discussions, it's obvious that, drug advertising even though helps pharmaceutical companies to market their product have adverse effect on the people of Ghana since drug adverts are not checked and pharmaceutical companies and other local drug producers advertise drugs which are illegal to advertise according to the FDB. Most of these adverts are made on the radio which is the medium through which drug adverts are heard most in Ghana.

5.3 Policy recommendations.

The Food and Drugs Board law 1992 (PNDCL 305B) which stipulates that, there shall be no advertisement permitted for drugs and herbal medicines specified in schedule 2 of the PNDCL 305B as outlined in the problem statement must be enforced this law to help solve the problem of indiscriminate advertising of medication drugs which may have adverse effect on the health of Ghanaians if not consumed based on prescription.

The Ghana Health Service must include in their adverts the essence of consumers of health care engaging in healthy behaviors and outline various health behaviors to help improve the health status of the citizenry. This will help sway people's attention from the consumption of medication drugs to help repair tissues in the body which can also be repaired by not consuming medication drugs some of which have adverse effect on consumers.

The study again recommends that, there must be proper monitoring by the Food and Drugs Board on the activities of pharmaceutical companies in Ghana. This will put pharmaceutical companies on their toes and help engage in activities that will better the Ghanaian health care system. They have to engage in educative advertising and do more research to come out with drugs with minimal or no side effects. Pharmacy shop operators must be checked to ensure that, they have the ideal requirements to operate pharmacy shops.

The study also recommends that, the population should be made aware on the need for periodic check-ups. This will help prevent certain diseases to be cured better than waiting for them to become serious before health attention is sought. This will help solve the bad consequences of self-medication since drugs will be consumed for the right diseases.

Based on the advice by WHO (2009), the use of responsible self-medication practices should be encouraged so as to reduce the burden on facilities and health care personnel in the developing economies like Ghana. This will help reduce pressure on the existing health care institutions and even increase productivity since patients will spend less time in the hospitals. Since advertising has a significant effect on self-medication based on the findings of this research, it is encouraged that, detailed adverts on the medication drugs should be made with no asymmetric information for improved healthcare system.

.

REFERENCES

Afolabi A. O. (2008), *Factors Influencing The Pattern Of Self-Medication In An Adult Nigeria Population*. annals of Africa medicine, 120-127 vol 7, n 3

Ajzen, I., & Fishbein, M. (1977). *Attitude, behavior relations: A theoretical analysis and review of empirical research*. Psychological Bulletin, 84, 888.918.

Belloc, N B and Breslow, L, (1972). *Relationship of physical health status and health*

Berg, B.L. (2007). *Qualitative research methods for the social sciences* (6 th ed.). Boston: Pearson and Allyn and Bacon

Biehal, Gabriel, Debra Stephens, and Eleonora Curlo (1992), *Attitude* Toward *The Advertisement And Brand Choice*, Journal of Advertising, 21 (3), 19-36.

Blaxter, M, (1990). *Health and Lifestyles*. London: Routledge.

Boxill, Ian; Chambers, Claudia; Wint, Eleanor (1997). *Introduction to Social Research With Applications to the Caribbean*. University of The West Indies Press. Chapter 4, page 36. ISBN 976-8125-22-5.

Chang F, Trividi P. K, (2003), *Economics of Self-medication: theory and evidence, Health economics*:12:721-739

CIA World Factbook (2012)

Conner, M and Norman, P, (1996). (eds.) *Predicting Health Behaviour*. Buckingham, UK: Open University Press.

Conner, M., and Norman, P. (Eds.) (2005). *Predicting Health Behaviour: Research and Practice with Social Cognition Models, 2nd Ed*. Maidenhead: Open University Press.

D S Gochman (Ed), (1997). *Handbook of Health Behavior Research* New York, Vols. 1–4: Plenum.

Daysal, N. Meltem; Orsini, Chiara (2012), *Spillover Effects Of Drug Safety Warnings On Health Behavior.*

Donohue, J. M, Berndt, E.R; (2004) *Effects of Direct-To-Consumer Advertising On Medication Choice: The Case Of Antidepressant.* Journal of public policy and marketing, vol 23, 115-127.

Foxall, G., 1990. *Consumer Psychology in Behavioral Perspective*. London: Routledge

Gochman (1997), *The Handbook Of Health Behavior* (Vol. 1, p. 3).

Gujarati N. Damodar (2003), *Basic Economics*, 4th edition, USA. Gary Burke.

Gupta P, Prateeks B, Saurabh R, Shrivasti T; (2011) *Determinants Of Self-Medication Practices In An Urban Slum Community*. Asian journal of pharmaceutical and clinical research. vol 4, 0974-2441

Iizuka Toshiaki and Jin Ginger Zhe (2007), *Drug Advertising And Health Habits*.

John E. Calfee, Clifford Winston, and Randolph Stempski (2003), *Direct-To-Consumer Advertising And The Demand For Cholesterol-Reducing Drugs*.

Katharine Greider, (2003) The Big Fix: *How The Pharmaceutical Industry Rips Off American Consumers.*

Lesley Chiou and Catherine E. Tucker (2010), *How Does Pharmaceutical Advertising Affects Consumer Search?*

Lynette Bradley and Julie Zito (1989).

Mike fillon (2005), *Ephedra Fact And Fiction*. Page 77. Woodland publishers.

Mohit Bhandari and Anders Joensson (2009*) Clinical Research for Surgeons*. page 293 Thieme publishing company

Mosby's Medical Dictionary, 8th edition. © 2009, Elsevier.

Neuman, W.L. (2006). *Social Research Methods: Qualitative and Quantitative Approaches.* Toronto: Pearson

Patton M. Q (2002), "*Research & Evaluation Methods*": 3rd edition, Newbury Park, California: Sage productions.

Phillip O. Anum, Gifty E. Mankartah, Kwabena A. Anaman (2010) , *The Assessment Of Pharmaceutical Wholesale Market In Ghana* .Practices. Preventive Medicine, **9**, pp. 409–421.

Ribeaux, Poppleton., 1978. *Psychology and Work*. London: Macmillan Education

Rohit K.V, Lalit M, Manisha P;(2010) *Evaluation Of Self-Medication Among Professional Student In North India*, Asian journal of pharmaceutical and clinical research, vol 3, 0974-2441

Sam Peltzman (1975). *Offsetting Behavior And Medical Breakthroughs*

Schiffman, L.G, Kanuk, (2000) *Consumer Behavior*. 9th ed. New Jersey: Prentice Hall.

Shveta S, Jagmohan S; (2011) *A study of the pattern of self-medication in Punjab*. Indian journal of pharmacy practice; vol 4

Simon, H., 1997. *Administrative Behavior: A Study of Decision-Making Processes in Administrative Organizations*. 4th ed. ed. New York: The Free Press.

Singh Tanuja And Donnavieve Smith (2005), *Direct-To-Consumer Prescription Drug Advertising: A Study Of Consumer Attitudes And Behavioral Intentions*

Solomon, Bamossy et al (2006*). Consumer Behaviour*: A European Perspective. 3rd ed. Harlow: Prentice Hall.

Stewart, J., (1994). *The psychology of decision making*. In: D. Jennings And S. Wattam, eds. Decision Making: an Integrated Approach. London: Pitman.

Stock J.H, Watson M.W, (2007) *Introduction to Econometrics*, 2nd edition, USA, Pearson.

Strategies for Enhancing Access to Medicines (SEAM) Ghana (2003) *Program Center for Pharmaceutical Management*

Strauss A. & Corbin J. (1990), "*Basics of Research: Grounded theory procedures and techniques*", London: Sage.

US Department of Health and Human Services (1990) Health People 2000: *National Health Promotion and Disease Prevention Objectives*. US Department of Health and Human Services, Public Health Service, Washington, DC.

Veal A. J (2006); *Research Methods Of Tourism And Leisure: A practical guide*, 3rd edition, prentice hall, Pearson education ltd

Viscusi W. K (1985), *A Baysian Perspective On Biases In Risk Persception. Economic Letters*. 17, 59-62

WHO (2009) *Self-Medication in the Context Of Primary Health Care*. Report of the regional consultation in Bangkok Thailand, 7-9 January 2009. Regional office for south-east Asian.

Wilkes Michael S., Bell Robert A., and Kravitz Richard L. (2000) *Direct-To-Consumer Prescription Drug Advertising: Trends,Impact, And Implications*

William F. Arens, Christian Arens, Michael F. Weigold, (2010) *Contemporary Advertising*, 13th edition, illustrated. Publisher, McGraw-Hill

Yamane, Taro (1967). *Statistics: An Introductory Analysis*, 2nd Ed., New York: Harper and Row.

APPENDIX 1; Questionnaires

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

DEPARTMENT OF ECONOMICS

Effects Of Drug Advertising on Consumer Health Behavior; A Case Study Of Kumasi

This study is conducted in partial fulfillment of the requirement of the award of a Master of Arts degree in economics. All information received would be used solely for academic purposes and treated with strict confidentiality.

1 Age: [ ]

2 sex: male [ ] female [ ]

3 Monthly income level: [ ]

4 Education level: basic [ ] senior high [ ] tertiary [ ] uneducated [ ] other……

5 Have you heard or listened (seen) to any advertisement on drugs? a) Yes [ ] b) no [ ]

6. Which of the following is the medium through which the advertisement was made?

a) Radio [ ] b. Television [ ] c. Bill board [ ] d. mobile vans [ ] Drug hawkers [ ] other specify……..

Behavior and market information

7. Do you buy drugs? Yes [ ] No [ ]

8. If yes, what was the source of information of drugs purchased?

a) Physician prescription [ ]
b) Advert [ ]
c) Past prescription [ ]
d) Friends [ ]
e) other specify…….

9. If yes in 7, which drugs do you buy?

a) Prescription Drugs [ ]
b) Over The Counter Drugs [ ]

c) Herbal Drug [ ]

10. Do you engage in the following health behaviors?

a. Exercising ; YES [ ] NO[ ]

b. Good eating habits: YES [ ] NO [ ]

c. Personal hygiene: YES [ ] NO [ ]

d. Dissociation from high risk behaviors eg. Smoking, Alcoholism, Promiscuity: YES [ ] NO [ ]

12. Are you an NHIS holder? Yes [ ] no [ ]

13. Do you engage in self-medication? Yes [ ] no [ ]

14. What are the other sources of information on self-medication?

a) Information from chemist [ ]

b) b) advert [ ]

c) c) Past prescription [ ]

d) d) friends [ ]

e) Others specify……..

15. What illnesses normally influence you to engage in self-medication?

a) Pains [ ]

b) Malaria [ ]

c) Cough [ ]

d) Others specify……

16. What was the result of self-medication?

a. Disease cured with no bad effects [ ]

b. Disease cured but with bad effects [ ] eg……

c. Disease not cured and no bad effects [ ]

d. Disease not cured but with bad effects [ ] eg……

APPENDIX 2; Regression results

```
. logit HBEXERCISE AGE INCOME FEMALE BASIC SHS TERTIARY ADVERT, vce(robust)

Iteration 0:   log pseudolikelihood = -345.54889
Iteration 1:   log pseudolikelihood = -291.43213
Iteration 2:   log pseudolikelihood = -290.97087
Iteration 3:   log pseudolikelihood =  -290.9693
Iteration 4:   log pseudolikelihood =  -290.9693

Logistic regression                             Number of obs   =        500
                                                Wald chi2(7)    =      83.89
                                                Prob > chi2     =     0.0000
Log pseudolikelihood =  -290.9693               Pseudo R2       =     0.1580

------------------------------------------------------------------------------
             |               Robust
  HBEXERCISE |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         AGE |  -.0493193   .0105363    -4.68   0.000      -.06997   -.0286686
      INCOME |  -.0002551   .0002459    -1.04   0.300     -.000737    .0002269
      FEMALE |  -1.071347   .2067069    -5.18   0.000    -1.476485   -.6662093
       BASIC |   .7285594   .4149639     1.76   0.079     -.084755    1.541874
         SHS |   .7749414   .3731002     2.08   0.038     .0436785    1.506204
    TERTIARY |    1.49381   .3620961     4.13   0.000     .7841149    2.203506
      ADVERT |  -.2420181   .2392309    -1.01   0.312     -.710902    .2268659
       _cons |   1.328529   .5196481     2.56   0.011     .3100372     2.34702
------------------------------------------------------------------------------

.
```

```
mfx compute
Marginal effects after logit
      y  = Pr(HBEXERCISE) (predict)
         =  .45245216
------------------------------------------------------------------------------
variable |      dy/dx    Std. Err.     z    P>|z|  [    95% C.I.   ]      X
---------+--------------------------------------------------------------------
     AGE |  -.0122183      .00261   -4.69   0.000  -.017326  -.00711    33.338
  INCOME |  -.0000632      .00006   -1.04   0.300  -.000183  .000056    510.04
  FEMALE*|  -.2592042      .04765   -5.44   0.000  -.352599 -.165809      .492
   BASIC*|   .1799384      .09942    1.81   0.070  -.014922  .374799      .142
     SHS*|   .1913338      .08997    2.13   0.033   .015003  .367664      .276
TERTIARY*|   .3563891      .07909    4.51   0.000   .201377  .511401      .432
  ADVERT*|  -.0601723      .05956   -1.01   0.312  -.176901  .056557      .746
------------------------------------------------------------------------------
(*) dy/dx is for discrete change of dummy variable from 0 to 1

. logit  HBDIET AGE INCOME FEMALE BASIC SHS TERTIARY ADVERT, vce(robust)

Iteration 0:   log pseudolikelihood = -126.81947
Iteration 1:   log pseudolikelihood = -104.80658
Iteration 2:   log pseudolikelihood = -89.185359
Iteration 3:   log pseudolikelihood = -87.693573
Iteration 4:   log pseudolikelihood =  -87.63887
Iteration 5:   log pseudolikelihood = -87.638812
Iteration 6:   log pseudolikelihood = -87.638812

Logistic regression                             Number of obs   =        500
                                                Wald chi2(7)    =      49.69
                                                Prob > chi2     =     0.0000
Log pseudolikelihood = -87.638812               Pseudo R2       =     0.3089
```

	Robust				
HBDIET	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]
AGE	.1213337	.0814233	1.49	0.136	-.0382529 .2809204
INCOME	.0071683	.0025842	2.77	0.006	.0021034 .0122332
FEMALE	.7954051	.4224927	1.88	0.060	-.0326654 1.623476
BASIC	1.380102	.9658194	1.43	0.153	-.512869 3.273074
SHS	1.390592	.872307	1.59	0.111	-.3190981 3.100282
TERTIARY	.468979	.8134277	0.58	0.564	-1.12531 2.063268
ADVERT	-.3393206	.410802	-0.83	0.409	-1.144478 .4658366
_cons	-3.425784	2.084515	-1.64	0.100	-7.511358 .6597892

Note: 0 failures and 8 successes completely determined.

. mfx compute

Marginal effects after logit
y = Pr(HBDIET) (predict)
= .99449156

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
AGE	.0006647	.0005	1.32	0.187	-.000323	.001652	33.338
INCOME	.0000393	.00002	1.74	0.083	-5.1e-06	.000084	510.04
FEMALE*	.0044411	.00378	1.18	0.240	-.002963	.011845	.492
BASIC*	.0050009	.00336	1.49	0.136	-.001575	.011577	.142
SHS*	.006045	.00419	1.44	0.149	-.002167	.014257	.276
TERTIARY*	.0025115	.00442	0.57	0.570	-.006161	.011183	.432
ADVERT*	-.0017195	.00204	-0.84	0.400	-.005725	.002286	.746

(*) dy/dx is for discrete change of dummy variable from 0 to 1

```
. logit   HBMEDCHECKUP AGE INCOME FEMALE NHIS BASIC SHS TERTIARY ADVERT, vce(robust)

Iteration 0:   log pseudolikelihood = -286.52846
Iteration 1:   log pseudolikelihood = -266.68812
Iteration 2:   log pseudolikelihood = -266.25746
Iteration 3:   log pseudolikelihood = -266.25695
Iteration 4:   log pseudolikelihood = -266.25695

Logistic regression                             Number of obs   =        500
                                                Wald chi2(8)    =      39.27
                                                Prob > chi2     =     0.0000
Log pseudolikelihood = -266.25695               Pseudo R2       =     0.0707

------------------------------------------------------------------------------
             |               Robust
HBMEDCHECKUP |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         AGE |   .0359755     .01077     3.34   0.001     .0148668    .0570843
      INCOME |   .0001339    .000216     0.62   0.536    -.0002896    .0005573
      FEMALE |   .5525716   .2145252     2.58   0.010     .1321098    .9730333
        NHIS |   .0967106   .2646789     0.37   0.715    -.4220506    .6154718
       BASIC |   .2284757   .4253392     0.54   0.591    -.6051738    1.062125
         SHS |   .2858314   .3946603     0.72   0.469    -.4876887    1.059351
    TERTIARY |   1.058681   .3577768     2.96   0.003     .3574518    1.759911
      ADVERT |   .2332697   .2784924     0.84   0.402    -.3125653    .7791048
       _cons |   -3.50065   .5928342    -5.90   0.000    -4.662583   -2.338716
------------------------------------------------------------------------------

. mfx compute

Marginal effects after logit
```

```
      y  = Pr(HBMEDCHECKUP) (predict)
         =  .24158837
------------------------------------------------------------------------------
variable |      dy/dx    Std. Err.      z    P>|z|  [    95% C.I.   ]      X
---------+--------------------------------------------------------------------
     AGE |   .0065916      .00194    3.40   0.001   .002787  .010396    33.338
  INCOME |   .0000245      .00004    0.62   0.537  -.000053  .000102    510.04
  FEMALE*|   .1013415      .03957    2.56   0.010   .023782  .178901      .492
    NHIS*|   .0174794      .04716    0.37   0.711  -.074958  .109917       .77
   BASIC*|   .0436016      .08427    0.52   0.605  -.121561  .208764      .142
     SHS*|   .0540669      .07686    0.70   0.482   -.09658  .204714      .276
TERTIARY*|   .1997748      .06787    2.94   0.003   .066759  .332791      .432
  ADVERT*|   .0414604       .0478    0.87   0.386  -.052227  .135147      .746
------------------------------------------------------------------------------
(*) dy/dx is for discrete change of dummy variable from 0 to 1

. logit    HBRISKAVOID AGE INCOME FEMALE NHIS BASIC SHS TERTIARY ADVERT, vce(robust)

Iteration 0:   log pseudolikelihood =  -268.4242
Iteration 1:   log pseudolikelihood = -243.43626
Iteration 2:   log pseudolikelihood = -242.28875
Iteration 3:   log pseudolikelihood =   -242.283
Iteration 4:   log pseudolikelihood =   -242.283

Logistic regression                             Number of obs   =        500
                                                Wald chi2(8)    =      41.96
                                                Prob > chi2     =     0.0000
Log pseudolikelihood =   -242.283               Pseudo R2       =     0.0974

------------------------------------------------------------------------------
             |               Robust
 HBRISKAVOID |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
```

```
-------------+----------------------------------------------------------------
         AGE |  -.0069625   .0118596    -0.59   0.557    -.0302069    .0162818
      INCOME |   .0002184   .0003548     0.62   0.538    -.0004771    .0009138
      FEMALE |   .8399923   .2343262     3.58   0.000     .3807215    1.299263
        NHIS |   .5804376   .2728495     2.13   0.033     .0456624    1.115213
       BASIC |   .5635125    .387884     1.45   0.146    -.1967263    1.323751
         SHS |   .7551331   .3535718     2.14   0.033     .0621451    1.448121
    TERTIARY |   1.250653   .3558966     3.51   0.000     .5531084    1.948198
      ADVERT |  -.7856451   .3448219    -2.28   0.023    -1.461484   -.1098066
       _cons |   .3978046   .5160526     0.77   0.441    -.6136398    1.409249
------------------------------------------------------------------------------


. mfx compute


Marginal effects after logit
      y  = Pr(HBRISKAVOID) (predict)
         =  .79897454
------------------------------------------------------------------------------
variable |      dy/dx    Std. Err.     z    P>|z|  [    95% C.I.   ]      X
---------+--------------------------------------------------------------------
     AGE |  -.0011183      .00191   -0.59   0.558  -.004858  .002621    33.338
  INCOME |   .0000351      .00006    0.61   0.539  -.000077  .000147    510.04
  FEMALE*|   .1345066      .03603    3.73   0.000   .063889  .205124      .492
    NHIS*|   .1018887      .05262    1.94   0.053  -.001242   .20502       .77
   BASIC*|   .0798772      .04854    1.65   0.100  -.015261  .175015      .142
     SHS*|   .1094616      .04707    2.33   0.020   .017214  .201709      .276
TERTIARY*|   .1915695      .05216    3.67   0.000   .089332  .293807      .432
  ADVERT*|    -.11217      .04224   -2.66   0.008  -.194951 -.029389      .746
------------------------------------------------------------------------------
(*) dy/dx is for discrete change of dummy variable from 0 to 1


. logit     DRUGPURCHASE AGE INCOME FEMALE NHIS BASIC SHS TERTIARY ADVERT, vce(robust)
```

```
Iteration 0:   log pseudolikelihood = -60.27508
Iteration 1:   log pseudolikelihood = -47.780043
Iteration 2:   log pseudolikelihood = -42.389822
Iteration 3:   log pseudolikelihood = -42.037581
Iteration 4:   log pseudolikelihood = -42.032236
Iteration 5:   log pseudolikelihood = -42.032236

Logistic regression                             Number of obs   =        500
                                                Wald chi2(8)    =      61.73
                                                Prob > chi2     =     0.0000
Log pseudolikelihood = -42.032236               Pseudo R2       =     0.3027

------------------------------------------------------------------------------
             |               Robust
DRUGPURCHASE |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         AGE |   .0975188   .0618177     1.58   0.115    -.0236417    .2186793
      INCOME |  -.0010317   .0006946    -1.49   0.137     -.002393    .0003296
      FEMALE |   .6202875   .6468933     0.96   0.338    -.6476001    1.888175
        NHIS |   -.215403    .739633    -0.29   0.771    -1.665057    1.234251
       BASIC |  -.8422899   1.433469    -0.59   0.557    -3.651838    1.967259
         SHS |   1.194695   1.200575     1.00   0.320    -1.158388    3.547778
    TERTIARY |   1.132665   1.185146     0.96   0.339    -1.190178    3.455508
      ADVERT |   3.922568   1.222444     3.21   0.001     1.526621    6.318514
       _cons |  -.8584296   1.368706    -0.63   0.531    -3.541043    1.824184
------------------------------------------------------------------------------

. mfx compute
Marginal effects after logit
      y  = Pr(DRUGPURCHASE) (predict)
         =  .99642941
```

```
------------------------------------------------------------------------------
variable |      dy/dx    Std. Err.      z    P>|z|  [    95% C.I.   ]      X
---------+--------------------------------------------------------------------
     AGE |    .000347      .00029    1.21   0.225  -.000213  .000907    33.338
  INCOME |  -3.67e-06      .00000   -1.45   0.148  -8.6e-06  1.3e-06    510.04
  FEMALE*|   .0022306      .00297    0.75   0.452  -.003587  .008049      .492
    NHIS*|  -.0007247      .00264   -0.27   0.784  -.005906  .004457       .77
   BASIC*|  -.0041582      .00589   -0.71   0.480    -.0157  .007384      .142
     SHS*|   .0034518      .00671    0.51   0.607  -.009695  .016598      .276
TERTIARY*|   .0039316      .00837    0.47   0.639  -.012477   .02034      .432
  ADVERT*|   .0613451      .03129    1.96   0.050   .000026  .122664      .746
------------------------------------------------------------------------------
(*) dy/dx is for discrete change of dummy variable from 0 to 1

. logit SELFMED AGE INCOME FEMALE NHIS BASIC SHS TERTIARY ADVERT, vce(robust)

Iteration 0:   log pseudolikelihood = -202.48174
Iteration 1:   log pseudolikelihood = -185.44346
Iteration 2:   log pseudolikelihood = -183.13369
Iteration 3:   log pseudolikelihood = -183.09739
Iteration 4:   log pseudolikelihood = -183.09729
Iteration 5:   log pseudolikelihood = -183.09729

Logistic regression                             Number of obs   =        500
                                                Wald chi2(8)    =      38.51
                                                Prob > chi2     =     0.0000
Log pseudolikelihood = -183.09729               Pseudo R2       =     0.0957

------------------------------------------------------------------------------
             |               Robust
     SELFMED |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
```

AGE	.0486046	.0175063	2.78	0.005	.0142929	.0829163
INCOME	-.0005738	.0002212	-2.59	0.009	-.0010074	-.0001402
FEMALE	-.1496674	.2690597	-0.56	0.578	-.6770146	.3776798
NHIS	-.5206522	.3670174	-1.42	0.156	-1.239993	.1986888
BASIC	-.4859361	.7773143	-0.63	0.532	-2.009444	1.037572
SHS	-1.132633	.6891667	-1.64	0.100	-2.483375	.2181093
TERTIARY	-1.177624	.6533533	-1.80	0.071	-2.458173	.1029253
ADVERT	.8001347	.2866748	2.79	0.005	.2382624	1.362007
_cons	1.546756	.9644476	1.60	0.109	-.3435263	3.437039


```
. mfx compute

Marginal effects after logit
      y  = Pr(SELFMED) (predict)
         =  .89153459
```

variable	dy/dx	Std. Err.	z	P>|z|	[95% C.I.]		X
AGE	.0047001	.00165	2.85	0.004	.001466	.007934	33.338
INCOME	-.0000555	.00002	-2.60	0.009	-.000097	-.000014	510.04
FEMALE*|	-.0144922	.02621	-0.55	0.580	-.065865	.03688	.492
NHIS*|	-.0452598	.02784	-1.63	0.104	-.099822	.009303	.77
BASIC*|	-.0538603	.09703	-0.56	0.579	-.244039	.136319	.142
SHS*|	-.1347217	.0965	-1.40	0.163	-.323851	.054407	.276
TERTIARY*|	-.1237501	.07307	-1.69	0.090	-.266972	.019471	.432
ADVERT*|	.0906773	.03781	2.40	0.016	.016565	.16479	.746

```
(*) dy/dx is for discrete change of dummy variable from 0 to 1
```