



Faculty of Medicine and Health Sciences

**COMPARISON OF SOCIO-ECONOMIC STATUS AND HUMAN
RELATED FACTORS AMONG ADULTS BETWEEN HOTSPOT
AND NON-HOTSPOT AREAS OF DENGUE IN KUCHING
AND SAMARAHAN, SARAWAK**

Ahmad Salimi Bin Abu Bakar

Master of Public Health

2020

**COMPARISON OF SOCIO-ECONOMIC STATUS AND HUMAN
RELATED FACTORS AMONG ADULTS BETWEEN HOTSPOT
AND NON-HOTSPOT AREAS OF DENGUE IN KUCHING AND
SAMARAHAN, SARAWAK**

Ahmad Salimi Bin Abu Bakar

**Research Project submitted in partial fulfilment of the requirements for the degree of
Master of Public Health**

**Faculty of Medicine and Health Science
UNIVERSITI MALAYSIA SARAWAK**

2020

DECLARATION OF ORIGINALITY

UNIVERSITI MALAYSIA SARAWAK

Grade: _____

Please tick (✓)

Final Year Project Report

Masters

PhD

✓

DECLARATION OF ORIGINAL WORK

This declaration is made on the 22 day of SEPTEMBER 2020

Student's Declaration:

I, Ahmad Salimi Bin Abu Bakar (Matric No: 19030202), from the Faculty of Medicine and Health Sciences, hereby declare that the work entitled 'Comparison of Socioeconomic Status and Human Related Factors Among Adults Between Hotspot and Non-Hotspot Areas of Dengue in Kuching and Samarahan, Sarawak' is my original work. I have not copied from any other students' work or any other sources except where due reference or acknowledgement is made explicitly in the text, nor has any part been written for me by another person.

22 SEPTEMBER 2020

Date submitted



Ahmad Salimi Bin Abu Bakar (19030202)

Supervisor's Declaration:

I, Professor Datu Dr Andrew Kiyu, hereby certifies that the work entitled 'Comparison of Socioeconomic Status and Human Related Factors Among Adults Between Hotspot and Non-Hotspot Areas of Dengue in Kuching and Samarahan, Sarawak' was prepared by the above-named student, and was submitted to the Faculty of Medicine and Health Sciences as partial fulfilment for the conferment of Master of Public Health and the aforementioned work, to the best of my knowledge, is the said student's work.

Received for examination by: _____

(Professor Datu Dr Andrew Kiyu)

Date: 22 September 2020


I declare that Project/Thesis is classified as (Please tick (√)):


- CONFIDENTIAL (Contains confidential information under the Official Secret Act 1972)
- RESTRICTED (Contains restricted information as specified by the organisation where the research was done)
- OPEN ACCESS

Validation of Project/Thesis

I therefore duly affirm with free consent and willingly declare that this said Project/Thesis shall be placed officially in the Centre for Academic Information Services with the abiding interest and rights as follows:

- This Project/Thesis is the sole legal property of University Malaysia Sarawak (UNIMAS).
- The Centre for Academic Information Services has the lawful right to make copies for the purpose of academic and research only and not for another purpose.
- The Centre for Academic Information Services has the lawful right to digitalise the content for the Local Content Database.
- The Centre for Academic Information Services has the lawful right to make copies of the Project/Thesis for academic exchange between Higher Learning Institute.
- No dispute or any claim shall arise from the student itself neither third party on this Project/Thesis once it becomes the sole property of UNIMAS.
- This Project/Thesis or any material, data, and information related to it shall not be distributed, published, or disclosed to any party by the student except with UNIMAS permission.

Student signature: 
(Ahmad Salimi Bin Abu Bakar)
Date: 22 SEPTEMBER 2020

Supervisor signature: 
(Professor Datu Dr Andrew Kiyu)
Date: 22 September 2020

Current Address: Department of Community Medicine and Public Health, Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak, Sarawak, Malaysia.

(The instrument was duly prepared by The Centre for Academic Information Services)

ACKNOWLEDGEMENT

I am grateful to my supervisor, Professor Datu Dr Andrew Kiyu, for his time, advice, guidance, critical comments, and support in all possible ways that helped me to complete this research project. I also extend special thanks to Professor Dr Md Mizanur Rahman for his endless guidance throughout this research project. My sincere thanks also go to Associate Professor Dr Jeffery Stephen, head of the Department of Community Medicine and Public Health, Professor Dr Lela Hj Su'ut, chairman of Medical Ethics Committee, Associate Professor Cheah Whye Lian, Associate Professor Dr Helmy Hazmi, Associate Professor Dr Zafar Ahmed and all other lecturers in Faculty of Medicine and Health Sciences for giving the kind assistance, guidance and encouragement throughout the dissertation. I want to thank the Ethics Committee of University Malaysia Sarawak (UNIMAS) for granting permission to conduct this study. I would also like to thank my parents, my parents-in-law, my wife, and children for their love and sacrifice.

TABLE OF CONTENT

DECLARATION OF ORIGINALITY	ii
ACKNOWLEDGEMENT	iv
TABLE OF CONTENT	v
LIST OF TABLES	x
LIST OF FIGURES	xii
LIST OF ABBREVIATIONS	xiii
LIST OF APPENDICES	xiv
ABSTRACT	xv
ABSTRAK	xvi
CHAPTER 1: INTRODUCTION	1
1.1 Background	1
1.2 Problem Statement	2
1.3 Objective	5
1.3.1 General objective	5
1.3.2 Specific objective.....	5
1.4 Research Questions	5
1.5 Research Hypothesis	6
1.6 Conceptual Framework	6
CHAPTER 2: LITERATURE REVIEW	8
2.1 Introduction	8

2.2	Transmission	9
2.3	Clinical Manifestations.....	11
2.3.1	Febrile Phase.....	12
2.3.2	Critical Phase	13
2.3.3	Recovery/Reabsorption Phase	14
2.4	Factors Contributing to the Increasing of Dengue Incidence	14
2.5	Factor Affecting Dengue Prevention Behaviour	16
2.6	Human Related Factors	17
2.7	Impact of Dengue Virus infections	18
2.7.1	Public Health Impact	18
2.7.2	Social Impact	19
2.7.3	Economic Impact	20
2.8	Community involvement in the control of dengue.....	21
2.8.1	COMBI	23
2.8.2	Environmental management	24
2.8.3	Solid waste management	25
2.8.4	Individual and household protection.....	25
2.8.5	Chemical Control.....	26
2.8.6	Biological Control.....	28
2.9	Dengue Vaccine	28
2.9.1	Vaccine characteristics	29

2.9.2	Adverse outcomes in the vaccinated seronegative persons	29
2.9.3	Challenges to vaccine development.....	32
2.10	Instrument Used to Measure Knowledge, Attitude, and Practices Towards Dengue	32
CHAPTER 3: METHODOLOGY		37
3.1	Study Area	37
3.2	Research Design	38
3.3	Study Population and Sample.....	39
3.4	Study Duration	39
3.5	Inclusion and Exclusion Criteria	39
3.5.1	Inclusion Criteria	39
3.5.2	Exclusion Criteria	39
3.6	Sample Size and Sampling Method.....	40
3.7	Data Collection Procedure.....	41
3.8	Data Collection Instrument	41
3.9	Pilot / Pre-test	43
3.10	Operational definitions	44
3.11	Statistical Analysis	45
3.12	Ethical Consideration	45
CHAPTER 4: STUDY RESULTS.....		46
4.1	Sociodemographic characteristics of the participants	46
4.2	Risk perception, knowledge, attitude, and practice towards dengue.....	48

4.2.1	Risk perception of dengue fever	48
4.2.2	Knowledge of dengue fever.....	51
4.2.3	Attitude towards dengue fever.....	55
4.2.4	Practice towards dengue fever	57
4.3	Relationship between risk perception, knowledge, attitude, and practice with the selected sociodemographic characteristics.....	60
4.3.1	Relationship between risk perception, knowledge, attitude, and practice with gender.....	60
4.3.2	Relationship between risk perception, knowledge, attitude, and practice with the level of household income.....	61
4.3.3	Relationship between risk perception, knowledge, attitude, and practice between the level of education	64
4.4	Comparison of risk perception, knowledge, attitude, and practice between the hotspot and non-hotspot area	66
4.5	Correlation between risk perception, knowledge, attitude, and practice towards dengue fever	68
CHAPTER 5: DISCUSSION.....		70
5.1	Comparison of socioeconomic status, risk perception, knowledge, attitude, and practices between the areas of dengue hotspot and non-hotspot.....	70
5.1.1	Comparison of household income between the areas of hotspot and non-hotspot.....	70
5.1.2	Comparison of education level between the hotspot and non-hotspot areas.....	71
5.1.3	Comparison of risk perception, knowledge, attitude and practices between the hotspot and non-hotspot areas	71

5.2	Relationship between socioeconomic status, risk perception, knowledge, attitude, and practices related to dengue	72
5.2.1	Relationship of gender to risk perception, knowledge, attitude, and practices related to dengue	72
5.2.2	Relationship of household income to risk perception, knowledge, attitude, and practices related to dengue	73
5.2.3	Relationship of education level to risk perception, knowledge, attitude, and practices related to dengue	74
5.2.4	Relationship between risk perception, knowledge, attitude, and practices related to dengue	75
5.3	Strength of study	76
5.4	Limitation of this study	76
5.5	Recommendation.....	77
CHAPTER 6: CONCLUSION.....		79
REFERENCES.....		81
APPENDICES		91

LIST OF TABLES

Table 4.1 Sociodemographic characteristics of the participants	47
Table 4.2 Percentage distribution of respondent's risk perception towards dengue fever (N-102).....	49
Table 4.3 Distribution of respondent's risk perception towards dengue fever in hotspot and non-hotspot area (N-102)	50
Table 4.4 Percentage distribution of respondent's knowledge towards dengue fever (N-102)	52
Table 4.5 Distribution of respondent's knowledge towards dengue fever in hotspot and non-hotspot area (N-102)	53
Table 4.6 Percentage distribution of respondent's attitude towards dengue fever (N-102)	55
Table 4.7 Distribution of respondent's attitude towards dengue fever in hotspot and non-hotspot area (N-102)	56
Table 4.8 Percentage distribution of respondent's practice towards dengue prevention (N-102).....	58
Table 4.9 Distribution of respondent's practice towards dengue fever in hotspot and non-hotspot area (N-102)	59
Table 4.10 t-test for comparison of mean marks in risk perception, knowledge, attitude and preventive practice between male and female.....	61
Table 4.11 ANOVA for significant difference of mean marks in risk perception, knowledge, attitude, and practice between levels of household income.....	62
Table 4.12 ANOVA for significant difference of mean marks in risk perception, knowledge, attitude, and practice between level education	65

Table 4.13 Score difference of risk perception, knowledge, attitude, and preventive practice level on Dengue between Hotspot and Non-hotspot Communities 67

Table 4.14 t-test for comparison of mean marks in risk perception, knowledge, attitude, and preventive practice between the hotspot and non-hotspot..... 68

Table 4.15 Correlations of risk perception, knowledge, attitude, and preventive practice towards dengue..... 69

LIST OF FIGURES

Figure 1.1: Conceptual framework for the relationship between socioeconomic status, risk perception, knowledge, attitude, and practices.	7
Figure 2.1: The urban dengue virus cycle in humans and mosquitoes(Guzman et al., 2016).	11
Figure 3.1: Location of Kampung Pasir Pandak and Kampung Meranek (Google, n.d)	38

LIST OF ABBREVIATIONS

COMBI	Communication for Behavioural Impact
MOH	Ministry of Health
SAGE	Strategic Advisory Group of Experts
WHO	World Health Organization

LIST OF APPENDICES

APPENDIX A: QUESTIONNAIRE (ENGLISH VERSION).....	91
APPENDIX B: QUESTIONNAIRE (MALAY VERSION)	95
APPENDIX C: INFORMED CONSENT FORM (ENGLISH VERSION)	99
APPENDIX D: INFORMED CONSENT FORM (MALAY VERSION).....	103
APPENDIX E: GANTT CHART	107
APPENDIX F: UNIVERSITY MALAYSIA SARAWAK (UNIMAS) ETHIC COMMITTEE APPROVAL LETTER.....	109

ABSTRACT

Introduction: Despite the ongoing efforts by the Ministry of Health in dengue control, it remains a public health issue in Kuching and Samarahan as the surge of the outbreak and increased number of hotspot areas. Human behaviour had contributed to the rising number of dengue cases. This study aims to compare socioeconomic status, risk perception, knowledge, attitude, and practice among the communities in dengue hotspot and non-hotspot areas. **Methodology:** A community-based cross-sectional study was conducted in the hotspot and non-hotspot areas in Kuching and Samarahan. One-hundred-and-two respondents were randomly selected to answer the self-administered questionnaire. Desired socioeconomic characteristics, risk perception, knowledge, attitude, and practices towards dengue prevention were compared using Chi-Square test, independent sample t-test, and one-way analysis of variance (ANOVA) as appropriate. Finally, risk perception, knowledge, attitude, and practice were correlated using Pearson correlation. **Results:** People living in the hotspot area had lower household income and education levels compared to people living in the non-hotspot area; still, they have a better attitude (p-value: <0.05). In this study, females showed better in prevention practice than males (p-value: <0.05) but no significant differences in risk perception, knowledge, and attitude. Concerning the level of education, this study findings show a better attitude among people with a higher education level than people with lower education levels (p-value: <0.01). Also, people with higher risk perception tend to have better knowledge and attitude towards dengue (p-value: <0.01). Similarly, people with higher education will also show a better attitude (p-value: <0.01). However, there is no correlation between risk perception, knowledge, and attitude toward dengue preventive practices. **Conclusion:** Therefore, dengue prevention activities should focus on communities with lower household income and lower education levels. Strengthening intersectoral collaboration is suggested to increase the economic status and level of education of the communities.

ABSTRAK

Pendahuluan: Denggi masih menjadi isu kesihatan awam di Kawasan Kuching dan Samarahan walaupun pelbagai inisiatif telah dilaksanakan oleh pihak Kementerian Kesihatan. Ini dapat dilihat dengan lonjakan bilangan wabak serta peningkatan kawasan yang diisytiharkan sebagai hotspot. Tingkah laku manusia merupakan faktor utama kepada peningkatan jumlah kes denggi. Kajian ini bertujuan untuk membandingkan persepsi risiko, pengetahuan, sikap dan tingkah laku masyarakat di antara kawasan hotspot dan bukan hotspot denggi. **Metodologi:** Ini merupakan kajian keratan rentas yang dijalankan di kawasan hotspot dan bukan hotspot di Kuching dan Samarahan. Seratus dua responden telah dipilih secara rawak untuk menjawab soalan kaji selidik. Ciri-ciri sosioekonomi, persepsi risiko, pengetahuan, sikap dan tingkah laku terhadap pencegahan denggi dibandingkan dengan menggunakan ujian Chi Square, Uji t sampel bebas dan analisis varians satu arah (ANOVA) mengikut kesesuaian. Akhirnya, hubungan antara persepsi risiko, pengetahuan, sikap dan tingkahlaku dianalisa menggunakan korelasi Pearson. **Hasil:** Penduduk yang tinggal di kawasan hotspot mempunyai pendapatan isi rumah dan tahap pendidikan yang lebih rendah berbanding penduduk yang tinggal di kawasan bukan hotspot; namun mereka mempunyai sikap yang lebih baik (nilai p: <0.05). Dalam kajian ini, wanita menunjukkan tingkah laku terhadap pencegahan denggi yang lebih baik berbanding lelaki (nilai p: <0,05) namun tidak terdapat perbezaan yang ketara dalam persepsi risiko, pengetahuan dan sikap. Disamping itu, kajian ini juga mendapati individu yang berpendidikan tinggi menunjukkan sikap yang lebih baik berbanding individu yang berpendidikan lebih rendah (p-value: <0.01). Selain itu, individu yang mempunyai persepsi risiko yang lebih tinggi cenderung mempunyai pengetahuan dan sikap yang lebih baik terhadap denggi (nilai p: <0,01). Begitu juga, individu yang berpengetahuan tinggi juga akan menunjukkan sikap yang lebih baik (nilai p: <0.01). Namun, tidak ada hubung kait antara persepsi risiko, pengetahuan dan sikap terhadap tingkah laku pencegahan denggi. **Kesimpulan:** Oleh itu, program pencegahan denggi perlu diberikan penekanan terhadap masyarakat yang mempunyai latar belakang pendidikan dan pendapatan yang rendah. Pengukuhan kerjasama antara pelbagai agensi juga disarankan bagi meningkatkan taraf ekonomi dan tahap pendidikan masyarakat.

CHAPTER 1: INTRODUCTION

1.1 Background

Dengue is one of the most rapidly expanding mosquito-borne viral diseases over the past few decades and becoming endemic in more than 100 countries worldwide. The figure of Dengue cases is not only increasing but also surging into outbreaks. Among the endemic regions are the Western Pacific, South-East Asian, African, Eastern Mediterranean, and the Americas (World Health Organization, 2019b). The number of dengue cases is estimated to be around 390 million every year, with about 96 million developing a different level of severity in the disease symptoms(Bhatt et al., 2013).

Malaysia is also facing an excessive number of dengue cases, that is fluctuating each year. In 2013, there were 43,436 dengue cases reported, and that number significantly increased to 108,698 and 120,836 in 2014 and 2015, respectively. The number of cases decreased slightly to 101,357 cases in 2016. There was a further reduction in the number of cases to 83,849 and 80,615 in 2017 and 2018, respectively, but it is still very high compared to those before 2014(Ministry of Health Malaysia, 2019).

Sarawak has also experienced a surge in the number of dengue cases. Its capital city, Kuching, had a sudden increase in the number (nine) of hotspots in 2019, compared to two hotspots in 2018. Kuching city has an area of 431 square kilometres. It is divided into Kuching North administrative region and Kuching South administrative region with a total population of 570,407 and 754.33/km² in density(Kementerian Hal Ehwal Ekonomi, 2019).

Even though the Ministry of Health and the Local Authorities had put a lot of effort into the activities of dengue prevention and control, still those number of cases continued to rise. At least five significant factors that contribute to the spread of dengue fever, namely the dengue virus as the agent, human as a host, vectors or mosquitoes behaviour, environmental factors, and also climate change. Other than that, factors like rapid urbanisation, population growth, human behaviour, and movement make the control of dengue very challenging(Rose Nani Mudin, 2015). Since dengue control is a behavioural problem(Karimah Hanim et al., 2017), this study was conducted to describe the human-related factors, which are socioeconomic status, risk perception, knowledge, attitude, and practices that are important in dengue transmission. All these modifiable factors are compared between the hotspot and also non-hotspot areas in Kuching and Samarahan. From the literature search, the author did not find any previous study comparing socioeconomic status, risk perception, knowledge, attitude, and practice between communities residing in hotspot and non-hotspot areas in Sarawak. Therefore, there is a need to do the study to fill in the gap in knowledge of those factors in Sarawak. Additionally, the study findings will assist the local authorities to formulate policies on suitable infection prevention practices and vector control programmes based on the related factors in the study.

1.2 Problem Statement

Active community participation is especially important in the control of *Aedes* mosquitoes, the vectors of the dengue virus. Toledo (2007) showed that the entomological indices reduced when the community participated in the intervention and control activities. The study also showed a similar effect between strategy involving the community and the routine intensive vector control(Toledo et al., 2007).

In sustaining the disease control programme, it needs a sense of belonging among the community, use of their resources, idea, and leadership in designing and setting the direction of the programme(Gubler & Clark, 1996). Gubler had proposed that an effective ethnic-geographic study be conducted to understand better the community values and diversity and then use this information to develop targeted educational messages and design intervention strategies(Gubler & Clark, 1996).

Prevention and control by including the community in the programme are crucial as dengue is rapidly spreading globally. It affects people mainly in tropical and subtropical countries, primarily in developing countries around the world. Seventy to eighty per cent of reported dengue cases occur in urban areas. Among the factors that favour dengue transmission are high population density and rapid development of the regions(Ministry Of Health Malaysia, 2015; World Health Organization, 2009).

Dengue imposes a burden on endemic populations in medically, economically, and socially. In 2001, the disability-adjusted life years (DALYs) lost due to dengue fever were estimated to be 528 per 1000 globally (Cattand et al., 2006). In addition, other family members who took care of the dengue patients were also affected by dengue, and an average of burden was 14.8 days lost to outpatients and 18.9 days lost for inpatients care. On average, about USD 514 were spent for the non-fatal outpatient case, meanwhile, USD 1491 for a non-fatal hospitalised case(World Health Organization, 2009).

Dengue is one of the significant public health problems because of its high burden on morbidity and mortality(Ministry Of Health Malaysia, 2015). For the time being, there is no approved safe vaccine for all or specific medicine on this life-threatening disease. There is also no significant vector control effort in preventing its

rapid emergence and global spread(Tatem, Hay, & Rogers, 2006; World Health Organization, 2009).

Since 2011, the Ministry of Health Malaysia has adopted an integrated plan in the National Dengue Strategic Plan (NDSP) for dengue disease control and prevention. It includes the following approaches:(i) enhance dengue surveillance, (ii) implement integrated vector control, (iii) emphasis on treating dengue cases, (iv) preventive activities by social and community empowerment, (v) ensure quick response in the dengue outbreaks management and (vi) initiate dengue research in developing new innovative methods (Rose Nani Mudin, 2015). With the assistance of the World Health Organization in 2001, a new approach in planning and implementation of social mobilisation was piloted in Johor Bahru. It was known as Communication for Behavioural Impact (COMBI)(Suhaili et al., 2004). Currently, COMBI is implemented in the whole of Malaysia. A study done in 2008 in Selangor, Malaysia, showed that COMBI programme was unsuccessful in bringing the expected behavioural impact base on qualitative and quantitative studies, together with epidemiological and entomological assessments(Ismail, Nawi, & Mohamed, 2015).

Despite the ongoing efforts by the Ministry of Health in dengue control, dengue remains a public health problem in Kuching, as evidenced by the surge in the number of outbreaks and increased number of hotspot areas. Human behaviour contributes to the rise of dengue cases, which lead to dengue outbreak and then become a hotspot. Thus, this study will compare the socioeconomic status, risk perception, knowledge, attitude, and practice between the hotspot and the non-hotspot area. The results will benefit dengue control activities specifically by finding a better approach in reducing dengue cases in Kuching and Samarahan areas.

1.3 Objective

1.3.1 General objective

To compare the socioeconomic status, risk perception, knowledge, attitude, and practices between communities living in the hotspot and non-hotspot areas in Kuching and Samarahan.

1.3.2 Specific objective

- i. To describe the socioeconomic status, risk perception, knowledge, attitudes, and practices towards dengue among communities in the hotspot and non-hotspot areas in Kuching and Samarahan.
- ii. To determine the relationship between socioeconomic status, risk perception, knowledge, attitude, and practices towards dengue.

1.4 Research Questions

The general research question is:

Are there any differences between socioeconomic status, risk perception, knowledge, attitude, and practices that contribute to dengue outbreaks in hotspot and non-hotspot areas in Kuching and Samarahan?

The specific research questions are:

- i. Is there any association between socioeconomic status and knowledge of dengue?
- ii. Is there any association between risk perception and practice towards Dengue vector control?

- iii. Is there any association between knowledge of dengue with risk perception, attitude, and practices towards Dengue vector control?
- iv. Is there any association between practice toward dengue control with risk perception and the right attitude?

1.5 Research Hypothesis

Null Hypothesis:

There is no difference in socioeconomic status, risk perception, knowledge, attitudes, and practices towards dengue between the communities in the hotspot and non-hotspot areas in Kuching and Samarahan.

Alternative Hypothesis:

There is a difference in socioeconomic status, risk perception, knowledge, attitudes, and practices towards dengue between the communities in the hotspot and non-hotspot areas in Kuching and Samarahan.

1.6 Conceptual Framework

According to the objective of the study, the outcome variable is the practices related to dengue. This study will also determine the relationship between socioeconomic status, risk perception, knowledge, attitude, and practices related to dengue and to compare those factors between the hotspot and non-hotspot areas in Kuching and Samarahan.

Previous researches on socioeconomic status, risk perception, knowledge on dengue, attitudes, and practices for dengue were reviewed (Abdul Rahim, Hamizah,

Olivia, Anita, & Mohd Rafee, 2016; Castro et al., 2013; Harapan, Anwar, Setiawan, & Sasmono, 2016; Leong, 2014; Lugova & Wallis, 2017). The hypothesis was that higher economic status is directly associated with higher knowledge on dengue, increased risk perception on dengue will reduce the risk practices for dengue. Higher knowledge of dengue is associated with higher risk perception, better attitude, and practices. Finally, higher risk perception and the right attitude are also associated with a decrease in risk practices (Figure 1.1).

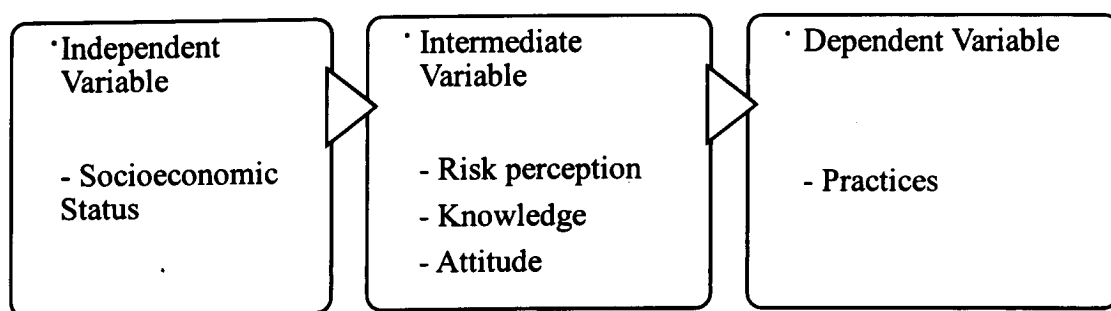


Figure 1.1: Conceptual framework for the relationship between socioeconomic status, risk perception, knowledge, attitude, and practices.