HMONG SUDDEN UNEXPECTED NOCTURNAL DEATH SYNDROME: A CULTURAL STUDY

by

Bruce Thowpaou Bliatout
(Thojpov Npliajtub)

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Bruce Thowpaou Bliatout (Thojpov Npliajtub) is Hmong, born in 1948, and raised in Xieng Khouang, Laos. He was the son of a farmer and has four brothers, one sister, four half-brothers, three half-sisters, one step-brother, and two step-sisters. Although Bruce's father passed away when he was about seven, he was fortunate to be allowed to continue his schooling because he belonged to one of the few Hmong families of that time who believed in the value of education. In his late teens and during his twenties, Bruce received a series of grants which enabled him to obtain his higher education in the field of Public Health in the United States.

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PREFACE

This investigation's intent was to open avenues for alternate types of research on the subject of Hmong Sudden Unexpected Nocturnal Death Syndrome. The author hoped to promote the idea that cross-cultural considerations must be given when investigating a specific ethnic group.

The results of this study show that much more research is needed on the subject, and the author does not want to give the impression that this work has established the cause of *the Hmong Sudden Unexpected Nocturnal Death Syndrome. Rather, the author feels he has just scratched the* surface of the research needed on this subject. The author wishes to encourage other researchers and the Hmong community to continue in their efforts to discover the mechanism of sudden nocturnal death, and how to prevent this type of death from occurring. It is the author's special hope that the Hmong youth of today will build on the present research until a solution is found. They will have the benefits of a Western education as well as knowledge of the Hmong culture, and the community looks forward to any future contributions from them.

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ABSTRACT

The Hmong are an ethnic minority group found in China, Vietnam, Laos, Thailand; and since 1975, Argentina, Australia, Canada, France and the United States. The Hmong of Laos were heavily involved in the cold wars of Indochina during the 1960s and 1970s. When the Lao government changed hands in 1975, this group of people underwent diaspora.

Since 1973, there have been documented cases of mysterious sudden nocturnal deaths in the Hmong population. Although these deaths also strike other ethnic groups such as the Cambodian, Filipino, Japanese, Laotian, Mien and Vietnamese, by far the Hmong have experienced the highest death rates. Therefore, these deaths have become known as the Hmong Sudden Unexpected Nocturnal Death Syndrome. The deaths are associated with sleep and most victims had been relatively young, previously healthy men. Despite several ongoing investigations, the cause of these deaths has not yet been found.

This study was done in an attempt to discover if these sudden deaths could have some cultural origins. The Hmong concepts of health and illness are very much intertwined with their beliefs in ancestor worship. The first focus of this study investigated whether beliefs in the power of spirits and other religious concepts, along with being unable to keep up traditional religious practices and rituals in Western communities could possibly be a contributing factor to the Hmong Sudden Unexpected Nocturnal Death Syndrome. The second area of examination was to see whether the usage of traditional Hmong healing arts influenced the occurrence of these sudden deaths. Thirdly, the study considered whether membership in certain Hmong subgroups, clans or lineages was an added risk factor for sudden nocturnal death, indicating a possible genetic origin for the syndrome. Fourthly, the study questioned whether past geographic locations were common to the sudden nocturnal death victims' backgrounds. Fifth, other aspects of Hmong

culture were considered for possible correlation to these deaths. Lastly, the study reviewed certain other investigators' theories that the sudden nocturnal deaths were linked to exposure to chemical warfare; depression caused by the stress of assimilating into a Western culture; terror induced by nightmares; as well as other miscellaneous theories on possible causes of these deaths.

Although no conclusive results were found, the evidence suggested that the cause of sudden nocturnal death may be genetic in origin. There were indications that certain members of the Hmong population are predisposed to sudden death. However, what causes some individuals to die at certain times has not yet been determined. There was some evidence that the deaths were linked to the presence of a higher level of stress. This stress was sometimes caused by beliefs in the powers of spirits, the inability to perform traditional religious ceremonies and rituals in Western countries, as well as a variety of other causes.

It also seemed possible that exposure to chemical warfare was a common background for many of the sudden nocturnal death victims; if not exposure to an actual attack, then exposure to chemical residuals remaining in various areas of northern Laos. Whether this could cause sudden nocturnal deaths at a later date is still under debate.

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CHAPTER 1

Introduction to the Problem of Hmong Sudden Unexpected Nocturnal Death Syndrome

The Hmong are one of the new minority groups to arrive and settle on American soil. They are refugees from the country of Laos, but are a separate ethnic group from the lowland Laotian refugees, many of whom have also settled in the United States. The Hmong have been among us since 1975 when their homeland of Laos changed governments. The Hmong remain a close knit cultural group and have exhibited special resettlement problems.

Recently, the phenomenon of what has become known as Hmong Sudden Unexpected Nocturnal Death Syndrome has come sharply into focus as a special health problem of the Hmong. To date, there has been no conclusive evidence as to what the cause of these mysterious deaths might be. As the Hmong culture is uniquely different from even other Asian cultures, the author feels an investigation into the culture of the Hmong could possibly give clues or indications as to reasons why sudden nocturnal deaths are striking these people at such a high rate of occurrence.

Before beginning an investigation of possible cultural reasons for the Hmong Sudden Unexpected Nocturnal Death Syndrome, a brief discussion on who the Hmong are, what their history is, some aspects of their traditional lifestyle, and some of their resettlement problems in the United States will be presented. In addition, an overview of Hmong religion will be given as many of the Hmong concepts about illness and death are tied in with their religious beliefs; therefore some investigations into this area may shed some light on the cause of the Hmong Sudden Unexpected Nocturnal Death Syndrome.

Background Information on the Hmong Ethnic Group

The Hmong are a minority group found in the countries of China, Vietnam, Laos and Thailand. During the recent war in Vietnam, which spread to Laos and Cambodia, the Hmong of Laos were recruited by the American supported Royal Lao government to combat the Russian supported Pathet Lao troops. The Hmong of Laos became known as hard-fighting, loyal soldiers. In 1975, when the United States decided to pull their military and economic support out of Indochina, the Laotian government changed hands. Since many of the Hmong of Laos had supported the American war effort in Laos, large groups decided to flee Laos rather than chance reeducation camps or possible death under the new Communist regime. The majority of Hmong refugees have relocated in the United States and France. Smaller Hmong refugee communities have settled in Canada, Argentina and Australia. Many Hmong of Laos still remain in Thai refugee camps and more keep trickling in across the Mekong river, all hoping for resettlement in a third country.

As the Western world becomes more familiar with who and what the Hmong people are, more attention is being given to their rich and ancient culture. It is unfortunate that there is so little literature on Hmong history. Partly this is because the Hmong did not have a written language of their own with which to document their history until about thirty years ago when a missionary created one for them. The only known historical references to the Hmong are found in ancient Chinese literature.

History of the Hmong

The Hmong as a separate ethnic group were first cited in Chinese literature around 2300 B.C. Southern China was

their earliest recorded homeland. Unfortunately, from the third through eleventh centuries A.D., no direct references to the Hmong can be found in Chinese literature because the literature of that time period referred to all non-Chinese groups collectively as "man" or "nan-man" meaning "barbarians" or "southern barbarians." Starting around the twelfth century, some direct references to the Hmong can again be found. Several references are made to military operations of the Yuan and Ming dynasties against the Hmong, which may have been contributing factors towards the Hmong people moving more and more southward to remoter areas of China (Yih-Fu, 1962).

Chinese suppression of the Hmong continued through the Ching period up through the late nineteenth century. The last large-scale migration of the Hmong appears to have taken place during that time and took them south and southwestward out of China; first into Vietnam, then into Laos and lastly into Thailand. Other reasons for the Hmong people's southward migration may have been overpopulation, lack of food, economic disaster, or some combination of these reasons (Yih-Fu, 1962).

Chinese literature refers to the Hmong as "Miao" and others refer to this group as "Meo" or "Hmung." The Hmong prefer the term "Hmong," a word which has come to be interpreted as "free man." At the present time there remains an estimated two million six hundred eighty thousand Hmong in Southern China (Morechand, 1969), two hundred fifty thousand Hmong in Vietnam (Yang, 1975), five hundred thousand Hmong in Laos (Hang, 1982), and forty-five thousand eight hundred Hmong in Thailand (Young, 1962).

Hmong Lifestyle in Laos

Wherever the Hmong in Asia live, they remain mountain dwellers as they have been for centuries. Opium is their tra-

ditional cash crop as poppies flourish in upland climates. The Hmong dietary staple is mountain (non-glutinous) rice seconded by corn. Their protein intake level is low, although it is supplied by eggs, chicken, pork and some fish and beef. The rest of their diet is made up of fresh vegetables, fruits and herbs.

Hmong poppy, rice and corn fields are cleared by the ancient slash and burn method. Fields cleared and cultivated in this fashion are usually depleted of nutrients after two or three years of use, and the Hmong must then move on to find new fields. As time passes, crop fields grow further and further away from the village, and eventually village occupants may decide to move their houses closer to the fields. Other reasons to move villages are superstitious fears of spirits, high death rates of livestock, poor crop yields, or harrassment by other ethnic groups (Chindarsi, 1976). Thus, the Hmong have become known as a people always on the move.

Chinese literature makes references to several subdivisions of the Hmong, examples being Red, Black or Flowery Hmong (Yih-Fu, 1962). These descriptive names probably reflect regional differences in Hmong costumes. However, there are only two major subdivisions among the Hmong of Laos which are demarked by linguistic and cultural differences. They are the White Hmong and the Blue or Green Hmong. The Blue or Green Hmong generally prefer to be called Green Hmong, so they will therefore be referred to as such for the duration of this text. Both Hmong groups have a strong feeling of being Hmong, versus being non-Hmong. The two groups can understand each other, despite accent, tonal and word differences, and intermarriages are not uncommon. One can distinguish between the two Hmong groups by observing their women's style of dress. Jackets and turbans reflect regional differences, but in general, the Green Hmong women traditionally wear dark green, almost black, pleated skirts. The material to make these dark colored skirts is superimposed with light blue batik and brightly colored embroidery. The White Hmong women

prefer black trousers and wear plain white pleated skirts for formal occasions.

Both the Green and the White Hmong groups are divided into twenty-three known clans. They are the Cha ("Tsab"), the Chai ("Cai"), the Chee ("Tshib"), the Cheng ("Tsheej"), the Chue ("Tswb"), the Fang ("Faj"), the Hang ("Ham"), the Her ("Hawj"), the Khang ("Khab"), the Kong ("Koo"), the Kue ("Kwm"), the Lee ("Lis"), the Lo ("Lauj"), the Moua ("Muas"), the Phang ("Phab"), the Plua ("Plua"), the Tang ("Taj"), the Thao ("Thoj"), the Vang ("Vaj"), the Vue ("Vwj"), the Xiong ("Xyooj"), the Yang ("Yaj"), and the Yao Jua ("Yob Tshuab"). However, thirteen of the clans, the Cha, Cheng, Hang, Her, Kue, Lee, Lo, Moua, Thao, Vue, Xiong, Vang and Yang clans, are larger in numbers than the others. Clan ties follow paternity lines and extended family relationships are considered very important. Each clan is divided into many lineages. Membership in a lineage depends upon the ability to track back to a common ancestor. Hmong persons prefer to live with, or near, other lineage and clan members for mutual protection against attacks from other ethnic groups or wild animals. Intermarriage within one clan is strictly forbidden, so sons must seek wives from other clans.

The Hmong are traditionally polygamous and custom requires them to have many children, preferably sons. After marriage, daughters become members of their husbands' clans and work to help that clan. Therefore daughters are less desired when having children. Sons are bound by custom to care for parents in their old age and to provide necessary funeral services, so are more cherished by Hmong parents. Sons usually bring wives home to live with their parents until they are considered sufficiently mature to start a new household (Chindarsi, 1976). Marriage age is quite early among the Hmong. For the girl the normal age range for marriage is between fourteen and sixteen, and for the boy, between fifteen and twenty. Couples will normally have at least one or two children before considering moving into a home of their own. Even at that time, a son will

typically build his house near his parents' home.

The Hmong house is usually built on a mountain slope and has only an earthen floor. The walls are constructed out of wood and the roof is usually thatched with a special type of hay. The house is usually a large, rectangularly shaped building with two doors and a central pillar. The house is sectioned by walls into two separate areas, the sleeping area and the living and eating area. In the sleeping area, the Hmong bed is usually a simple wooden platform elevated about one foot off the ground. Often whole families will sleep together in one bedroom. In the living and eating area, one usually finds a large fireplace for major cooking, a small fireplace to provide warmth and also to act as a supplementary cooking area, a guest bed, an eating area, and any spiritual altars the family may have.

Hmong villages rarely have any running water or sewage system. Even privies are not commonly built. When it is time to excrete, most simply go out into the surrounding jungle or crop fields and squat among the bushes. Hmong livestock (usually chickens and pigs with occasional ducks, cattle or water buffalo) are allowed to freely wander about the Hmong village and even enter their owner's house. Pigs provide a type of sanitary service by keeping the Hmong house and surrounding areas free from human feces (Chindarsi, 1976).

Hmong Resettlement in the United States

There are currently approximately forty-six thousand five hundred Hmong refugees resettled in the United States. There are no accurate statistics of the Hmong because United States Immigration does not differentiate between the various ethnic groups of Laos, the Lao, Hmong and Mien. Although the influx of Hmong refugees into Western countries has slowed considerably in the past two years, the Hmong community in the United States is still slowly grow-

ing as more refugees are processed through Thai refugee camps. Although United States policy has been to distribute Hmong and other Indochinese refugees as evenly as possible throughout the individual states, much secondary migration has occurred. The Hmong in particular prefer to follow clan or lineage leaders. Once admitted into the United States, families will save until they have accumulated the money to move to the city where their relatives are located. Thus, large Hmong communities, with a population of three thousand or more, have sprung up in Chicago, Illinois, Fresno, California, Merced, California, Minneapolis, Minnesota, San Diego, California, Santa Ana, California and Stockton, California. Smaller Hmong communities with a population of one thousand or more exist in Denver, Colorado, Des Moines, Iowa, Portland, Oregon, Seattle, Washington, and Providence, Rhode Island.

The Hmong have had a difficult time in adjusting to Western lifestyle. One of the biggest problems is that the majority of Hmong are illiterate, even in their own language. Most other groups of Indochinese refugees have at least a sixth grade education or higher in their own language. However, the Hmong lived in the mountains outside the mainstream of Laotian life and few managed to learn to read and write even the Laotian language, much less any Western language. Due to their limited background in formal education, many Hmong find it difficult to learn English in the classroom setting. Also, the Hmong have very little experience in the use and upkeep of modern American homes and appliances.

Without the ability to speak and understand English, the Hmong are unable to compete for jobs. Since many are unable to read or write, they cannot even understand job announcements or fill in a job application. Therefore, a large percentage of the Hmong have remained in the Welfare system. With the threats of Welfare and other assistance cutbacks, many Hmong have grown more and more fearful and depressed over their future well-being in the United States.

Many Hmong in the United States have clung to traditional practices even though they are living in a new setting. Hmong families remain large and many still live with an extended family. On occasion there may be up to eighteen family members squeezed into a two or three bedroom apartment. At times, this and other Hmong practices have caused neighborhood and community friction.

Despite their many resettlement problems, the Hmong are new Americans and are here to stay. Their culture is an ancient one and has many points of interest. Every effort should be made to understand and learn from their fascinating background and heritage.

Hmong Religion and its Relationship to Hmong Concepts of Health and Illness

The Hmong religious beliefs are closely interwoven with their beliefs on illness and death. It is impossible to discuss their beliefs on illness and death without first reviewing Hmong theology. Unfortunately, it is difficult to present a consistent theology on Hmong religion. This may be because most of the Hmong religious practices and rituals were traditionally handed down from father to son by observation and word of mouth. As time passed, regional, clan and lineage variations developed.

Different clans often have variations in religious practices, and within one clan lineages may have differences in ritual details. These differences denote which family ties are considered close and which ones are not. Those who follow exactly the same practices and rituals to the last detail consider themselves closer relations.

However, despite the many slight differences and variations, the broad outlines of Hmong theology have some consistencies throughout all Hmong clans, both the Green and White groups. This is because common Hmong traditional

religious practices are all somewhat centered on ancestor worship. In addition, the Hmong also believe in many other spiritual entities.

Hmong legends explain the origins of the many spirits the Hmong believe in. An abbreviated account of these legends will be given as background information, because the story relates to Hmong beliefs on sickness and health.

Hmong Legends

Long ago, the chief of gods and his wife, who both lived in the center of heaven, gave birth to two sons. Both sons grew up and got married. Their wives became pregnant, but the eldest son's wife gave birth first. She gave birth to a great balloon. The chief of gods gave the couple the earth to be their home. He told the couple to descend to earth through the gateway between heaven and earth and there they should burst the balloon. In the balloon would be everything needed to start life on earth. They did as they were told, and when the balloon was burst, all good things came out. All the spirits of nature needed to make earth a good place to live came from that balloon. Also from that balloon came the ancestors of Hmong people today.

When the second son's wife gave birth, she also gave birth to a great balloon, only hers was shaped like a peanut. The chief of gods told them not to burst the balloon, but to burn and destroy it. He then gave this second couple the area of the gateway between heaven and earth to be their home. When the couple arrived at their new home, the second son felt strongly that despite what his father had told him, he would burst the balloon instead of destroying it, so that he could see what his child looked like. When he burst the balloon, all manner of evil spirits spewed out. Ogres, evil spirits that cause illness and misfortune, and all wicked things poured out of the balloon. These evil spirits immediately attacked the second son and his wife. The wife was

killed, but the second son escaped death by opening the gateway to enter and hide on earth. Unfortunately, all the evil spirits followed him, and this is why evil spirits exist on earth today.

The evil spirits caused such illness, death and misery to mankind that the chief of gods had pity on the Hmong people and decided to create a special type of spirit to come to earth and combat the evil spirits. This spirit was called "neng" and was given special powers with which to fight evil spirits. The first "neng" came to live with a man named Sheeyee. The "neng" taught Sheeyee many healing arts, both how to fight evil spirits and how to use herbs to heal the sick. However, because Sheeyee cruelly cracked three dragon eggs, he was cursed by the mother dragon that he would be able to cure all people, but not members of his own family. Because of this curse, when Sheeyee's son was taken by evil spirits, Sheeyee could not win his son's life back. The death of his son so embittered Sheeyee that he decided to give up his "neng." He also felt that one "neng" was not enough to provide adequate care to meet all the Hmong people's needs. Sheeyee therefore gathered up his healing tools, including his gong, tambourine and rattle, and put them into a pile. Then he went high up into the skies carrying his bowl of holy water. From that high vantage point Sheeyee poured all the holy water into his mouth. Aiming at his tools he spat the water out with great force. The force of the water caused the tools to break up and scatter. All those Hmong men and women who were sprayed with holy water, or happened to catch a piece of one of Sheeyee's tools, were those selected to have a "neng." In this way, enough men and women were able to learn the healing arts needed to help sick people.

Plate 1. Tools a Person with a "Neng" Uses.
Photo by Bobbie Martin.

Types of Hmong Spirits

This legend gives an account of the origins of all the different types of spirits the Hmong traditionally believe in. The Hmong commonly classify the gods into different levels as explained below.

The Great Gods. The two highest levels of gods belong to what are called the great gods. The first level of gods include the chief of gods who lives in the center of heaven and the four gods who hold up the heavens, which for the Hmong are synonymous with the skies. The second level of gods belong to the four gods who hold up the earth and their head god who lives in the center of the earth. These gods are considered benevolent and rarely harm mankind, but can be appealed to for assistance.

The Wild Spirits. The third level belongs to the wild spirits which include the nature spirits, ogres and untamed evil spirits. The nature spirits include a wide variety of spirits ranging from very powerful deities to lesser spirits of localized areas. Some nature spirits have posts serving the chief of gods while others of lesser power are thought to inhabit nature spots. The Hmong believe all things in nature are inhabited by a spirit. Thus, mountains, trees, streams, valleys, caves, ponds and even wind currents are thought to be governed by a nature spirit. Nature spirits are not considered malevolent. They usually have little interest in human beings' affairs unless a person offends them in some way. In that case these spirits can cause illness or misfortune to the offending person or members of that person's family.

Ogres are considered to be the largest in physical size and the strongest in evil power of all the wild evil spirits. Ordinarily, it is believed that because of Hmong traditional religious practices, ogres are prevented from seeing or attacking humans. It is thought that if one worships one's ancestors correctly, one's ancestor spirits will protect one from ogres. If anyone, for some reason, is not protected, it is believed

The Hmong Great Gods

Plate 2. The Hmong Great Gods.

that ogres can cause instant, sudden death.

Wild evil spirits are thought to hide and lurk in the world, usually in uninhabited areas. They can attack any passerby for no apparent reason, and cause misfortune, illness or death. This is why many Hmong persons prefer not to travel singly in forests, jungles or uninhabited areas.

The Tame Spirits. The fourth level of spirits belong to what are called the tame spirits. Within this level, the first sublevel belongs to the ancestor spirits. The Hmong believe that each person born has three souls. The first soul is the soul which normally stays with the body. The second is the soul which wanders; it is the wandering soul that causes one to dream while asleep. The third soul is the protective soul which tries to protect its owner from harm. Upon death, the first soul stays with the body at the grave site. The second soul comes to live with his or her descendants. The third soul goes back to heaven and may be reborn. A soul may be reincarnated as either a person, animal, or perhaps an inanimate object, depending on one's past actions and luck. Thus, the Hmong believe in both reincarnation and that ancestor spirits remain around them.

Hmong descendants must honor their ancestral spirits by performing appropriate ceremonies and sacrifices periodically. This is done to insure that one's ancestor spirits will continue to protect and bring prosperity to their family. In addition, if ancestors are not worshipped properly, illness or misfortune may strike the family.

The next sublevel belongs to the house spirits. Each time a Hmong family builds or moves a house, the spirits of their house must be invited to inhabit or reinhabit the house and help protect the family from misfortune. The house spirits consist of two door spirits, one for the front door and one for the back or side door; four corner spirits, one for each corner of the house; and two fireplace spirits, one for the large fireplace and the other for the small fireplace. In addition, it is believed that the central pillar of the Hmong house is the resting place for the family's ancestor spirits. Lastly, a

Hmong head of household may choose to set up a family altar to establish a family spirit who will help bring prosperity to the home and also protect family members from harm, in which case a spirit will be invited to live in that altar which is usually located in the living and eating area of the Hmong house. Certain ceremonies must be done during each New Year celebration to keep harmony with all house spirits and to insure that they will continue to protect and assist the family. House spirits usually do not cause illness to the occupants of the house unless they are inadvertently or consciously offended; perhaps by being kicked, hit, or urinated upon. In that case, sacrifices to the offended spirit may have to be made to appease that spirit's anger.

"Nengs" are another set of tame spirits. Over the centuries, the Hmong have come to believe that the only way to acquire a "neng" is to inherit one from an ancestor. It is believed that "nengs" are passed down through bloodlines. When a person with a "neng" dies, his or her "neng" will wait until a suitable descendant in the following generation appears. The "neng" will then select that person to be his or her new host. Those who inherit a "neng" have great status in the community as that person is thought to be able to cure illness, foretell misfortune, and ward off evil spirits. Once a "neng" selects a person, the "neng" teaches that person how to send it back out to talk with, or fight if necessary, the spirits that are causing illness, in order to assist sick persons. Through the "neng" it is possible to communicate with the spirit world and come up with a diagnosis for almost any illness or misfortune. Thus the person with a "neng" is the Hmong diagnostician, along with having a selection of other healing skills. Some "nengs" are thought to be very powerful and have a wide range of healing abilities, while others are thought to have only limited healing powers. However, all "nengs" are spirits whose purpose is to help people and they are thought to prevent the person they select to live with from doing any harm to others.

The last sublevel of the tame spirits contain the evil spirits which can be captured by some individuals who have learned

Hmong House Spirits

1. Four house corner spirits
2. Small stove spirit
3. Large stove spirit
4. Two door spirits
5. Ancestor spirits which live in the central pillar

Plate 3. Hmong House Spirits.

A Person with a "Neng"

Plate 4. The Hmong Diagnostician.

certain magic spells and rituals. These evil spirits normally have one of two special powers. One power is the ability to cause illness or death to persons by magically implanting foreign objects, such as rocks or bones, into victims. The second power is the ability to cause death through no apparent cause. Some Hmong people say that persons owning this type of evil spirit must cause death to victims periodically in order to satisfy his or her spirit's lust to drink blood. If he or she does not permit his or her evil spirit to drink another victim's blood, the spirit may attack the owner instead.

Hmong Beliefs on Causes of Illness and Types of Cures

Much of the Hmong religious effort is aimed at pleasing or appeasing the various wild and tame spirits. Livestock are not only raised for economic gain and family consumption, but to insure adequate animal sacrifices for planned and unplanned, but necessary, ceremonies. A Hmong family never knows when a nature spirit may inadvertently be offended or when an ancestor spirit may require a sacrifice. When a person grows sick, his family will ask a person with a "neng" to tend the sick one. If the person with a "neng" accepts the case, he or she will prepare the altar by burning candles, incense and some gold and silver paper money. He or she will don a black hood, pick up the tambourine and rattle, then sit on a bench. While a person behind assists by beating a gong, he or she will start bouncing or jumping up and down on the bench. This causes the tambourine and rattle to make additional noise. Soon he or she enters into a trance. While in a trance, the "neng" is sent to find out from the spirit world what is causing the victim's illness. Sometimes the "neng" will discover that it is the time for this person to die and nothing can be done to save this person. This is because it is thought that everyone's time span on earth is predesignated by the gods prior to entry to earth. Before being born, each person receives a "visa" to enter earth. Each

"visa" has an expiration date. When that date arrives, the owner of that "visa" must die so that he can return to the spirit world.

However, there are many times when the "neng" will find information that can lead to curing a sick person. The types of reasons the Hmong believe cause illness or death are extremely numerous. A few of some relatively common reasons a "neng" may cite for a person falling ill are: 1) loss of soul, 2) offended or needing ancestor spirit, 3) angered nature spirit, 4) a wild evil spirit attack, 5) a loved one's spirit attack, 6) a curse, 7) a tame evil spirit attack, 8) an ogre attack, and 9) illness or death by reason other than spiritual causes. A brief description of these reasons for illness will be given as examples of how Hmong concepts on illness and death are firmly tied in with their beliefs in spirits.

Loss of Soul. This is considered a very common Hmong malady. It is believed that it is necessary for the soul and body to be in unity, or illness will follow. Usually it is the first soul, the soul that should stay with the body, that gets lost. There are several ways a person can lose his or her soul. One way is that a soul can be frightened away, perhaps by encountering a vicious tiger or a large poisonous snake. When a person becomes suddenly or excessively fearful of imminent death, his or her soul may get so scared that it flees the body. At other times a soul may simply get lost by the wayside when a person makes an extended journey. Another common way a soul gets lost is that when a person passes a place the soul finds particularly lovely, the soul may decide to linger at that place and forget to come back. The Hmong believe that souls are fond of playing with little knick-knacks and lingering in beautiful nature spots. So, for example, if a person happens to visit a store with many knick-knacks or pass a lovely meadow, his or her soul may enjoy itself so much playing there, that it will forget to come back to its body.

The symptoms of a person with a lost soul vary consider-

ably. The most common symptom is a marked behavioral change such as becoming suddenly abusive, developing nervous habits, becoming forgetful, being disoriented, loss of sleep, or nightmares. If no treatment is obtained, the person may develop physical symptoms such as severe headaches, stomach aches, body aches, or weakness of limbs. Victims can grow progressively worse until assistance is found or he or she dies.

The treatment for a person with a lost soul is to perform a soul calling ceremony. This ceremony can be learned by almost anyone. In fact, most Hmong heads of household learn this art. However, in serious illnesses, most times a person with a "neng" is invited to perform the soul calling. Usually two or more chickens as well as some eggs and incense are prepared for the ceremony. The Hmong believe souls are fond of chicken meat and eggs as these are considered luxury items in Hmong communities. The cooked chickens, boiled eggs and burning incense are used to entice the soul back to its rightful body. Sometimes the soul calling is conducted in the ill person's home. At other times the soul caller will go to the place it is believed the soul was lost and will then lure the soul back to the village and the sick person.

Offended or Needing Ancestor Spirit. This is also a very common cause cited for Hmong illness. Most often it is an ancestor spirit who is angry at a descendant for not worshipping or honoring him or her properly, who causes the illness. However, at times, the ancestor spirit is simply lacking something in the spirit world and has come to ask its descendants for what is desired. An ancestor causes illness to a descendant only to communicate his or her need. They do not usually cause death unless they are denied their request. The symptoms of a person whose illness was caused by an ancestor spirit are usually physical ones, such as body or stomach pains, fever, or loss of consciousness. Sometimes though, the symptoms are just very bad nightmares.

Plate 5. Altar of a Person with a "Neng".
Photo by Bobbie Martin.

Plate 6. Person with a "Neng" Entering a Trance.
Photo by Bobbie Martin.

The method to cure illness caused by this reason is to consult a person with a "neng." He or she will send the "neng" to talk to the spirits and gather information. The "neng" will find out which spirit is causing the problem, why, and specifically what the spirit wants. The "neng" will even attempt to bargain for the least expensive sacrifice for the family of the ill person to make. Usually the bargain made will be that if the sick person gets well by a specified time, certain sacrifices will be made to the spirit. Common necessary sacrifices are eggs, chickens, a pig, a cow, a buffalo, paper money and incense, or any combination of some of these. After performing the sacrificial ceremonies, the family consumes the eggs, chickens, or other livestock, so the food does not go to waste.

Angered Nature Spirit. Another common diagnosis for illness is an angered nature spirit. It is sometimes difficult to avoid angering nature spirits. A child throwing a rock into a stream may anger the spirit of the stream. A man defecating on a tree root may anger the spirit of the tree. When shooting at a bird, one's arrow or stone may hit an air spirit by mistake. There are countless ways in which nature spirits can be angered. A person with a "neng" can usually find out which spirit is angry, what the offense was, and then bargain with the spirit for the necessary sacrifices needed to appease it. Sacrifices required are usually those similar to the ones made to ancestor spirits.

A Wild Evil Spirit Attack. On occasion, a wild evil spirit may decide to attack someone. The attack may be for a variety of reasons. Sometimes the evil spirit is just hungry for human blood. Or perhaps it is a female evil spirit who lusts after young human males. Those who are attacked by evil spirits usually exhibit extreme physical pain, or seem to undergo an extreme behavioral change and may appear "crazed."

A person with a "neng" must be called in immediately. The "neng" will first attempt to make a bargain with the

Plate 7. Soul-Calling Ceremony.
Photo by Bobbie Martin.

Plate 8. The "Neng" Sword Used to Fight Evil Spirits.
Photo by Bobbie Martin.

evil spirit to spare the victim's life in return for sacrifices. The evil spirit may agree to this, but on the other hand, it may decide that it does not wish to relinquish the victim. In the latter case, the person with a "neng" can send his "neng" to fight the evil spirit. If the "neng" is more powerful, the patient will gain back his health; if not, the patient may die.

In some situations, the person with a "neng" may advise the family of the ill person to perform a ceremony to change the ill person's name. This is done in the hope that the evil spirit will be fooled into thinking the ill person is someone else and will then leave. Sometimes only the first name of the patient is changed. At other times another clan name is borrowed and both the first and clan name are changed. A similar ceremony that Hmong families usually hold to name an infant must be performed for the sick one. Eggs and two or more chickens, or even a pig or cow may be prepared to entice the soul of the sick one to accept its new name. After this is done, if successful, the evil spirit will be deceived and the patient recovers.

A Loved One's Spirit Attack. This usually happens when a loved one dies prematurely. That spirit may not want to relinquish his or her hold on his or her former lover, spouse or children. The spirit may decide to attack and attempt to capture his or her loved ones' souls so that they will die also. In a situation such as this, after discovering the problem, the person with a "neng" will send his "neng" to try and decoy or deceive the loved one's spirit. Large paper dolls will be cut to symbolically take the place of the people under attack. The "neng" will then try to fool the spirit into taking the paper dolls instead of the people's lives.

Curses. A curse is a slightly more rare diagnosis for an ill person. The Hmong believe that curses have power if the person who curses is morally right and the victim has done a serious offense and refused to make amends. A curse can vary in its severity widely. A curse may simply be from an angry parent stating that, "your children will treat you as

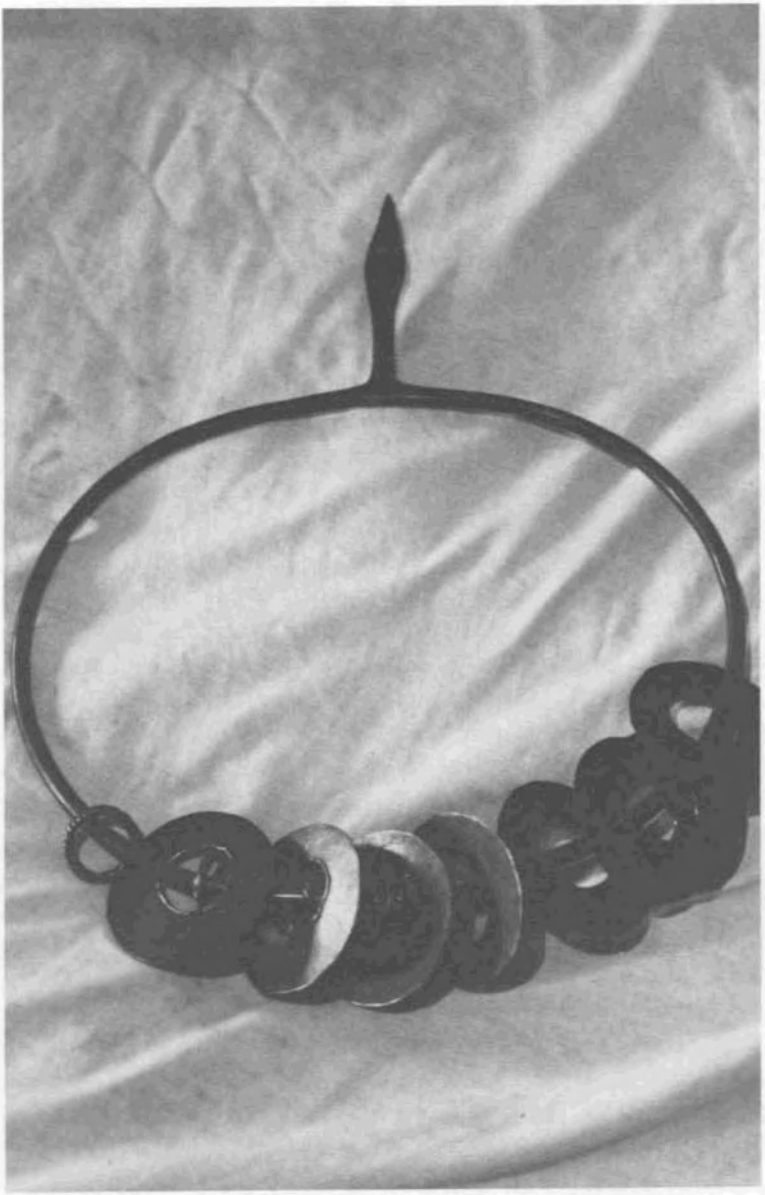


Plate 9. Hmong Implement Used to Entrap Evil Spirits.
Photo by Bobbie Martin.

cruelly as you treat me." Or a curse may cause economic disaster, serious illness, insanity, or even death.

A person with a "neng" can discern who originated the curse and the victim can only get well if he or she can convince the cursing person to withdraw the curse. If the person who originated the curse is already deceased, it then becomes necessary to contact the spirit of the dead person and ask how to make amends and what sacrifices need to be offered in order to gain forgiveness.

A Tame Evil Spirit Attack. The person with a "neng" may come up with the information that a person owning a tame evil spirit has sent the evil spirit to implant a foreign object into the victim's body; or is sucking the victim's blood and life away. Victims of this type of attack usually exhibit signs of acute and violent pain and often lose consciousness suddenly. Only a person with the skill to implant foreign objects into a person can take the object out, and thus cure the victim. Only a person with a spirit who has the ability to suck blood from a victim can cure a person being attacked by such a spirit. There may be a contest between two evil spirit owners to see whose spirit is more powerful; or perhaps if an evil spirit owner has been hired to assassinate the victim, or has a personal quarrel with the victim and intends murder, the victim's family may be able to bribe him or her into calling off the attack.

Ogre Attack. For victims who exhibit no prior symptoms of ill health and just suddenly die for no apparent reason, the Hmong believe that the victim has died of an ogre attack. Since these deaths occur so suddenly and swiftly, there is usually no time to call in a person with a "neng" for a diagnosis. The Hmong have few traditional defenses from this type of death. They believe that from time to time their ancestor spirits who normally protect them from ogre attacks have let down their guard. Perhaps they have been offended seriously and therefore let the ogres see and attack their descendants.

Illness or Death by Reasons Other Than Spiritual Causes. This is the last type of information a person with a "neng" may give a patient's family. The family must then explore other reasons for the illness or death. Often the family will conclude that the victim must have eaten or drank something wrong. Usually, people who fall sick for this reason suffer from stomach pains, diarrhea, constipation, loss of appetite, loss of weight, nausea or vomiting. When this happens, usually a Hmong herbalist will be called in. These herbalists are skilled in the use of fresh and dried herbs and have remedies for many sorts of complaints.

Alternatively, a Hmong massager, Hmong accupuncturist, or Hmong wiseman may be consulted. Each of these practitioners have various skills in healing a wide variety of illnesses caused by reasons other than spiritual problems. A Hmong massager usually handles cases who complain of muscular or stomach pains. Hmong accupuncturists use larger needles than their Chinese counterparts and are usually asked to treat patients with fever or pressure problems. Hmong wisemen are able to read omens, consult Chinese charts and come up with a diagnosis for a wide variety of maladies.

Only those with a "neng" must inherit their skills. Any of the other Hmong healing arts may be learned. Any one person may be skilled in more than one of the mentioned healing arts and may even learn all of the skills. A Hmong person skilled in any of the healing arts, by custom, never advertises his or her skill. The Hmong community learns of their abilities only through the village grapevine.

Problem of Hmong Sudden Unexpected Nocturnal Death Syndrome

Starting in 1977, certain mysterious nocturnal deaths among the Hmong communities in the United States began to be reported. As the deaths were scattered throughout

Plate 10. Hmong Herbalist in her Garden.
Photo by Bobbie Martin.

several different cities, it took about two years before health authorities began to realize that these deaths were starting to fit into a pattern. Whatever was killing these people was reaching epidemic proportions among Hmong males in the United States. The deaths were not confined to Hmong males, however, as Hmong women and Cambodian, Laotian and Vietnamese men were also victims of similar deaths. However, by far, the mysterious deaths were striking Hmong males at a much higher rate than any other group. Since medical science has not come up with conclusive evidence as to what caused these deaths, the Hmong communities have expressed growing concerns as to their inability to undertake any preventative health care steps. Hmong men in particular are fearful that they will be the next victim.

Description of Syndrome

The Centers for Disease Control (1981) reported that the deaths shared several common features. All occurred during sleep or while falling asleep. Almost all happened during late night or early morning hours. All except one female case involved relatively young, apparently healthy men. The transition between apparent health and death was very quick. Some witnesses of the deaths reported hearing respiratory difficulties, gasping, moaning, or groaning sounds just prior to death. A few witnesses to the deaths reported hearing gurgling, and observing frothy sputum. Some also reported the victim becoming rigid during the episode, but most remained flaccid. Some victims became incontinent of urine or stool, or both. Autopsy findings were of acute cardiac failure without underlying disease. No signs of toxins or drugs have been found, nor any evidence of suicide.

Some witnesses have interpreted the terminal sounds of moaning, groaning or gurgling as possible signs of terror, indicating that the victim was having a nightmare at the time

of death. There is some speculation that terror from the nightmares could have triggered the deaths (Marshall, 1981). However, this theory has limited support as the sounds described by witnesses to the deaths are the sounds normally associated with the sounds heard during the end of cardiac arrest cases (Centers for Disease Control, 1981).

Several other controversial causes for the Hmong Sudden Unexpected Nocturnal Death Syndrome have been suggested. One is that the deaths are caused by the long-term effects of exposure to chemical or biological warfare in Laos (Vang, 1982). Another is that the deaths among the Indochinese refugee population in the United States are caused by the stress of adapting to life in a new country, or perhaps depression over the loss of their former lifestyle and the inability to be successful in a Western setting (Ota, 1981). It has also been suggested that the deaths may be related to sleep apnea (Munger, 1982). The Centers for Disease Control's research indicates that the cause of the deaths could be a disruption of the cardiac electrical conduction system (Grady, 1982). There are several studies currently being conducted which are investigating some of these theories, but so far there have been no published results.

Centers for Disease Control's Statistics

The Centers for Disease Control (1981) reported forty-one cases of sudden nocturnal death among the nation's Indochinese refugee communities. Of these, twenty-five cases were Hmong, twenty-four men and one woman. Of the others, nine cases were Lao men, four were Vietnamese men, two were Cambodian men and one was a Mien man. The first reported death in the United States occurred on July 15, 1977, while the latest death reported by the Centers for Disease Control happened on October 2, 1981.

The victims had been in the United States from between five days to fifty-two months prior to their deaths. Seven

deaths occurred in California, seven in Minnesota, four in Oregon and one death each in Washington State, Iowa, Oklahoma, Ohio, Wisconsin, Illinois and Rhode Island. This somewhat reflects the Hmong population distribution in the United States.

The deaths that were witnessed occurred between nine thirty in the evening and seven in the morning. All died while asleep or falling asleep. There is only one documented case of a survivor of an attack of similar symptoms.

The age range of the victims varies from twenty to sixty-three years of age. By far, the deaths strike those in their twenties and thirties at a much higher rate. The thirties seemed to be the highest risk age range. Twelve of the Hmong men who died were in their thirties. The Centers for Disease Control quoted the death rate for sudden nocturnal death of adult males from Laos betwen the ages of twenty-five to forty-four as eighty-seven per one hundred thousand. This includes men from three ethnic groups of Laos, the Hmong, the Lao and the Mien. This death rate is comparable to the sum of the four leading natural causes of death among United States men of similar age.

For Hmong males alone, between the ages of thirty and forty, the death rate for sudden death soars to two hundred per one hundred thousand (Munger, 1982). This translates to a truly epidemic problem for Hmong males in the United States.

Implications of the Deaths

The Hmong in the United States are still a close knit group despite their wide flung locations across the continent. As the number of deaths mount, the Hmong community is growing increasingly alarmed, especially as many claim they know of additional sudden nocturnal deaths that have not been documented by the Centers for Disease Control.

Young Hmong males are having enough adjustment problems just learning how to cope in the American system. From being a mountain farmer or soldier with little or no education, the Hmong male is now expected to quickly learn English, find housing for his family, find food and medical care, find schooling for his children, and find a job to support his large extended family. Most Hmong men are also having difficulties learning to cope with a change in their role and status in the community. In Laos, the Hmong head of household commanded respect and unquestioning obedience from every member of his household. In the Western setting, the Hmong male must now cope with the concept of equal rights for women. He is often surprised and dismayed when his wife or children begin to question his actions or decisions. In addition, the Hmong head of household who once provided adequately for his family in Laos must now accept being on the bottom of the American socio-economic ladder. All of this upheaval and change causes a great deal of stress and at times Hmong men may wonder if it is worth the effort to try to assimilate themselves and their families into Western life. Now that they are faced with the added stress of fear of sudden nocturnal death, many Hmong males may be even more doubtful that the struggle to be successul in their new environment is worth it. This may be a contributing factor to some Hmong males continuing to keep their families in the Welfare system.

Another repercussion of these sudden nocturnal deaths is that the deaths are causing a great deal of fear and superstitious beliefs among Hmong refugees still in the Thai refugee camps. Rumors and wild stories regarding these deaths have spread among some camp residents. One story is that the sudden nocturnal deaths are caused because the refugees are not allowed to practice their traditional religion in the United States. This causes ancestor spirits to get angry and these spirits cause the sudden nocturnal deaths. Another story is that because the United States is on the other side of the world, it must be that the United States is where ogres

live. Many refugees are afraid to enter the United States for fear they will soon be killed by ogres, despite repeated reassurances from relatives and friends now living in the United States that this is not so.

Research has not yet narrowed the scope of possible reasons for the Hmong sudden nocturnal deaths. As long as this is so, Hmong and other Indochinese groups will live in fear that they or their family members will be the next victims. The Hmong do not know what preventative health measures they should adopt; nor does Western science know how to screen for high risk victims. Study of this unusual syndrome is vitally necessary, not only to help the Hmong, but to add needed knowledge to the field of cross-cultural medicine. Although the Hmong have the highest death rate, other ethnic groups suffer from similar sudden nocturnal death syndromes, but at a lower rate of incidence. Japanese, Filipino and other Indochinese ethnic groups all share an interest in obtaining more information on Hmong Sudden Unexpected Nocturnal Death Syndrome.

Focus for Study

This book focused only on possible cultural reasons influencing the high rate of sudden nocturnal deaths among the Hmong population. The author did not propose to do any medical laboratory studies as others were already pursuing investigations into these areas. Although it was known that the deaths were related to a malfunction of the heart, there was still a need to discover why certain individuals became sudden nocturnal death victims at certain times in their lives. It was thought that investigation into social and cultural aspects of the sudden nocturnal deaths could throw some light on the cause of this syndrome.

The Hmong themselves have several views on what is causing the sudden nocturnal deaths. Western medicine tends to discredit alternate health services delivery systems. How-

ever, the Hmong have been delivering health care to themselves in a fashion they feel more than adequate for as many centuries as they can remember. Accupuncture, herbal lore, chiropractic and other controversial medical disciplines have now gained widespread acceptance in the Western world. Perhaps aspects of traditional Hmong health delivery systems will eventually find acceptance also. Rather than ignoring the possibility that the Hmong may have an answer to the question of what is causing sudden nocturnal deaths, an investigation was made to see whether the Hmong beliefs on the subject were plausible. Rather than ridicule the Hmong beliefs in nature and ancestor spirits and sudden nocturnal death caused by ogres or curses, a study was first done to see if those beliefs could have affected the health status of some or all of the sudden nocturnal death victims.

In addition to studying the Hmong beliefs on the causes of sudden nocturnal death and whether these beliefs could affect the sudden nocturnal death rate, research was also conducted on certain aspects of the Hmong culture which could also possibly have been contributing factors to the high rate of Hmong sudden nocturnal deaths. For example, common past geographical locations, job occupations, refugee camp experiences, housing, use of opium or other drugs, and common hobbies were reviewed. Other possibilities examined were whether the deaths were linked to certain individual's diets (consumption of special foods), or were perhaps related to the usage of traditional medicines or health treatments, and also whether the deaths were related to membership in certain clans or lineages. The field of cultural investigation was very wide. However, the author investigated as many aspects of Hmong culture in relationship to sudden nocturnal death, as was possible within the scope of the study.

This investigation did not confine itself to only those cases reported by the Centers for Disease Control. The study included several undocumented and suspected cases as it was felt in a cultural study, the larger the number of cases, the better the chance of gathering more information. In addition, the study did not want to focus only on sudden nocturnal deaths of the Hmong in the United States. Therefore, any sudden nocturnal death cases of Hmong from other countries, such as Canada, France, Laos or Thailand, that the author discovered, were included in the study.

CHAPTER 2

Review of Previous and Current Research on Hmong Sudden Unexpected Nocturnal Death Syndrome

The phenomenon of Hmong Sudden Unexpected Nocturnal Death Syndrome is relatively new in the United States, particularly as the Hmong have been living among us only since 1975. Documentation of these mysterious deaths began a mere five years ago. Perhaps due to the limited time period of exposure to this unusual syndrome, there seems to be very little literature on past studies of Hmong sudden nocturnal deaths. As stated earlier, there are several investigations currently being conducted, but to date, no one has published or disclosed their results.

However, a review of the literature reveals that during the 1940s and 1950s some studies on similar sudden nocturnal deaths among the Filipino population of Hawaii were done. These Filipino deaths had many similarities to the Hmong sudden nocturnal deaths. Review of the studies done on Filipino sudden nocturnal deaths may prove relevant to the current investigations on Hmong sudden nocturnal deaths. Unfortunately, even the Filipino sudden nocturnal death studies are limited in number and scope.

Despite the limitations of literature available on the subject, a review of the current studies being done on Hmong sudden nocturnal deaths and past studies on the Filipino sudden nocturnal deaths reveals a wide range of theories as to the possible cause for the sudden nocturnal death syndromes. Some theories are exotic in nature and little support can be found for them, although they cannot be discounted until further research is done. Other theories are less speculative in nature, although even these lack adequate support-

ive evidence. The cause for Hmong sudden nocturnal deaths remains a mystery and more research into all possible aspects of the deaths should be done until conclusive evidence of the disease cause and possible cures can be found.

Current Studies on Hmong Sudden Nocturnal Deaths

During the past two years, the news media has given ever widening publicity to the subject of Hmong sudden nocturnal deaths. This has generated more interest on the subject and encouraged more research on Hmong sudden nocturnal deaths to get underway. Each of the current studies has a different perspective and there continue to be widely varying theories on the cause of the these deaths. At this time, it is impossible to guess which avenue of research will produce the most fruitful results, especially as no one has yet published their findings. Each investigation has merit in its own right and it is beneficial that there is very little duplication of research areas between the current studies, despite the fact that the research is centered on a common subject. The current studies will be briefly mentioned on the following pages.

Centers for Disease Control

Doctor Roy Baron of the Centers for Disease Control in Atlanta, Georgia, is heading a nationwide study on the sudden nocturnal death syndrome among the Indochinese populations. He has found that the deaths are compatible to cardiac dysrhythmia, but the underlying cause has not yet been established. A possibility is that the hearts of the sudden nocturnal death victims underwent loss of timing due to a faulty transmission of electrical signals. What causes the faulty transmission and why it happens only during sleep

has not been discovered yet.

Besides examining heart tissues, the Centers for Disease Control has also run routine toxicologic screening tests on thirty cases of sudden nocturnal death. No evidence of toxins were found in the victims. In addition, they have circulated a questionnaire to study twenty-six cases of sudden nocturnal death from the country of Laos to determine whether the deaths might be associated with geographic regions of Laos, current or past job occupations, military experience, chronic stress, refugee camp experiences, or dietary changes (Centers for Disease Control, 1981).

Only preliminary reports from the Centers for Disease Control's study are now available for public perusal. Doctor Baron has stated that he believes they will have some answers soon, but will not disclose any further information until the studies are completed (Grady, 1982).

Prendergast

Doctor Thomas Prendergast, an epidemiologist in Orange County, California, where a large population of Hmong live, has examined more than eighty Hmong electrocardiograms to see if he could uncover any heart problems in the Hmong community. He found no abnormalities in the electrocardiograms to account for the high rate of sudden nocturnal deaths among the Hmong. However, his tests lasted only a few minutes each and he suggests that longer testing could perhaps disclose some significant disturbances (Grady, 1982).

Westermeyer

Doctor Joseph Westermeyer, a professor of psychiatry at the University of Minnesota has studied the Hmong in his mental health clinic. He proposes that the sudden nocturnal

deaths may be linked to the stress of cultural assimilation. Many Hmong and other refugees have experienced difficulties in adjusting to their loss of native homeland, lifestyle, religion and relatives. Westermeyer attributes widespread depression among the Hmong related to their loss of social networks and forced transition from a spirit-worshipping, agricultural society to an urban, Western lifestyle. In addition, unemployment and dependency on Welfare disrupts the normal self-image and independence of the Hmong people (Ota, 1981). Westermeyer reports that the Hmong seem to have an unusually high number of nightmares, reflecting that the Hmong are a troubled people under stress. Other studies have shown that people under stress are more likely than others to develop cardiac arrhythmia (Grady, 1982).

Munger

Ronald G. Munger, doctoral candidate at the University of Washington in Seattle, Washington, has compared Hmong sudden nocturnal deaths with Filipino sudden nocturnal deaths in Hawaii. He noted some striking similarities between the two syndromes. In both syndromes, the deaths were associated with sleep. The age and sex distribution of the victims were similar. Both the Hmong and Filipino sudden nocturnal death rates peak in the twenty-five to thirty-five year old groups. Both syndromes are consistent with death due to cardiac arrhythmia with no apparent underlying cause. Munger suggests that the most promising area of research concerning these deaths would be the study of disorders of respiration during sleep, known as the sleep apnea syndromes (Munger, 1982).

Munger is currently conducting additional research on Hmong sudden nocturnal deaths. He will conduct a field study in the Thai refugee camps to see whether any relevant factors indicating the cause of Hmong sudden nocturnal death can be found there (Munger, 1982).

Marshall

Eliot Marshall reported the theory of a national expert on unexplained sudden deaths that the Hmong perhaps suffer from a congenital weakness of the autonomic system that causes the heart to beat irregularly and fibrillate in moments of intense emotional stress. He speculates that this weakness may be due to inbreeding (Marshall, 1981).

Stanford Sleep Center

This center is attempting to study the only known survivor of a sudden nocturnal death attack, Ge Xiong, a thirty-six-year-old Hmong male formerly of Seattle, Washington. One night during December of 1980, Ge Xiong's wife awakened to hear muttering and respiratory distress coming from her husband. Ge Xiong's skin had turned bluish and there was some froth in his mouth. He could not be aroused, although his eyes were open. His life was probably saved due to the speedy arrival of a paramedic team. The team found Ge Xiong's heart stopped, but were able to restore the heartbeat. Ge Xiong spent ten days recovering in a hospital, the first five days of which he remained unconscious. After recovery, he subsequently moved to Fresno, California.

The Stanford Sleep Center, which specializes in the study of sleep disorders, would like to monitor Ge Xiong's breathing, eye movements, brain waves and heart rhythms during his sleep. It is hopeful that arrangements can be finalized for this study as this could provide some valuable information about the sleep patterns of the Hmong (Xiong, 1982).

Bliatout

Ge Xiong's survival was attributed to the speedy arrival of a paramedic team who quickly put him under cardiac

monitoring. It was felt that if future victims of sudden nocturnal death attacks could also be kept alive until paramedic teams arrived, perhaps more people could be saved (Schade, 1982). It was suggested that widespread teaching of cardio-pulmonary resuscitation techniques to the Hmong communities might possibly help keep Hmong victims of sudden nocturnal death attacks alive long enough for trained personnel and cardiac monitors to arrive.

Through funding of the Multnomah County Health Department, under the direction of the author, the Hmong Family Association of Oregon is conducting a study to see if teaching cardio-pulmonary resuscitation techniques to the local Hmong community might reduce the death rate caused by Hmong Sudden Unexpected Nocturnal Death Syndrome. So far, two hundred Hmong adults have been trained in these techniques. Since the inception of the program, there has been no reported attack of sudden nocturnal death. It has therefore not been possible to measure the success of the program.

Studies on Filipino Sudden Nocturnal Deaths

There were at least forty-five documented cases in Hawaii of Filipino sudden nocturnal deaths, or what is called, "bangungut." In the Filipino cases, previously healthy males died during the night making moaning, snoring or choking noises. "Bangungut" means nightmare in Filipino and reflects some theories that the mysterious deaths were caused by terror during a nightmare. Due to the similarities of the two syndromes, a brief review of studies on the Filipino sudden nocturnal deaths will be given.

Manalang

In 1948, Doctor C. Manalang from the Department of

Health in the Phillippines conducted a study on Filipino sudden nocturnal deaths in Hawaii. He proposed that victims, after eating a large meal and falling asleep, developed a violent dream. This then caused a sudden excess reaction of the heart which overworked and caused a stasis in the lungs. This would produce the choking and groaning sounds associated with the syndrome, then sudden death from lack of oxygen (Manalang, 1948).

Larsen

In 1955, Doctor Nils P. Larsen, a prominent Honolulu pathologist, also studied the Filipino sudden nocturnal death syndrome. He proposed that these unexplained deaths were caused by excessive fear during sleep, probably due to a nightmare. Larsen found no consistencies in post-mortem examinations and chemical analyses, causing him to theorize other reasons for these mysterious deaths. He cited precedences for acceptance of exotic deaths, such as death caused by voodoo and death caused by the Hawaiian counterpart of voodoo—being "kahunaed" (Larsen, 1955).

Nolasco

In 1959, Doctor J.G. Nolasco of the University of Manila investigated the possibility that Filipino sudden nocturnal deaths were linked to the consumption of a toxic material found in one of the fish products commonly eaten by the Filipinos. Although a potent vaso-depressor capable of causing death in a manner consistent with sudden nocturnal death syndrome symptoms was found in large enough concentrations in some preserved fish products commonly consumed by Filipinos, not all victims had eaten fish or fish products the day of their death ("Bangungut", 1959).

Investigation on Chemical Warfare in Laos

One of the most controversial hypotheses on the causes of Hmong sudden nocturnal death is that these deaths are related to exposure to chemical warfare in Laos. Some think that perhaps there is a lingering biological effect due to exposure to chemical warfare in Laos which predisposes some individuals to sudden nocturnal death at a later time.

U.S. Army studies have shown that three known types of lethal chemicals were used in Laos. One was a nerve agent, the second was a blistering agent, and the third was a substance that induces heavy bleeding. It is believed that the chemicals were supplied to Communist forces in Laos by the Soviets.

The Carter administration refused to acknowledge the use of lethal chemical agents by the Soviet-backed regimes of Hanoi and the Pathet Lao. During the Reagan administration, up until March, 1982, the United States State Department maintained the position that there was no conclusive evidence that gassing had occurred, or was occurring in Laos.

On December 12, 1980, the United Nations General Assembly adopted a resolution calling for an United Nations investigation into the use of chemical warfare in various parts of the world. This included examination of many reports of chemical gassing in the country of Laos and a field visit to refugee camps in Thailand.

The United Nations' Report to the Secretary-General on Chemical and Bacteriological Weapons, dated November 20, 1981, stated that there was no reason to doubt the integrity of those persons making allegations of chemical warfare attacks in Laos. However, it was reiterated several times that the testimonies of individuals was not enough to prove that such attacks were actually occurring. Despite the evidence that was produced, the United Nations' report claimed that the study was inconclusive because members of their team were not allowed into areas allegedly sprayed

with chemicals to collect samples in a scientific manner. However, this report does reveal some interesting testimony and information. It states that witnesses claim that exposure to chemical clouds allegedly sprayed in Laos caused in rapid sequence,

> . . . dizziness, nausea, coughing of bloodtinged material, choking, vomiting of massive amounts of blood, bloody diarrhea, formation of multiple small hard blisters, followed by shock and death in those directly under the sprays. For those on the periphery of the attacks, or who ate or drank contaminated food, or water, symptoms took longer to develop (days, rather than minutes to hours) and usually led to death within two weeks if no treatment was given.

After evaluating these symptoms, experts concluded that no known traditional chemical warfare agent alone, or in combination with others could cause the above effects. Upon analyzing a leaf and stem sample allegedly from an area that had been under a chemical attack, three potent mycotoxins of the trichothecene group were found. Trichothecenes are capable of producing the symptoms seen by Hmong and other witnesses (United Nations General Assembly, 1982).

Despite the reluctance of the United Nations and the United States government prior to March, 1982, to admit to chemical warfare going on in Laos, Hmong military leaders estimate that a large percentage of the Hmong refugees in the United States have been exposed to chemical warfare, either knowingly or unknowingly in the past. Growing numbers of Hmong people are beginning to suspect that prior exposure to these unusual chemical gassings or their residuals weakened them in some way and makes them more susceptible to sudden nocturnal death.

Besides the problem of sudden nocturnal death, there are many Hmong in the United States who are chronically ill. Some believe that the cause for these chronic illnesses also

lies with prior exposure to chemical warfare (Hamilton-Merritt, 1981). There is currently no national study to investigate the chronically ill Hmong to see if these allegations have any basis, nor is there any study being done to see if the Hmong sudden nocturnal deaths could be linked to prior exposure to chemical gassing. Perhaps there is reluctance to undertake such a study because there are many claims that sudden nocturnal deaths occurred in the Hmong population prior to the beginning of the gassing, and therefore it would seem unlikely that the deaths are related to exposure to chemical warfare.

In response to this, some Hmong military leaders have stated that they believe that chemical warfare began in Laos as early as 1954. Unfortunately, there is no documentation of sudden nocturnal deaths prior to that year. This is because the Hmong did not commonly utilize medical facilities in the cities where medical records might have been kept, nor did they have a written language prior to the 1950s. Some elder Hmong persons state they have heard about cases of sudden nocturnal deaths prior to 1954 while other insist adamantly that there were no such deaths before the war years. There seems to be some confusion between death caused by diphtheria and sudden nocturnal death among some Hmong groups. This makes it even more difficult to ascertain whether these nocturnal deaths have occurred in the Hmong population throughout its history or whether it is a recent phenomenon.

The controversy over the theory that sudden nocturnal deaths are caused by prior exposure to chemical warfare is likely to continue until more research into the types of chemicals allegedly being used in Laos and their short-term and long-term effects is conducted. Until this happens, we cannot discount this theory. Whether this theory is proven or disproven, research on this subject would not only benefit the Hmong and other ethnic groups who suffer from sudden nocturnal deaths, but would be useful information for our military and national security.

Discussion of Studies

Each of the current studies being conducted on sudden nocturnal deaths has considerable merit in itself. Of course, each study must have some limitations depending on its scope and focus. For example, Doctor Baron of the Centers for Disease Control has already stated that he does not feel that the sudden nocturnal deaths are related to exposure to chemical warfare. He has, therefore, concentrated his investigations on heart tissue analysis accompanied by interviewing the families of the deceased for common backgrounds. In addition to narrowing the scope of investigation, the Centers for Disease Control did not include all the Hmong victims of sudden nocturnal deaths in their study. The author knows of two Hmong males in Hawaii and one Hmong female in Richmond, California, who were not included on their list. Another factor to consider when reviewing the Centers for Disease Control's study on sudden nocturnal death is that it does not give enough emphasis on the much higher risk of these deaths for Hmong men. The focus of their research is on sudden nocturnal deaths among Laotians as a whole, rather than concentrating on the ethnic group of the Hmong. Therefore their statistics reflect the lower death rates of the Laotian group as a whole, which downplays the skyrocketing death rate figures of the Hmong.

Prendergast's study was designed to be very narrow in scope. He worked only with the Hmong living in the Orange County, California area, and his test consisted only of a short electrocardiogram. Longer electrocardiograms and other more comprehensive testing should be considered for future investigations as well as including Hmong populations in other cities in the study.

Westermeyer's theory that the deaths are related to the stress of cultural assimilation has already come under attack by Larry Judy, a Public Health Service epidemiologist working for the Minnesota Health Department. He stated that not all the sudden nocturnal death cases were depressed

people (Ota, 1981). Although this may seem to be the case on the surface, consideration should be given to the fact that Hmong refugees living in the United States have lived through many years of war, suffered loss of homes and relatives, and are now thrust into an extremely different lifestyle. Although some of the Hmong victims may not have appeared to be depressed, the stress level must have been very high in their lives. Westermeyer is currently seeking funds for further investigation of this theory as more research into this area is definitely needed.

Munger has shown several similarities between Hmong and Filipino sudden nocturnal deaths. It is unfortunate that since the Filipino sudden nocturnal deaths occurred during the 1940s and 1950s, no extensive studies comparing Hmong and Filipino sudden nocturnal deaths can be done at the present time. Munger has only just begun his field study among the Hmong refugees in the Thai refugee camps. It is hoped that he will come up with some significant findings.

Marshall's report that sudden nocturnal deaths could be related to congenital weakness due to inbreeding has little validity. Hmong custom severely prohibits incest. Not only are Hmong males not allowed to marry close relations, they are not permitted to marry any female in their clan, no matter how distant the relationship. Marriage between brother and sister's children, and sister and sister's children are allowed as girls marry into other clans and their children bear that clan's name. However, even these marriages are not extremely common. It remains possible that Hmong sudden nocturnal death is a problem related to genetics but most likely not caused by inbreeding.

The study on Ge Xiong proposed by the Stanford Sleep Center has had problems getting underway. There are apparently funding problems and difficulties in arranging suitable testing times. Hopefully, these problems will be worked out as this would be the only study related to a possible relationship between Hmong sudden nocturnal deaths and the sleep apnea syndromes. It is also hoped that as time passes other survivors of sudden nocturnal death attacks can

be found. A study sample of just one person is very limiting.

The author's own program to teach the Hmong community in Portland cardio-pulmonary resuscitation techniques is designed to help prevent future sudden nocturnal deaths, not to study possible causes of the disease. The author feels all Hmong communities throughout the United States and other countries should be encouraged to start similar training programs, as this is a practical way to help prevent death. However, efforts in this direction will not uncover the cause for sudden nocturnal death.

The theories on the causes for Filipino sudden nocturnal deaths, although of interest, have some shortcomings. Manalang and Larsen felt the deaths were triggered by violent dreams. Since the Centers for Disease Control has explained that the moaning and groaning sounds often heard by witnesses are normal terminal sounds heard during cardiac arrest, this theory cannot be considered a likely one, either for the Filipino or Hmong sudden nocturnal death syndromes. Nolasco felt there could be a relationship between the Filipino sudden nocturnal deaths and the consumption of certain fish or fish products. Although many Hmong families also consume similar fish and fish products as the Filipinos did, it has already been shown that not all the Filipino sudden nocturnal death victims had consumed fish or fish products. Therefore, this theory is also unlikely to be proven as the cause for Hmong sudden nocturnal deaths.

As stated earlier, there is little research being done about the effects of gas attacks on the Hmong. The United Nations' study was to find out if allegations about the usage of chemical and biological warfare in Laos and other countries were true or not. The study did not do an in-depth study about the effects, either short- or long-term, on the victims exposed to the chemicals. The Centers for Disease Control continues to state that there is no clinical evidence to support a poisoning hypothesis. However, this does not rule out the possibility that a toxic substance is a possible cause of death. Only routine toxicological tests have been done, but

no detailed chemical analysis. More research in this area must be encouraged rather than discounting the theory that exposure to chemical warfare predisposes some individuals to sudden nocturnal death.

CHAPTER 3

Methodology and Materials

This investigation examined several hypotheses regarding the relationship between some aspects of Hmong culture and the Hmong Sudden Unexpected Nocturnal Death Syndrome. Information was gathered from Hmong communities throughout the United States, Thailand, Canada and France. Emphasis was given to studying cultural aspects of the Hmong sudden nocturnal deaths, but other aspects of the deaths were not ignored. This study did not want to preclude other theories on the subject. On the contrary, it wished to encourage more research into all possible causes of sudden nocturnal deaths. Each investigation, by necessity, must focus on only certain aspects of a problem. The focus selected for this study was on the possible relationship between Hmong traditional beliefs and practices regarding health, illness and death, and several other aspects of Hmong culture, and the Hmong sudden nocturnal deaths.

Hypotheses

Five major hypotheses and various related subject matters were examined in this study. Each of the five hypotheses covered an aspect of Hmong culture that the author felt could possibly be a contributing factor to the high rates of sudden nocturnal death among the Hmong people. In addition, some miscellaneous theories put forth by other investigators were also briefly considered.

Hypothesis One—Hmong Religious Beliefs

The first hypothesis of this study was that Hmong traditional beliefs about illness and death were contributing factors to the Hmong Sudden Unexpected Nocturnal Death Syndrome. Strong beliefs can affect a person's health status and can even cause death in some instances. For example, Larsen (1955) cited a case of a Hawaiian man dying because he believed a rival for the affections of his girlfriend had paid a Hawaiian priest, a "kahuna", to chant him to death. Although the patient was confined to the Queen's Medical Center, a large and well-equipped, modern hospital in Honolulu, Hawaii, no apparent diagnosis could be found. Shortly thereafter, the patient died as he had said he would. Autopsy revealed nothing organically wrong.

Hmong elders cite many examples of similar mysterious deaths which they believe were caused by ogres or evil spirits. Although Western medical practitioners may ridicule these concepts, generations of belief in supernatural powers can cause ill health and death. Many Hmong elders have stated that they believe that the Hmong sudden nocturnal deaths were caused by people not continuing their traditional religious practices and rituals to worship their ancestors. They feel that in anger over not being worshipped properly, ancestor spirits may withhold their protection and this allows ogres and evil spirits to kill their descendants. It is their belief that ogres are the spirits that cause sudden nocturnal deaths.

The disruption of the Hmong traditional religion is caused by several factors. One factor is that some Hmong have converted to some form of Christianity. Another factor is that the recent war killed many heads of household before they could teach their sons the proper methods of ancestor worship. In addition, due to the uncertainty about United States law, many Hmong are fearful of performing their ceremonies which can be protracted and noisy. Some Hmong families who attempted to perform traditional ceremonies were visited by the police and warned to cease dis-

turbing the peace. Other families have had their animal sacrifices confiscated by public health officials.

Since the belief that the sudden nocturnal deaths were related to the disruption of traditional religious beliefs on ancestor worship is a somewhat common feeling among many Hmong, especially the elders, the author decided to study the deceased's religious backgrounds to see if those who converted to Christianity suffered higher death rates than those who had not. In addition, the families of the deceased were reviewed as to beliefs on the cause of death, to see what percentage believed the deaths to be related to aspects of Hmong religion, such as whether they believed the deaths were caused by ogres, evil spirits, ancestor or other spirits, or the inability to perform traditional ceremonies. It was felt that this would uncover how large a percentage of the Hmong community believed in the power of death or illness caused by spirits angered by the inability of descendants to continue their traditional religious beliefs, practices and rituals. If the percentage was large, it would indicate that traditional religious beliefs did contribute to the stress level, mental health status, and general health status of many Hmong people and perhaps was a contributing factor in the sudden nocturnal death cases.

Hypothesis Two—Utilization of Traditional Health Practices

The second hypothesis was that the inability to find and use traditional Hmong healing arts caused deterioration of health and eventually was a contributing factor to the Hmong Sudden Unexpected Nocturnal Death Syndrome. Hmong communities across the United States have reported the inability to find and use their traditional medicines and healing arts. There are many reasons why this is a problem for the Hmong society in Western countries. First, the Hmong communities in Western countries are new commu-

nities. Many families did not know each other back in Laos. Since it is the custom that Hmong healing practitioners not advertise their skills, it was difficult for newly arrived refugee families to find the right type of healing practitioner. Second, many healing practitioners were unable to bring their tools of trade with them. Some were forced to sell them when faced with starvation in the refugee camps. Others were prevented by immigration officials from bringing in their plants and herbs. Last, due to the disruption of Hmong society caused by the war and the necessity of relocation, many of the Hmong youth have lost knowledge of their cultural background. It now seems that only a few of the elders still retain knowledge of Hmong medicine and healing arts; and as these people die, the arts will slowly be lost.

There is an overwhelming number of Hmong adults who have expressed to their community leaders or to the author the feeling that Western medicine is unable to cure the types of sickness Hmong people commonly have. Part of this problem is caused by language barriers, economic problems, transportation problems and lack of information as to where to find medical help. However, more importantly, there seems to be a cultural barrier between the Hmong clients and Western practitioners of medicine. A Hmong client's expectations of a doctor's treatment are very different from what they usually get. The Hmong often explain the symptoms of their illness in ways that Western doctors may not understand or accept, even when a translator is present.

It seems that the Hmong are finding it increasingly difficult or impossible to continue utilizing Hmong traditional healing treatments, but are not yet ready to utilize Western medical delivery systems. Since so many Hmong have expressed their concern over these problems, the author decided this would be a worthwhile subject to investigate.

Hypothesis Three—Hmong Subgroups, Clans and Lineages

The third hypothesis was that membership in certain Hmong subgroups, clans or lineages was a contributing factor to the Hmong Sudden Unexpected Nocturnal Death Syndrome. As stated earlier, the Hmong of Laos were divided into two linguistic and cultural subgroups, the White and Green Hmong. The author investigated whether sudden nocturnal deaths struck one subgroup more than another. Also investigated was whether sudden nocturnal deaths proportionately struck certain clans more than others, or whether certain lineages suffered more from these deaths. If this hypothesis were found to be true, it would suggest that there was a relationship between sudden nocturnal death and genetics.

The Centers for Disease Control (1981) stated that only one of their cases alleged a relative also dying from sudden nocturnal death, the death taking place in Laos. However, the author knows of several other cases in which relatives also died from sudden nocturnal deaths. One of the cases involved a father and son who both died sudden nocturnal deaths just months apart from each other. These deaths occurred in the state of California. Another case involved three cousins who all died sudden nocturnal deaths. Cases such as these suggest that investigation of this hypothesis could be a promising avenue of research.

The author wishes to note that many Hmong have more than one name and some entered the United States with a name that does not reflect their true clan heritage. As the author is familiar with the Hmong language and people, he is well-equipped to investigate to which subgroup, clan and lineage each victim really belonged, which was important when checking into genetic background.

Hypothesis Four—Past Geographic Locations

The fourth hypothesis was that past geographic locations were a contributing factor to the Hmong Sudden Unexpected Nocturnal Death Syndrome. First considered was that Hmong people from different regions in Laos have slight cultural differences. In Laos, there were four regional Hmong subgroups whose slightly different costumes were indicative of some minor cultural differences. They were the Hmong of Sam Neua, noted for their blue striped sleeves; the Hmong of Xieng Khouang and Borikane, noted for their pink and green cummerbunds; the Hmong of Sayabory, Luang Prabang and Vientiane, noted for their blue bordered aprons; and the Hmong from Phongsaly and Luang Nam Tha, noted for their embroidered aprons. If certain Hmong groups from the same region of Laos were found to have higher numbers of sudden nocturnal death, it would indicate two possibilities. The first would be that these deaths were related to genetics as people in one region tend to intermarry and keep the genetic pool somewhat enclosed. The second possibility would be that some regional groups of Hmong have certain cultural practices or were exposed to something in their environment which predisposed them to sudden nocturnal death at a later time.

Secondly, the author looked at past refugee camp experience. There were six refugee camps in Thailand that the Hmong could have been processed through before being relocated to a third country. The author checked to see whether the sudden nocturnal death cases had been processed through only a certain camp, indicating an experience in the camp which predisposed them to sudden nocturnal death at a later time.

Thirdly, the author briefly considered past locations in the United States. Since the majority of deaths occurred in the United States, the author felt it would be worthwhile to review this.

Hypothesis Five—Other Aspects of Hmong Culture

The fifth hypothesis was that certain aspects of other Hmong cultural practices were contributing factors to the Hmong Sudden Unexpected Nocturnal Death Syndrome. The Hmong have lived semi-autonomously in whatever country they inhabited, from China to the United States. In Laos, the Hmong lived a significantly different lifestyle as compared to the other ethnic groups around them. Their rice staple was different from the grains consumed by the lowland ethnic groups, and the Hmong commonly ate more corn than others. The Hmong houses were different and the climate of the mountains on which they lived was considerably cooler than the lowlands. In Western countries the Hmong continue to live differently from the cultures around them. For example, they often live in very crowded conditions, by choice, rather than economic necessity. Many keep the same social and family roles as they were used to in Laos.

It was thought that a study of certain aspects of the Hmong culture might point out some significant point that could be a contributing factor to Hmong sudden nocturnal death. The author investigated the deceased's family size, number of household members, number of dependents, family income, type of housing, educational background, employment record, use of alcohol, cigarettes and drugs, consumption of special foods, and hobbies for possible correlation to sudden nocturnal death.

Miscellaneous Theories

In addition to investigating the aforementioned five hypothesis, some theories put forth by other investigators were also considered. These theories included the possibility of sudden nocturnal death being related to exposure to chemical warfare, imprisonment in concentration camps, or that the deaths were related to depression and the stress of

adapting to Western lifestyles. Also considered were the theories put forth for the Filipino sudden nocturnal deaths, to see if the pattern of Hmong sudden nocturnal deaths supported any of these hypotheses.

At this time, no one else has investigated the author's first four hypotheses. The Centers for Disease Control (1981) has circulated a questionnaire pertinent to this study's fifth hypothesis, however, they are studying the sudden nocturnal deaths of the Laotians as a whole. Since they have not yet published or revealed any results of their survey, the author decided to proceed to examine this hypothesis in relation to the Hmong culture only. The author considered other investigators' theories in his study also, as he hoped that in the event that no support for his own hypotheses could be found, that perhaps he would be able to find indications as to which theories were more probable and thus encourage other researchers to continue further investigations.

Research Design

After considering the hypotheses to be investigated, it was decided that data would be obtained through the utilization of a questionnaire, as well as informally acquiring background information from various Hmong elders and leaders.

Population Description

The Centers for Disease Control (1981) reported twenty-six cases and suspected cases of Hmong sudden nocturnal death. Since the total base population of documented Hmong dying sudden nocturnal deaths in the United States was relatively small, it was decided to attempt to study one hundred percent of these cases. In addition, nineteen other suspected cases of Hmong sudden nocturnal death in the

United States and seven other suspected cases from four other countries that the author learned about from Hmong community leaders were also investigated. For the purposes of this study, the author defined a suspected sudden nocturnal death case as any Hmong who died suddenly, while asleep.

The study population totaled forty-five cases, of which thirty-eight deaths were from twenty-two American cities, two deaths were from Thai refugee camps, three deaths were from Laos, and one death each was from Canada and France. The author accepted any deaths reported up until August 31, 1982, the date that marked the close of this study.

Description of Questionnaire

It was decided to design a questionnaire for a bi-lingual investigator to verbally interview family members of the deceased. The questionnaire was written in English and not translated into Hmong as only the investigator would handle the questionnaire. The primary reason for this was that many Hmong persons are unable to read, even in the Hmong language, and would have had difficulty in filling out a questionnaire on their own. The format of the questionnaire was designed for easy verbal questioning as well as so that the data could more easily be entered into a computer for analysis.

The questionnaire obtained data on the place, date and time of the deaths; histories of the deceased's movement from Laos to Thailand, then to a third country; the age, marital status, number of children, number of dependents, number of household members, type of house, level of education, job history and income level of the deceased; whether the deceased ate any special foods; the deceased's usage of alcohol, tobacco, drugs and opium; what the deceased's religious background had been; the deceased's history of

health problems, usage of Hmong traditional healing practices or usage of Western medical systems; what subgroup and clan to which the deceased belonged and whether the deceased had any relative who died a sudden nocturnal death; whether the deceased had been exposed to chemical warfare; whether the deceased had been interned in a concentration camp; whether the deceased had appeared to be depressed or having mental health problems prior to death; whether the deceased had appeared to have had a nightmare at the time of death; whether the deceased consumed fish or fish products, and what the deceased had eaten for his or her last meal and how heavy a meal it was; and what the deceased families' beliefs were regarding the cause of death.

Procedure for Gathering Data

Families of the six cases of Hmong sudden nocturnal death occurring in Portland, Oregon, were interviewed personally by the author. For the remaining thirty-two cases which occurred in twenty-one other United States cities, the author conducted telephone interviews with the deceased's families. Family members of the three cases which occurred in Laos and the two cases from Thailand had already relocated to the United States. Therefore telephone interviews were obtained from them also. For the one case in Canada and one case in France, the author also conducted telephone interviews with family members of the deceased.

The author first attempted to interview the spouses of the deceased. In the event that the spouse was not available or preferred not to be interviewed, a family member who lived in the household of the deceased at the time of death was questioned in place of the spouse. In some cases, when the family requested it, the family clan leader was interviewed instead, as this is customary in the Hmong culture.

The telephone interviews lasted approximately twenty to thirty minutes each. It was conducted completely in the Hmong language. In addition to the survey questions, notes on any family comments regarding any segment of the questionnaire were jotted down. This sometimes gave a better reflection on the family beliefs about the sudden nocturnal deaths.

Procedure for Data Analysis

Survey results were analyzed using the Columbia Research Center, Vancouver, Washington facilities which utilized a Hewlett-Packard HP3000 computer. Responses for all forty-seven questions of the survey were tabulated by frequency, percentage and adjusted percentage (disregarding any not applicable, don't know or missing responses) figures. In addition, selected cross tabulation studies were made.

Since the survey population was so small, only forty-five cases, it was difficult to decide what to consider a significant percentage of responses. The author arbitrarily decided that, if more than fifty percent of those responding to a question indicated the same response, this would be considered significant.

CHAPTER 4

Results

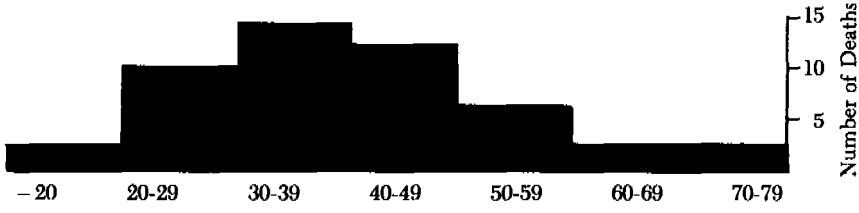
The survey sample was unfortunately somewhat small in size, being only forty-five cases. However, there were no other known families with sudden nocturnal death victims available for interview. The great majority of the sudden nocturnal death cases, thirty-eight cases, seem to have occurred in the United States. It cannot be determined at this time whether the Hmong in the United States have a higher death rate than Hmong in other countries, or whether there is better documentation, reporting and publicity in the United States as compared to the other countries.

Of the forty-five cases studied, only three were female, the other forty-two cases being male. Undoubtedly, Hmong males are much more at risk than Hmong females. Forty-one of the victims were married individuals, while only three were still single and one was widowed. This high percentage of married cases is to be expected as custom dictates that Hmong men and women marry early. Most who marry stay married, and even if a divorce or a case of becoming widowed occurs, most soon remarry. Usually, only the handicapped are not married by the age of twenty.

The age range of the victims fell between sixteen years of age to one case who was seventy-five years old. As seen in Figure 1, the number of deaths increased dramatically in the twenty to twenty-nine-year-old range and peaked in the thirty to thirty-nine-year-old range. Deaths remained high in the forty to forty-nine-year-old range, then declined through the fifty, sixty and seventy-year-old ranges. This corresponded to the Centers for Disease Control's (1981) findings.

Figure 1

Age Distribution



The majority of deaths occurred during the night hours as these deaths were associated with sleep. The highest number of deaths were found in the early morning hours, as is shown in Figure 2. This conforms both to what the Centers for Disease Control found and to the pattern found in the Filipino sudden nocturnal death studies in Hawaii. Although there were two deaths which occurred in the early evening, these deaths also occurred while the victims slept. It is not unusual for some Hmong individuals to sleep very early in the evening, as some still follow the pattern, as they used to when living in Laos, of going to sleep when the sun goes down.

From 1973 to 1979, from zero to three Hmong sudden nocturnal deaths were found per year. In 1980, the number of deaths almost quadrupled and remained high in number throughout 1981 and 1982, as shown in Figure 3. It is difficult to guess whether this sudden rise in numbers of deaths was due to better documentation and increased interest in the phenomenon of sudden nocturnal death, or whether it reflects a true rise in the death rate.

Figure 2

Time of Death Distribution

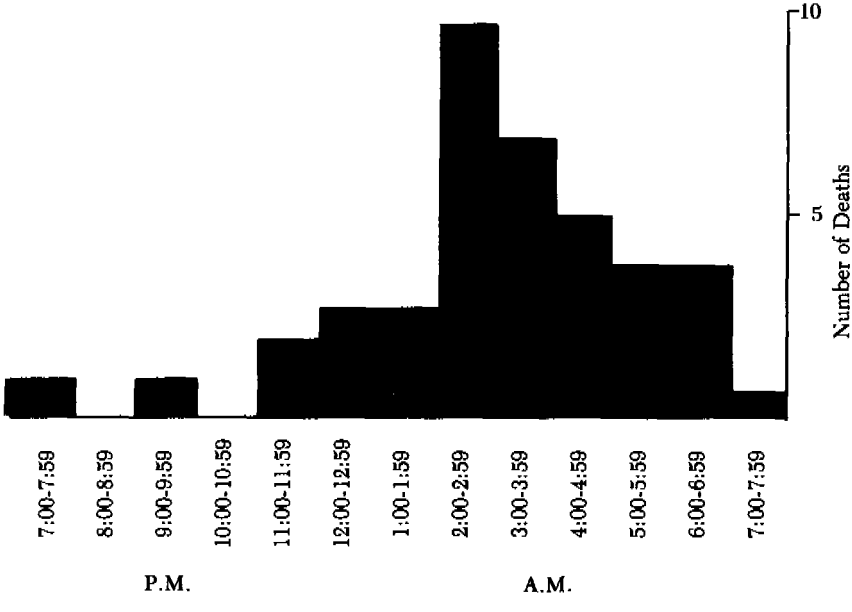


Figure 3

Number of Deaths per Year

Hypothesis One-Hmong Religious Beliefs

Table 1 shows that the study population of Hmong victims of the sudden nocturnal death syndrome were divided in their religious preference. Twenty-four, or fifty-three and a third percent, retained their traditional beliefs in Ancestor Worship. The other twenty-one persons were divided between Protestant, Catholic and Christian Missionary Alliance beliefs. However, of these same twenty-one persons, fifteen individuals had once been ancestor worshipers. Only six cases indicated no background of traditional religion although three of these cases had changed from one Christian

religion to another at some time. At least thirty-nine of the cases had some basis for fear of ancestor, nature spirits, evil spirits or ogres, and belief in the power of curses.

Table 1

Religious Preference of the Deceased

Religion at Time of Death	Prior Religion: Protestant	Catholic	Ancestor Worship	Not Applicable	Total
Protestant	1 8.3 100.0	2 16.7 100.0	7 58.3 46.7	2 16.7 7.4	12 100.0 26.7
Catholic	0 0.0 0.0	0 0.0 0.0	4 100.0 26.7	0 0.0 0.0	4 100.0 8.9
Ancestor Worship	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	24 100.0 88.9	24 100.0 53.3
Christian Missionary Alliance	0 0.0 0.0	0 0.0 0.0	4 80.0 26.7	1 20.0 3.7	5 100.0 11.1
Total	1 2.2 100.0	2 4.4 100.0	15 33.3 100.0	27 60.0 100.0	45 100.0 100.0

Table 2 shows the numbers and percentages of the persons interviewed who felt that the deaths in their families were caused by a religious or related problem. This included the categories of ancestor spirits, curses, loss of religion and nature spirits, as well as culture shock and depression. Culture shock was included in this group because the one family that indicated this response said that the deceased had been unable to assimilate into Western society because he was overly distressed about not being able to continue his tradi-

tional religious practices. Depression was also included as the four Hmong families who stated they felt this was the main cause of death for their relative, felt that the deceased's depressions were caused by the inability to perform religious ceremonies for their ancestors. Two cases even felt that the deceased's depressions were caused because their ancestors were unhappy and therefore caused mental and physical problems for the victims in an attempt to communicate their needs. Although the largest response of the survey sample was that they did not know what caused the sudden nocturnal deaths, among those who had an opinion on the major cause of death, fifty-six and three tenths percent indicated they felt the deaths were caused or related to the inability to keep up traditional religious practices.

Table 2

Opinion of Cause of Death

	Absolute Frequency		Relative Frequency		Adjusted Frequency	
Ancestor Spirits	3		6.7		13.0	
Culture Shock	1		2.2		4.3	
Curses	1		2.2		4.3	
Depression	4		8.9		17.4	
Loss of Religion	3		6.7		13.0	
Nature Spirits	1		2.2		4.3	
Sub-Total		13		28.9		56.3
Natural Causes	1		2.2		4.3	
Poison	1		2.2		4.3	
Chemical Warfare	5		11.1		21.7	
Other	3		6.7		13.0	
Don't Know	22		48.9		—	
Total	45		100.0		100.0	

Hypothesis Two—Utilization of Traditional Health Practices

Only ten of the forty-five families indicated that the deceased had had a history of some type of health problem. Table 3 shows where in the body the problem had been located and the length of time the victims had had the problem. When indicating the location of the ailment as either "head," "arms" or "legs," it usually meant the victim suffered from muscular aches. When the response was "chest," it usually meant a cough. When the response was "stomach," it usually indicated a problem of digestion. The survey utilized this method of identifying health problems, as this method was most easily understood by Hmong persons without formal education.

Table 3

History of Health Problems

Location of Ailment	Length of Time with Problem: 2-3 months	6-12 months	+12 months	Total
Head	0 0.0 0.0	1 100.0 50.0	0 0.0 0.0	1 100.0 10.0
Arms	0 0.0 0.0	1 100.0 50.0	0 0.0 0.0	1 100.0 10.0
Chest	1 33.3 50.0	0 0.0 0.0	2 66.7 33.3	3 100.0 30.0
Stomach	0 0.0 0.0	0 0.0 0.0	1 100.0 16.7	1 100.0 10.0
Legs	1 100.0 50.0	0 0.0 0.0	0 0.0 0.0	1 100.0 10.0
Other	0 0.0 0.0	0 0.0 0.0	3 100.0 50.0	3 100.0 30.0
Total	2 20.0 100.0	2 20.0 100.0	6 60.0 100.0	10 100.0 100.0

Of the ten cases with a history of health problems, seven had been under Western medical care as shown in Table 4. No one with a history of health problems admitted to undergoing any Hmong traditional healing practices.

Table 4

Utilization of Western Medical Care

History of Health Problem	Under Western Medical Care: Yes	No	Don't Know	Total
Yes	7 70.0 46.7	3 30.0 10.7	0 0.0 0.0	10 100.0 22.2
No	8 24.2 53.3	25 75.8 89.3	0 0.0 0.0	33 100.0 73.3
Don't Know	0 0.0 0.0	0 0.0 0.0	2 100.0 100.0	2 100.0 4.4
Total	15 33.3 100.0	28 62.2 100.0	2 4.4 100.0	45 100.0 100.0

In addition to the seven with a history of health problems, eight others, who presumably had short-term medical problems, also utilized Western medical facilities. This makes a total of fifteen cases, or one third of the study population, who utilized Western medical systems. Table 5 shows what type of health problems for which the fifteen cases were under Western medical care. Table 5 utilizes the same method of identifying a health problem as was used in Table 3.

All those interviewed denied knowledge of the victims of sudden nocturnal death utilizing any Hmong treatments or therapy for health problems, either for long-term or short-

term medical problems, as is shown in Table 6. Thirty-seven cases claimed the deceased had not been using Hmong herbs, been consuming special Hmong foods, were undergoing spiritual healing practices, or were receiving counseling from Hmong elders. Eight answered that they did not know if their deceased relative had utilized any of these practices.

Table 5

Health Problems Under Western Medical Care

	Absolute Frequency	Relative Frequency	Adjusted Frequency
Head	1	2.2	6.7
Neck	2	4.4	13.3
Arms	1	2.2	6.7
Chest	1	2.2	6.7
Stomach	2	4.4	13.3
Feet	1	2.2	6.7
Back	1	2.2	6.7
Eyes	1	2.2	6.7
Other	5	11.1	33.3
Not Applicable	30	66.7	—
Total	45	100.0	100.0

Table 6

Usage of Hmong Traditional Treatments

	Absolute Frequency	Relative Frequency	Adjusted Frequency
Yes	0	0	0
No	37	82.2	100.0
Don't Know	8	17.8	—
Total	45	100.0	100.0

Hypothesis 3—Hmong Subgroups, Clans and Lineages

Twenty-five of the deceased belonged to the Green Hmong subgroup, while twenty cases belonged to the White Hmong subgroup. Table 7 shows which of the twenty-three known Hmong clans had sudden nocturnal death cases. The Lee clan suffered the highest number of deaths, having eight sudden nocturnal death cases. The Thao and Vue clans had six deaths each, also relatively high numbers of deaths. The rest of the cases were scattered between ten other clans. Ten clans had no reported cases of sudden nocturnal death.

Table 7

Subgroup and Clan Distribution

Clan Deceased Belonged To	Green	White	Total
Cha	1 100.0 4.0	0 0.0 0.0	1 100.0 2.2
Cheng	0 0.0 0.0	1 100.0 5.0	1 100.0 2.2
Hang	1 100.0 4.0	0 0.0 0.0	1 100.0 2.2
Her	2 66.7 8.0	1 33.3 5.0	3 100.0 6.7
Kue	2 100.0 8.0	0 0.0 0.0	2 100.0 4.4
Lee	4 50.0 16.0	4 50.0 20.0	8 100.0 17.8
Lo	0 0.0 0.0	4 100.0 20.0	4 100.0 8.9

Clan Deceased Belonged To	Green	White	Total
Moua	3 100.0 12.0	0 0.0 0.0	3 100.0 6.7
Thao	4 66.7 16.0	2 33.3 10.0	6 100.0 13.3
Vang	3 75.0 12.0	1 25.0 5.0	4 100.0 8.9
Vue	1 16.7 4.0	5 83.3 25.0	6 100.0 13.3
Xiong	3 75.0 12.0	1 25.0 5.0	4 100.0 8.9
Yang	1 50.0 4.0	1 50.0 5.0	2 100.0 4.4
Total	25 55.6 100.0	20 44.4 100.0	45 100.0 100.0

Only eight of those interviewed stated that the deceased had had a relative who also died a sudden nocturnal death. Thirty-six cases claimed the deceased had had no relative who died in such a manner, and one did not know. Table 8 shows what the relationship to the deceased was. Five of the relationships were close family members, being father, mother, brother or son. Cousin is a term which reflects varying degrees of closeness in relationship. For the Hmong, it could mean a true cousin or a distant relation who happens to bear the same clan name. For the three cases citing "cousin" as a relative dying a sudden nocturnal death, the author learned that in each case, the cousin had been in the same clan and lineage as the other cases. These eight cases reflect seventeen and eight tenths percent of the study population.

Table 8

Relationship of Relative Dying Sudden Death with Deceased

	Absolute Frequency	Relative Frequency	Adjusted Frequency
Father	2	4.4	25.0
Mother	1	2.2	12.5
Brother	1	2.2	12.5
Son	1	2.2	12.5
Cousin	3	6.7	37.5
Not Applicable	36	80.0	—
Don't Know	1	2.2	—
Total	45	100.0	100.0

Hypothesis Four—Past Geographic Locations

The majority of Hmong families interviewed seemed not to have undergone widespread secondary migration while living in Laos. Those born in a province usually stayed and

lived there, only moving from village to village to escape war zones. Table 9 shows the provinces of Laos where each of the deceased was born. Quite a large majority, fifty-five and six tenths percent, were born and raised in the province of Xieng Khouang, a north-central province of Laos where much of the military action during the 1960s and 1970s took place.

Table 9

Birthplace of Deceased

	Absolute Frequency	Relative Frequency	Adjusted Frequency
Borikane	1	2.2	2.3
Luang Prabang	5	11.1	11.4
Nam Tha	2	4.4	4.5
Sayabory	8	17.8	18.2
Vientiane	3	6.7	6.8
Xieng Khouang	25	55.6	56.8
Don't Know	1	2.2	—
Total	45	100.0	100.0

The forty-one of the deceased who came to the United States, France or Canada, came through six different Thai refugee camps, as is shown in Table 10. The largest group, twenty-two cases, or forty-eight and nine tenths percent, came through Camp Vinay. Some of the families interviewed had lived in up to three of the refugee camps prior to being resettled in a third country. In the interviews the families stated that the most common departure place to third countries was Camp Vinay. Often, refugees in other camps would be relocated to Camp Vinay prior to admittance into a third country.

Upon arrival in the United States, only a few of the deceased and their families underwent secondary migration. Most of the victims died in the American city where they had first settled. Table 11 shows the number of Hmong sudden nocturnal deaths which occurred in each state. The

number of deaths documented from other countries are also included. The state of California had thirteen deaths, the highest number of sudden nocturnal deaths of any other state. The deaths were spread out between eight California cities. Six deaths occurred in Santa Ana, and one death each in Fresno, Huntington Beach, Long Beach, Sacramento, San Diego, and Westminister. Next, the states of Minnesota and Oregon each reported six deaths. The deaths in these states occurred in the cities of Minneapolis-St. Paul and Portland, respectively. The rest of the deaths were scattered throughout nine other states and four other countries.

Table 10

Thai Refugee Camp

	Absolute Frequency	Relative Frequency	Adjusted Frequency
Ban Tong	2	4.4	4.9
Nam Phong	2	4.4	4.9
Nam Yao	5	11.1	12.2
Nong Khai	4	8.9	9.8
Soptua	6	13.3	14.6
Vinay	22	48.9	53.7
Not Applicable	4	8.9	—
Total	45	100.0	100.0

Table 11

Place of Death

	Absolute Frequency	Relative Frequency	Adjusted Frequency
United States			
California	13	28.7	28.7
Hawaii	2	4.4	4.4
Illinois	1	2.2	2.2
Iowa	3	6.6	6.6
Michigan	1	2.2	2.2
Minnesota	6	13.3	13.3
Oklahoma	1	2.2	2.2
Oregon	6	13.3	13.3
Pennsylvania	1	2.2	2.2
Rhode Island	1	2.2	2.2
Washington	1	2.2	2.2
Wisconsin	2	4.4	4.4
Other Countries			
Canada	1	2.2	2.2
France	1	2.2	2.2
Laos	3	6.6	6.6
Thailand	2	4.4	4.4
Total	45	100.0	100.0

Hypothesis Five—Other Aspects of Hmong Culture

The majority of the deceased lived with very large families. This was to be expected, not only because custom dictates that couples have many children and that children should come as soon after marriage as possible, but because most Hmong persons live with their extended families. Most of the deceased had between three to six children. However, twelve cases had seven or more children. The three who did not have any children were the unmarried cases. Besides being responsible for spouse and children, most of the deceased had lived with, and were responsible for, extended family members such as elderly parents, uncles and aunts, or any nieces or nephews whose parents had died.

Table 12

Income Level of Families

Number of Dependents of Deceased	Total Family Income						
	– $300	$300- $499	$500- $799	$800- $999	– $1000	Don't Know	Total
None	1 50.0 25.0	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	1 50.0 9.1	2 100.0 4.4
1-2	0 0.0 0.0	1 33.3 20.0	2 66.7 14.3	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	3 100.0 6.7
3-4	1 10.0 25.0	2 20.0 40.0	2 20.0 14.3	1 10.0 16.7	0 0.0 0.0	4 40.0 36.4	10 100.0 22.2
5-6	1 7.7 25.0	0 0.0 0.0	3 23.1 21.4	4 30.8 66.7	3 23.1 60.0	2 15.4 18.2	13 100.0 28.9
7-8	0 0.0 0.0	1 14.3 20.0	4 57.1 28.6	0 0.0 0.0	1 14.3 20.0	1 14.3 9.1	7 100.0 15.5
9-10	0 0.0 0.0	1 16.7 20.0	2 33.3 14.3	1 16.7 16.7	0 0.0 0.0	2 33.3 18.2	6 100.0 13.3
11 or more	1 33.3 25.0	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	1 33.3 20.0	1 33.3 9.1	3 100.0 6.7
Don't Know	0 0.0 0.0	0 0.0 0.0	1 100.0 7.1	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	1 100.0 2.2
Total	4 8.9 100.0	5 11.1 100.0	14 31.1 100.0	6 13.3 100.0	5 11.1 100.0	11 24.4 100.0	45 100.0 100.0

With such large numbers of dependents, most of the deceased, who were heads of household, were unable to make a salary large enough to comfortably support their family. Most wives and elders in the Hmong families did not work. Many families lived on public assistance. Table 12 shows the number of dependents the deceased had in relation to the family income. The majority of families could be classified

as low income or in the lower socio-economic bracket. Eleven cases did not know the family income per month or did not wish to reveal the information. Of the thirty-three families that responded, the greatest number of families, fourteen of them, were in the five hundred to seven hundred ninety-nine dollar per month range. Many of the deceased had five to ten dependents, indicating they were responsible for the well-being of a large family with very limited incomes.

Table 13

Living Space of Families

Number of Rooms in Deceased's Housing

Number of Household Members	1-2	3-4	5-6	7 or More	Don't Know	Total
1-2	1 50.0 9.1	1 50.0 4.5	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	2 100.0 4.4
3-4	3 50.0 27.3	3 50.0 13.6	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	6 100.0 13.3
5-6	5 41.7 45.4	5 41.7 22.7	1 8.3 14.3	0 0.0 0.0	1 8.3 50.0	12 100.0 26.7
7-8	1 12.5 9.1	4 50.0 18.2	3 37.5 42.9	0 0.0 0.0	0 0.0 0.0	8 100.0 17.8
9-10	0 0.0 0.0	3 37.5 13.6	2 25.0 28.6	2 25.0 66.7	1 12.5 50.0	8 100.0 17.8
11 or more	0 0.0 0.0	6 75.0 27.3	1 12.5 14.3	1 12.5 33.3	0 0.0 0.0	8 100.0 17.8
Don't Know	1 100.0 9.1	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	0 0.0 0.0	1 100.0 2.2
Total	11 24.4 100.0	22 48.9 100.0	7 15.5 100.0	3 6.6 100.0	2 4.4 100.0	45 100.0 100.0

The majority of deceased were living in either an apartment or house, with a few who lived in a duplex or townhouse. However, the size of the majority of residences was very small for the number of people living in them. Table 13 shows the number of household members in relation to the number of rooms in their residences. Most seemed to have lived in very crowded conditions.

Many of the deceased had had very limited educational background. Unfortunately, this is true for most of the Hmong adult population at this time. Only those below the age of eighteen who relocated to a Western country have had the opportunity to easily seek higher education, or any education at all. Table 14 shows that over seventy-five percent of those who died had only sixth grade education or less. Thirty-five and six tenths percent had had no education whatsoever.

Table 14

Level of Education of Deceased

	Absolute Frequency	Relative Frequency	Adjusted Frequency
No Education	16	35.6	35.6
1-5th Grade	11	24.4	24.4
6th Grade	11	24.4	24.4
10th Grade	5	11.1	11.1
High School Diploma	1	2.2	2.2
1-3 Years College	1	2.2	2.2
Total	45	100.0	100.0

Eighteen out of the forty-five cases were former soldiers in Laos. This represents forty percent of the study population. The next largest group were farmers. Farmers represent thirty-one and one tenth percent of the study population or fourteen cases. The three female cases had been former homemakers. However, in Laos, this always meant that they assisted their spouses or menfolk on the farm. This

means that in actuality, there was a total of seventeen cases from a farming background. Only a smattering of the sudden nocturnal death cases had been professionals or otherwise employed, which is shown in Table 15.

Table 15

Former Employment in Laos

	Absolute Frequency	Relative Frequency	Adjusted Frequency
Agriculture	14	31.1	31.1
Homemaker	3	6.7	6.7
Professional	3	6.7	6.7
Soldier	18	40.0	40.0
Student	3	6.7	6.7
Other	4	8.9	8.9
Total	45	100.0	100.0

Of those that resettled in a Western country, a full sixty-five percent, or twenty-six cases, never became employed in their new country, as is shown in Table 16. The thirteen cases that were employed had widely differing types of jobs. One was a farmer, one was a caseworker, one was a cook, seven worked in various industries, and the others had miscellaneous other types of jobs.

Table 16

Employment in New Country

	Absolute Frequency	Relative Frequency	Adjusted Frequency
Full-time Employed	13	28.9	32.5
Part-time Employed	1	2.2	2.5
Never employed in new country	26	57.8	65.0
Not Applicable	5	11.1	—
Total	45	100.0	100.0

Table 17 shows that thirty cases or sixty-six and seven tenths percent of the sample population were thought never to have consumed alcoholic beverages. Five cases rarely drank and eight sometimes drank. Only one of the deceased was thought to have been a heavy drinker. This is in agreement with Hmong leaders' opinions that alcoholism is not a major problem of the Hmong race.

Table 17

Alcohol Usage

	Absolute Frequency	Relative Frequency	Adjusted Frequency
Never Used	30	66.7	68.2
Rarely Used	5	11.1	11.4
Sometimes Used	8	17.8	18.2
Heavy Usage	1	2.2	2.3
Don't Know	1	2.2	–
Total	45	100.0	100.0

Those that used addictive drugs were even fewer in number than those who consumed alcohol. Only three cases were thought to rarely use drugs and one to sometimes use drugs. Thirty-nine were thought never to have used addictive drugs. Most Hmong individuals had not been in Western countries long enough to be introduced to drugs such as heroin, cocaine and other addictive drugs. In Laos, a few Hmong sometimes used opium, which they produced themselves in their fields. There is a rumor that opium is being smuggled in from Thailand for Hmong consumption in the United States. However, even if this were true, Hmong elders and leaders of the community feel that only a very small percentage of the population is consuming it. The low rate of use of addictive drugs among the sudden nocturnal death cases is shown in Table 18.

Table 18

Use of Addictive Drugs

	Absolute Frequency	Relative Frequency	Adjusted Frequency
Never Used	39	86.7	90.7
Rarely Used	3	6.7	7.0
Sometimes Used	1	2.2	2.3
Don't Know	2	4.4	
Total	45	100.0	100.0

Cigarette usage was not common to the forty-five cases of sudden nocturnal death either. Thirty of the deceased were thought never to have used cigarettes, as shown in Table 19. Although six were thought to smoke heavily, and one was thought to be a chain smoker, seven cases constitute a relatively small percentage of the study population.

Table 19

Use of Cigarettes

	Absolute Frequency	Relative Frequency	Adjusted Frequency
Never Used	30	66.7	68.2
Rarely Used	1	2.2	2.3
Sometimes Used	6	13.3	13.6
Heavy Usage	6	13.3	13.6
Chain Smoker	1	2.2	2.3
Don't Know	1	2.2	—
Total	45	100.0	100.0

When asked if the deceased had consumed opium in Laos or Thailand, forty cases denied opium usage. Only three were thought to have formerly been addicted to opium, and one each was thought to rarely use it, or sometimes use it, as

is shown in Table 20. This is not surprising as Indochinese refugees were screened closely in refugee camps for possible addiction to opium prior to being allowed admittance into the United States.

Table 20

Use of Opium in Laos or Thailand

	Absolute Frequency	Relative Frequency	Adjusted Frequency
Never Used	40	88.9	88.9
Rarely Used	1	2.2	2.2
Sometimes Used	1	2.2	2.2
Addicted	3	6.7	6.7
Total	45	100.0	100.0

Table 21 shows that the victims of Hmong sudden nocturnal death had a variety of hobbies. Hunting and musical instruments seem to have been the most popular hobbies. However, eleven cases had no hobbies at all, and nine families did not know whether the deceased had had any hobbies.

Table 21

Hobby of Deceased

	Absolute Frequency	Relative Frequency	Adjusted Frequency
Hunting	6	13.3	16.7
Fishing	2	4.4	5.6
Music	7	15.6	19.4
Weaving	1	2.2	2.8
Sewing	1	2.2	2.8
Soccer-Outdoor Sports	3	6.7	8.3
Other	5	11.1	13.9
None	11	24.4	30.6
Don't Know	9	20.0	—
Total	45	100.0	100.0

It was surprising that only three out of the forty-five families said that the deceased ate food differently from their families. These three did not consume what was considered luxury items such as pork or beef organs as might be expected of traditional Hmong heads of household. Instead, two of them seemed to be on special diets for medical reasons. One consumed rice soup frequently, a dish known for its easy digestibility which many Hmong eat when they suffer from upset stomachs. Another ate only unsweetened foods, and the last one was fond of fried eggs.

Miscellaneous Theories

Poison in a Concentration Camp

Only one of the forty-five deceased had once been captured and put in a concentration camp during the war in Laos. This case was a woman who spent between six and twelve months during 1977 in "Ban Ma Tan," a concentration camp located in the province of Sayabory. Her family said that the deceased had said she saw "medicine" being mixed into the prisoners' food while she was interned.

Exposure to Chemical Warfare

Table 22 shows the response to the question of whether the deceased had ever been exposed to chemical warfare. Although only six families definitely knew their deceased relative had been exposed to chemical warfare, all who responded that they did not know if the deceased had been exposed to chemical warfare, also said that perhaps when escaping from Laos into Thailand, they and the deceased had

probably passed through areas that had been sprayed with chemicals. Only thirteen families felt the deceased had never been exposed to such chemicals.

Table 22

Exposure to Chemical Warfare

	Absolute Frequency	Relative Frequency	Adjusted Frequency
Yes	6	13.3	31.6
No	13	28.9	68.4
Don't Know	26	57.8	—
Total	45	100.0	100.0

For the six cases that were allegedly definitely exposed to chemical warfare, all exposures took place in the province of Xieng Khouang, Laos. This was the only known province in Laos to be allegedly subjected to repeated chemical warfare attacks.

Stress of Cultural Assimilation

Only five families felt that the deceased had exhibited unusual behavioral patterns before death. The types of behaviors exhibited are listed in Table 23. Only one case was thought to be depressed and another was talking of suicide.

Table 24 shows that seven families felt that the resettlement experience of their deceased relative had been "not very good" and four felt it had been "bad." Twenty-three felt the experience had been "all right" or better. Some of the deceased may have been under more stress than their families knew of, but the responses to the survey indicated that the majority of families interviewed felt that the deceased had not been suffering severely from a poor resettlement experience.

Table 23

Type of Behavior

	Absolute Frequency	Relative Frequency	Adjusted Frequency
Depression	1	2.2	20.0
Talk of Suicide	1	2.2	20.0
Disoriented	1	2.2	20.0
Nervous Habits	1	2.2	20.0
Sleep Problem	1	2.2	20.0
Not Applicable	40	88.9	—
Total	45	100.0	100.0

Table 24

Resettlement Experience

	Absolute Frequency	Relative Frequency	Adjusted Frequency
Wonderful	2	4.4	5.1
Good	8	17.0	20.5
All Right	13	28.9	33.3
Not Very Good	7	15.6	17.9
Bad	4	8.9	10.3
Not Applicable	5	11.1	12.8
Don't Know	6	13.3	
Total	45	100.0	100.0

Relationship to Filipino Sudden Nocturnal Death Studies

There were three theories put forth on possible causes for the Filipino sudden nocturnal deaths in Hawaii. The first was that the deaths were caused by terror originating from nightmares. The second was that the sudden nocturnal deaths were caused by a large meal followed by a nightmare. The third theory was that the deaths were caused by the consumption of certain fish or fish products which contained toxic matters.

Table 25 shows that of the twenty-eight sudden nocturnal deaths that were witnessed, in twenty-five of the cases, the families did not feel that the victim had been having a nightmare at the time of death. Only three families felt the deceased was having a vivid nightmare at the time of death.

Table 25

Appearance of Nightmare Prior to Death

	Absolute Frequency	Relative Frequency	Adjusted Frequency
Yes	3	6.7	10.7
No	25	55.6	89.3
Don't Know	17	37.8	—
Total	45	100.0	100.0

Thirty-eight of the deceased had eaten dinner as their last meal prior to death. Two had had lunch, four had had a snack, and one family did not know what the deceased's last meal had been. Table 26 shows that the majority of families felt that the size of the last meal was regular or light. Only one of the deceased had eaten heavily.

Table 26

Size of Last Meal

	Absolute Frequency	Relative Frequency	Adjusted Frequency
Heavy	1	2.2	2.4
Regular	37	82.2	88.1
Light	2	4.4	4.8
Very Light	2	4.4	4.8
Not Applicable	1	2.2	—
Don't Know	2	4.4	—
Total	45	100.0	100.0

Thirty-six of the families remembered the contents of the last dinner. No one had eaten fish or fish products the night of the death. Commonly consumed were chicken, pork, vegetables and rice. Table 27 shows the frequency the deceased consumed fish or fish products per week. Four cases never ate fish or fish products, and the majority of sudden nocturnal death victims only ate these items one or two times per week.

Table 27

Consumption of Fish or Fish Products

	Absolute Frequency	Relative Frequency	Adjusted Frequency
Never	4	8.9	13.8
1-2 times/week	22	48.9	75.9
3-4 times/week	3	6.7	10.3
Don't Know	16	35.6	—
Total	45	100.0	100.0

CHAPTER 5

Discussion of Results

Whoever was approached by the author was willing to be interviewed about the sudden nocturnal death in their family. The author feels he was able to talk to the families of nearly one hundred percent of the sudden nocturnal death cases which occurred prior to August 31, 1982. All the families who were interviewed gave the author the impression of willingness to share information and seemed to be very frank about how they felt in regards to the sudden nocturnal death. The author therefore feels the results he obtained accurately reflect the Hmong opinions and feelings about the Hmong Sudden Unexpected Nocturnal Death Syndrome.

Discussion of Hypotheses

First, evidence to support or disclaim the five major hypotheses of this investigation were sought. Then secondly, evidence to support or disclaim certain other investigators' theories were reviewed.

Hypothesis One—Hmong Religious Beliefs

It did not seem that religious preference was an indicator of sudden nocturnal death. Sudden nocturnal death struck both Christians and Ancestor Worshippers alike. Hmong leaders estimate that in the United States, about half of the population has converted to Christianity, while the other half remain ancestor worshippers. Of the thirty-eight sudden nocturnal death cases that died in the United States, exactly half, nineteen cases, were Christians and half were

Ancestor Worshippers. Thus, it seems that conversion to Christianity did not significantly increase the risk for sudden nocturnal death.

In Laos and Thailand, the percentage of those converting to Christianity is much smaller, so the fact that the five deaths occurring in these countries were all ancestor worshippers probably reflects the greater population of traditional worshippers rather than implying that being an ancestor worshipper increases the risk of sudden nocturnal death. Since there was only one death each from Canada and France, it was impossible to make any conclusions about these two cases. However, the author's theory that those who converted to Christianity suffered higher levels of stress and an increased risk of sudden nocturnal death was disproven.

The author speculates that this may be because both Christian and non-Christian Hmong were under similar stresses caused by the inability to resolve religious conflicts. Hmong Christians could have been under stress because many probably still retained some of their traditional beliefs about ancestors and spirits, even after conversion. Those converting to Christianity often experienced peer disapproval, the anger of other clan members, and were sometimes even ostracized. Another reason conversion to Christianity may have caused increased stress levels was that many families who converted did not truly understand the concepts of Christian religion. Some of the Hmong families who resettled in Western countries converted because their sponsors were church groups or religious voluntary agencies. Out of respect for their sponsors, or desire to obtain greater services and assistance, many of these families gave up their traditional religion to become Christian without truly taking any comfort from their new religion. Therefore, it seems that peer pressure and lack of understanding of Christianity may cause some Hmong Christians to have anxieties about not fulfilling their expected traditional religious duties, particularly towards their ancestors.

The non-Christian Hmong suffered from stress over not being able to perform traditional expected religious duties. The author discovered that of the nineteen Hmong families resettled in Western countries who continued in Ancestor Worship, every one of them expressed the view that they were not able to satisfactorily perform certain religious ceremonies. Reasons for this were that, besides being fearful of the police and breaking public health laws, many complained that since they were not allowed to raise or slaughter animals in their homes, it was difficult to find adequate livestock necessary for Hmong ceremonies. Some families said that due to the disruption of village and clan groups caused by relocation, they were unable to find a Hmong religious leader or other family members to help in the performance of correct ceremonies. Others cited that living in an apartment was not conducive to providing a central pillar for ancestor spirits to live in.

Of the nineteen non-Christian families in Western countries, eleven expressed the definite opinion that the sudden nocturnal deaths were caused by religious problems. This is over half of the non-Christian cases. In addition, many of the other families who said they did not know what the cause of death was, expressed in later conversations with the author that they felt the deceased had been concerned over the inability to perform traditional religious ceremonies, but that they were not sure this was the major cause of death. Many were reluctant to openly state their ideas about the subject at first, as they had no proof and were fearful that the American community would ridicule their beliefs.

Five of the sudden nocturnal death cases were from the countries of Laos and Thailand. This represents only a little more than one tenth of the study population. Many more sudden nocturnal deaths seemed to have occurred in Western countries, particularly in the United States where it is perhaps more difficult for Hmong families to keep up traditional religious practices. It may be that the lower numbers of sudden nocturnal deaths in Laos and Thailand only

means that these countries have not documented all their sudden nocturnal death cases, or that communication was not as good there. However, the Hmong grapevine is fairly reliable as a source of information, and there seems to be no other known cases of sudden nocturnal deaths in Laos or Thailand. All five of the sudden nocturnal death cases in Laos and Thailand were practicing ancestor worshippers. None of these five families felt that the inability to worship properly was the primary cause of death, probably because in these countries people can easily perform traditional religious ceremonies. However, one family felt that the death was caused by a curse, and another family felt the death was caused by an offended nature spirit. These two families felt the death of their relative was caused by a religious problem, but a problem not related to the inability to perform religious ceremonies.

In summary, a total of thirteen of the non-Christian families interviewed felt that the sudden nocturnal deaths were caused by religious problems—either the inability to perform traditional ceremonies in Western countries, or other types of religious problems in Laos and Thailand. The Christians were understandably reluctant to admit that they felt the sudden nocturnal deaths were related to traditional religious factors, but the author still feels that the Hmong Christian families experienced some stress over their change of religion for various aforementioned reasons.

The author did not prove that beliefs about ancestor spirits, nature spirits, evil spirits, ogres, curses, loss of soul, or the inability to perform traditional ceremonies actually caused sudden nocturnal death or was a contributing factor in the sudden nocturnal death cases. However, he found many indications that a fairly large group of Hmong, probably both Christians and non-Christians, have anxieties caused by not performing traditional religious practices. This probably contributed to raising the stress level in many of the sudden nocturnal death cases.

It seemed that those most susceptible to religious stresses are Hmong males who are heads of household. This is because in the Hmong society, it is the head of household who is responsible for religious activities. Women rarely lead or perform any religious rituals. Since it is the head of the household who is responsible for the well-being of the family's ancestor spirits, it is the men to whom spirits are thought to commonly cause illness. The majority of sudden nocturnal death cases happened to male heads of household. This supports the author's theory that the inability to perform traditional religious ceremonies or other religious problems, along with other day to day difficulties of adapting to a new life, can raise the stress level of many Hmong individuals and trigger mental health problems, health problems, and sudden nocturnal death.

Hypothesis Two—Utilization of Traditional Health Practices

Many of the sudden nocturnal death cases, twenty-seven of them, seemed to have been previously healthy individuals. However, there were eighteen who had had either a history of medical problems, or had had a short-term illness. Eighteen cases represents forty percent of the study population. The Centers for Disease Control had stated that most of their sudden nocturnal death victims had been previously healthy individuals. This study found indications that a sizable group had had some sort of illness prior to death. Ten of the cases had had a history of some sort of health problem while eight had had short-term illnesses prior to death.

Of the ten who had a history of a health problem, or long-term illness, seven had been under Western medical care and three had had no health care at all. None of this group were able to find Hmong traditional healing treatments. All eight of the short-term illnesses had recently been to a Western medical facility to treat the illness. None of these had

been able to find Hmong traditional healing treatments either. In fact, out of the forty-five cases, not a single one had been able to utilize Hmong traditional healing treatments.

The author feels that many Hmong either don't utilize Western medical facilities, as evidenced by the three cases with long-term medical problems who did not seek medical assistance, or underutilize Western medical facilities, probably because Western medicine is not able to provide for the Hmong population's health needs. It seems that much of the Hmong population is not getting adequate health care, either Western or Hmong. This in itself could cause deterioration of health. Although this does not prove that the inability to find traditional healing treatments triggers sudden nocturnal death, it strongly indicates that a sizable percentage of the Hmong community is unable to find the type of health care they desire. This probably adds a great deal of additional stress to their lives, which may cause mental health problems, health problems, and perhaps sudden nocturnal death.

Hypothesis Three—Hmong Subgroups, Clans and Lineages

First reviewed under this hypothesis was whether membership in either the Green Hmong subgroup or the White Hmong subgroup was a risk factor for sudden nocturnal death. The author first investigated what percentage of the Hmong population belonged to the Green Hmong and what percentage belonged to the White Hmong.

Hmong leaders estimate that the overall world population of the Green Hmong subgroup is slightly larger than the White Hmong subgroup. However, in the United States, an average of several Hmong leaders' population estimates indicates that the numbers of the Green Hmong subgroup make up only about forty percent of the Hmong refugee population. The rest, some sixty percent, are made up of

members of the White Hmong subgroup. Based on a figure of forty-six thousand five hundred Hmong in the United States, this translates to approximately eighteen thousand six hundred Green Hmong and twenty-seven thousand nine hundred White Hmong.

There were thirty-eight Hmong sudden nocturnal deaths documented in the United States. Twenty-one were from the Green Hmong subgroup and seventeen were from the White Hmong subgroup. This means that for the Green Hmong subgroup there were twenty-one deaths in a population of eighteen thousand six hundred; and for the White Hmong, there were seventeen deaths in a population of twenty-seven thousand nine hundred people. Since the numbers of deaths in the United States Green Hmong subgroup were higher and within a smaller population, it seems that membership in the Green Hmong subgroup is an increased risk for sudden nocturnal death. This indicates possible genetic origins for these deaths. However, since the population study is so small at this time and the population numbers of the Hmong in the United States only estimates, it is not yet possible to be sure of this theory. If more deaths occur, and a more accurate count of the population is made, a better evaluation could be done.

Next, the author investigated whether membership in certain Hmong clans was an increased risk for sudden nocturnal death. The thirteen clans with documented cases of sudden nocturnal death were the clans known to be larger in population than the other ten clans. The lack of deaths in these ten clans probably only reflect their smaller numbers rather than a decreased risk for sudden nocturnal death. There are no statistics on population numbers for each of the Hmong clans, either. However, Hmong leaders feel that the thirteen larger clans are fairly equal in numbers, with only minor variations. If this is true, then membership in the Lee, Thao and Vue clans may indicate a slightly higher risk of sudden nocturnal death, and that membership in the Cha, Cheng and Hang clans would seem to imply a lower risk from sudden nocturnal death.

The Lee, Thao and Vue clans had deaths in both the Green and White subgroups. However, some clans had deaths only in one subgroup, such as the four Lo clan deaths being all White Hmong and the three Moua clan deaths being all Green Hmong. This indicates the possibility that membership in certain clans and subgroups could mean an increased risk for sudden nocturnal death, which again indicates that the cause for sudden nocturnal deaths could be genetic in origin.

The last section of this hypothesis was the theory that sudden nocturnal death rates might be higher in certain lineages. In support of this theory, some eight of the sudden nocturnal death cases had had a relative in the same lineage who also died a sudden nocturnal death. Although this is a somewhat small percentage of the study population, there are some interesting features in this group of eight cases. Five of the deceased had had a close family member who also died. Two of these cases were a father and son of the Moua clan. Of the three who said a cousin had also died, all three were cousins to each other, all were members of the Lee clan, were all Green Hmong, and all shared the same lineage. This last group of cases is certainly enough to suggest that membership in some lineages could possibly be a risk factor for sudden nocturnal death.

All this evidence, while not proving that sudden nocturnal deaths are caused by a genetic problem, certainly supports the possibility of this theory. Should additional deaths occur, it will be more possible to prove or disclaim this theory.

Hypothesis Four—Past Geographic Locations

The first area of investigation of this hypothesis was to see if geographic origin was a contributing factor to Hmong sudden nocturnal deaths. Upon review of the deceased's birthplaces, it was found that more than half of the study

population had been born in the province of Xieng Khouang, Laos. This northeastern province of Laos, which shares a borderline with North Vietnam, underwent large scale military action during the 1960s and 1970s. It was in this province that many report witnessing repeated attacks of chemical warfare.

First the author investigated what the United States Hmong refugee population numbers were from each province of Laos. If over half of the Hmong population in the United States was born in Xieng Khouang, then the high number of deaths from this province would only reflect their greater population numbers.

It was impossible to obtain definite statistics on the birthplaces of the Hmong in the United States. The author consulted a Hmong community leader, Hang Sao, former colonel in the Royal Lao Army and in charge of security, who was one of the few known persons to have kept records on the number of Hmong living in each province of Laos and also estimates on the number of Hmong refugees from each Laotian province who eventually emigrated to the United States (Hang, 1982). Table 28 shows his estimates of the Hmong population in Laos by province or area.

Table 28

Hmong Population in Laos

Province	Population
Luang Prabang	50,000
Phongsaly	70,000
Sam Neua	120,000
Sayabory and Luang Nam Tha	60,000
Vientiane, Khamouane and Borikane	70,000
Xieng Khouang	130,000
Total	500,000

Table 29 shows Hang Sao's estimates of the percentages of refugees from different Laotian provinces presently living in the United States. Based on a total population of forty-six thousand five hundred Hmong, it was possible to estimate the numbers of refugees from different Laotian provinces. These numbers as well as the numbers of Hmong sudden nocturnal death cases coming from each province were included in Table 29 for easy reference. The sudden nocturnal death cases from other countries were deleted in this calculation.

Table 29

Hmong Population in the United States From Laotian Provinces

Birthplace	Estimated % of Hmong Population in U.S.	Estimated Numbers of Hmong Population in U.S.	Number of Deceased	
Luang Prabang	15	6,975	4	
Luang Nam Tha and Sayabory	15	6,975	2 5	7
Borikane and Vientiane	15	6,975	1 3	4
Xieng Khouang	30	13,950	22	
Sam Neua	20	9,300	0	
Total	100%	46,500	38	

The ratio of the number of deceased from Xieng Khouang to the population of Xieng Khouang Hmong refugees in the United States was considerably larger than the ratios of refugees from other provinces of Laos. This indicates that being born in Xieng Khouang was indeed an increased risk factor for sudden nocturnal death. Whether the reason for this was because of the genetic pool of the Hmong in Xieng

Khouang, cultural aspects of this group of people, or due to being exposed to something in their environment such as war and chemical warfare, is open for debate at this time. Certainly, further research into these possibilities is needed.

When considering common refugee camp experience as a possible factor contributing to sudden nocturnal death, the author noted that a large group of Hmong came through Camp Vinay. However, although many refugees complained about very poor sanitary conditions, the unavailability of medical care, the lack of and poor quality of food and clothing, and some even suspected that their food was poisoned, at least three sudden nocturnal deaths occurred to individuals who had never been in a refugee camp. It therefore seemed unlikely that the Thai refugee camp experience significantly affected the Hmong sudden nocturnal death rate.

It did not seem that common United States geographical locations was a contributing factor in the Hmong sudden nocturnal death cases either. One reason is that the number of deaths in each state somewhat reflects the varying Hmong population sizes of each respective state. In other words, states with larger Hmong populations had higher numbers of sudden nocturnal death. The number of sudden nocturnal deaths for the size of Hmong population in France, Thailand and Laos is disproportionately small in comparison to the United States. This could possibly indicate that life in the United States as a whole is an added risk factor contributing to Hmong sudden nocturnal death. Perhaps the Hmong find life in the United States more stressful than in those countries. The author continues to consider the possibility that not all the sudden nocturnal death cases in these countries were reported. Continued surveillance is needed to check on this. The one death in Canada reflects the small Hmong population of that country.

Hypothesis Five—Other Aspects of Hmong Culture

The majority of the Hmong sudden nocturnal death cases lived in very crowded conditions on a limited income. However, they seem to have been living in similar conditions as other minority groups in the lower socio-economic bracket. Therefore, perhaps their housing, the number of people they lived with and their income levels were not major factors contributing to the Hmong Sudden Unexpected Nocturnal Death Syndrome.

Nevertheless, Hmong family life and social roles are somewhat different from other minority groups in the same socio-economic bracket. Family ties remain very strong. Many heads of household continue to strive to maintain complete authority and responsibility for each of their household members. However, there is some minor role changing caused by Western influence which can cause increased stress levels for many Hmong adults, particularly heads of household. After coming to Western countries, the Hmong head of household has had to get used to being dependent on children for translation services and often on Welfare checks to support his family. It seemed very likely to the author that this loss of dignity and authority over his family, along with other stresses, caused mental health and health problems for many individuals, and could even have eventually triggered sudden nocturnal death. Certainly it seems that being a Hmong head of household involves a great deal of stress which could increase the risk for sudden nocturnal death.

Former education level did not seem to be a contributing factor to the sudden nocturnal death syndrome. Although the majority of deceased had very limited educational background, this is true for most of the Hmong race at the present time.

Former job occupation also did not seem to be a common factor in the sudden nocturnal death cases. Most who died

were former soldiers or farmers. Again, most Hmong refugee adults in Western countries also have this same background.

Job occupations in the West could not have been a common factor for Hmong sudden nocturnal deaths because so many of the cases had never been employed in their new country. In addition, those who had become employed had jobs differing in place and type from each other.

Consumption of alcoholic beverages cannot have been a common feature of the sudden nocturnal death cases as so few of the deceased had consumed alcohol regularly. Alcoholic beverages are traditionally consumed only at weddings, during the new year's celebrations and other very special occasions.

Most of the study population was thought not to have been using addictive drugs, nor to have been former opium users. This is probably true as most of the Hmong sudden nocturnal death cases would not have known how to procure illegal drugs from local drug distributors because the majority did not speak enough English to solicit drugs on the streets. Hmong leaders know of no Hmong drug dealer, so Western addictive drugs were probably not readily available to the sudden nocturnal death victims. There continues to be some allegations that relatives in Thailand are sending opium to families in the United States for home consumption and for resale. Even if this were true, most of the families felt the deceased had not recently used opium and had had no prior history of using opium. This is also probably true as Hmong and other refugees were screened carefully in the Thai refugee camps for opium addiction prior to entry into the United States. Anyone found with a trace of opium in his or her urine was denied entry. All this indicates that it is unlikely that addictive drugs or opium usage contributed to the sudden nocturnal death syndrome.

Most of the study population were thought not to have been cigarette smokers. The deceased did not seem to have any hobbies in common. Most of the deceased did not eat

foods separately from their families. Therefore it is probable that none of these factors were a significant contributing factor to the Hmong sudden nocturnal death rates either.

Miscellaneous Theories

After investigating this studies' five hypotheses, the author considered the possibility of other investigators' theories being feasible. This includes some theories on Hmong sudden nocturnal deaths and some on the Filipino sudden nocturnal deaths.

Poison in a Concentration Camp. Hmong leaders report many stories from those who had been interned in a concentration camp, many of whom claimed to have witnessed poison being mixed in their food. This story has been confirmed by many different former prisoners. However, since only one of the deceased had formerly been imprisoned, this could not be a common factor in the Hmong sudden nocturnal death syndrome.

Exposure to Chemical Warfare. The possibility that exposure to chemical warfare was a contributing factor to the sudden nocturnal death syndrome cannot be ruled out. Although only six cases were thought to have been definitely exposed to chemicals, all six exposures happened in the Xieng Khouang province of Laos, the only known Laotian province to have experienced repeated chemical warfare attacks. More than half of the sudden nocturnal death victims were former residents of Xieng Khouang. In addition, the group of Hmong coming from Xieng Khouang had a death rate from sudden nocturnal death that was higher than Hmong groups from other Laotian provinces. It is possible that exposures to low levels of chemical residues in and around the Xieng Khouang area could have predisposed some individuals to sudden nocturnal death at a later time.

Men were more likely to have been exposed to the chemicals as many were soldiers who spent a lot of time in the open. Also, in the Hmong society, the male farmer was the one who was expected to scout for new fields and prepare the new fields for cultivation. Thus, they were more likely to have been exposed to any chemical residuals. Women spent more time in vegetable gardens which were closer to the villages. Most of the sudden nocturnal death cases were former male soldiers or farmers, the two groups most likely to have been exposed to chemicals.

Another factor to consider is that the number of Hmong sudden nocturnal deaths soared upwards and stayed high from 1980 on. This abrupt rise in the number of deaths (see Figure 3) corresponds to Hmong military leaders' opinions that although chemical warfare began in Laos as early as the 1950s, large scale chemical gassing started in 1979.

Arguments against the possibility that exposure to chemical warfare was a contributing factor to sudden nocturnal deaths are: 1) that the Filipinos were not exposed to chemical warfare, and 2) that some of the Hmong who died sudden nocturnal deaths, died prior to the advent of known chemical attacks in Laos. However, much of the military action in World War II took place in the Philippines, and exposure to some sort of chemical or biological warfare could have taken place during those years. Alternately, it must be considered that the Filipino sudden nocturnal death syndrome and the Hmong sudden nocturnal deaths syndrome may not be exactly the same. Many of the Filipino deaths were associated with an inflammation of the pancreas (Death Mystery in Hawaii, 1948), something not found in the Hmong sudden nocturnal death cases.

Another thing to consider is that some early Hmong sudden nocturnal deaths seem to have been confused with diphtheria. This disease is marked by the formation of a false membrane in the throat by a bacterium which produces a toxin causing inflammation of the heart and nervous system. Some who died of diphtheria gave the surface appearance of having the same symptoms of sudden nocturnal

death, especially as the victims also made the same type of groaning or gurgling sounds at the time of death. So perhaps the early Hmong sudden nocturnal deaths were not really sudden nocturnal deaths.

Considering all these possibilities, it seems that we cannot rule out that exposure to chemical warfare weakened some individuals and predisposed them to sudden nocturnal death at a later time. Rather than avoiding the issue, further research into this possibility must be encouraged.

Stress of Cultural Assimilation. The majority of the families interviewed felt that the deceased had not exhibited any obvious signs of mental health problems. Only five of the families indicated that the deceased had had a change in behavior prior to death; and of these five, only two were felt to have been very depressed or talking of suicide. Despite this, the author still feels that many of the deceased were under stress from a large variety of reasons. Some had anxieties over not being able to reconcile religious differences, or not being able to find the type of medical assistance they felt they needed. Others were distressed over their changed roles of being dependent on Welfare and children, rather than being a breadwinner and family head of household. Another reason for stress is that some heads of household felt unable to cope in their new society, much less continue to make decisions for all their many dependants. Perhaps the sudden nocturnal death cases did not exhibit clinical signs of mental health problems, nevertheless, the stress level must have been high in most of these cases.

Most of the families felt that the deceased had had an "all right" resettlement. Unfortunately, there is no direct translation for the word "resettlement" in the Hmong language. Most Hmong who answered this question meant that the deceased had had an "all right" experience from the time they left Thailand until they were either able to get public assistance or the head of the household found a job. They did not mean the deceased had had an "all right" life after living in their new environment after the first couple of

months. In talking with the families of the deceased, many told the author that the deceased had not adjusted well to life in a third country. Many were very homesick, missed relatives, mourned for lost ones, or were just unable to accept their new roles and lifestyle. Therefore, despite the responses to the questionnaire, the author still feels that the stress of cultural assimilation very possibly affected many of the sudden nocturnal death victim's lives and may even have triggered the sudden nocturnal deaths. This is a difficult theory to prove, but it must nevertheless be considered a possibility.

Relationship to Filipino Sudden Nocturnal Death Studies. The pattern of Hmong sudden nocturnal deaths did not support any of the three theories proposed for the Filipino sudden nocturnal death syndrome. Only three of the Hmong families suspected the deceased of having a nightmare at the time of death. This is far too small a number to support the first Filipino sudden nocturnal death theory that nightmares triggered these deaths. All except one of the Hmong families did not feel the deceased had eaten an unusually heavy meal prior to sleeping the night of the death. This contradicts the second theory that the Filipino sudden nocturnal deaths were caused by a heavy meal followed by a nightmare. Lastly, none of the Hmong had eaten fish or fish products at the last meal before death, and many did not eat fish or fish products frequently. In fact, four of the Hmong cases never ate fish or fish products. Therefore sudden nocturnal death caused by toxins found in fish or fish products is not likely. The Filipino sudden nocturnal death theories had already been considered unsubstantiated, so alternate theories for both syndromes should be considered.

Conclusions

The results of this research established that some of the theories for the cause of the Hmong sudden nocturnal death syndrome were not probable. This study found that housing, income, number of household members, prior job occupations, recent job occupations, refugee camp experience, geographic location in the United States, former education level, the consumption levels of alcohol, addictive drugs, opium or cigarettes, consumption of special foods, and hobbies were not common factors to those Hmong who died a sudden nocturnal death. Internment in a concentration camp was also not a common experience. In addition, this study reinforced other investigators' opinions that the theories put forth regarding the Filipino sudden nocturnal death syndrome were unsubstantiated.

Several hypotheses remain possible, although none were definitely proved. The first is that the cause of the Hmong sudden nocturnal death syndrome is related to a problem of genetics. This dovetails with what medical investigations are supporting; that the deaths are related to an electrical cardiac conduction failure, probably caused by a congenital defect (Centers for Disease Control, 1981). It would seem that certain populations have a small percentage of individuals who are susceptible to sudden nocturnal deaths. Some populations, such as the Hmong, may have a higher percentage of the population being at risk. However, what needs to be considered is what causes these individuals at risk to die at a certain time. Many of the sudden nocturnal death victims had lived throughout the war, survived a refugee camp experience and a traumatic move to a new country, only to die suddenly at a later date. The factor which triggers these sudden nocturnal deaths has not yet been firmly established.

This study proposes that there are two possible triggering mechanisms for the sudden nocturnal deaths, although the author does not mean this to imply these are the only two possible causes. Other investigators may suggest other valid

possibilities also. The first triggering mechanism for sudden nocturnal death this study proposes to be possible is that the stress to certain individuals caused by the inability to continue traditional religious practices in Western countries or other religious difficulties; or stress caused by other reasons such as the inability to find traditional healing practices or the difficulty in adapting to a new lifestyle, can cause a variety of health problems, including eventual sudden nocturnal death. The second possible triggering mechanism this study proposes to be possible is that exposure to chemical warfare weakened some individuals and predisposed them to sudden nocturnal death at a later date.

Recommendations

The first recommendation of the author is that the Western medical communities should encourage more research into possible psychological causes of sudden nocturnal death and also into the possibility that exposure to chemical warfare could predispose some individuals to later sudden nocturnal death. Few investigators have been willing to tackle these controversial subjects, but it is hoped that this research will encourage others to attempt this difficult task. Research into these theories is still very much needed.

The second recommendation of the author is that Western health practitioners acknowledge the possibility of benefits from alternate health delivery systems. Although some Hmong are utilizing Western health services to a limited extent, some of the Hmong who are ill continue to show reluctance in accepting Western medicine. There seems to be an excessive fear of surgery, which keeps some individuals from visiting a doctor's office. It is recommended that Western medical practitioners be sensitive to this and other fears and that they facilitate and encourage Hmong families to seek traditional healing arts and pursue their traditional religion in conjunction with Western medicine. Whether this pro-

vides actual medical benefit for the patient or not, is immaterial. It is sure to provide psychological benefits and create an atmosphere in which the patient is more likely to feel reassured and confident of returning to good health.

The third recommendation of this study is that Western medical facilities employ and utilize bicultural and bilingual workers at all levels, from menial to professional. There is a tendency for health agencies to hire interpreters at the paraprofessional level only, excluding bilingual/bicultural persons from policy and decision making functions. More bilingual/bicultural professionals should be integrated into the Western health services delivery system, which hopefully will benefit both the minority ethnic groups as well as the Western medical profession as more culturally appropriate health programs may be developed.

The author's fourth recommendation is for the Hmong communities in Western countries. He urges that they assert their rights to continue in their traditional religious and health practices. They should lobby for exemptions to allow them to sacrifice animals in their homes. Each community should be encouraged to compile a referral list of Hmong healing practitioners and religious leaders so that newly arrived Hmong families can more easily seek the assistance they need. Hmong leaders should inform their communities that surgery is not the only method of treatment from Western medical systems, and that recommended surgery can be refused. They should also inform their communities that medical treatments from Western practitioners can be beneficial for a large variety of illnesses and that Hmong families can utilize both traditional and Western health delivery systems at the same time without offending anyone.

If these recommendations are put into practice, it is probable that a greater percentage of Hmong persons will utilize both Western and Hmong health delivery systems. Hopefully, this will promote better general health and mental health status in the Hmong population and perhaps even a reduction in sudden nocturnal death rates. Although this reduction is not guaranteed, higher utilization of Western and

Hmong health delivery systems will certainly lower the level of anxiety and stress for Hmong people as well as raise the quality of their lives.

In closing, it is the hope of the author that this study will promote the understanding of the benefits of accepting alternate health delivery systems. It is the aim of this study to encourage the provision of cross-cultural medical services for the Hmong, Indochinese, and all other minority groups.

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