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An Examination of Risk and Violence Indicators among a Subset of Elder Deaths in Fulton County, GA

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**An Examination of Risk and Violence Indicators among a
Subset of Elder Deaths in Fulton County, GA**

By
Ahmed Witwit

GEORGIA STATE UNIVERSITY

A Thesis Submitted to the Graduate Faculty
of Georgia State University in Partial Fulfillment
of the
Requirements for the Degree

MASTER OF PUBLIC HEALTH

ATLANTA, GEORGIA
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APPROVAL PAGE

TITLE

**An Examination of Risk and Violence Indicators among a Subset
of Elder Deaths in Fulton County, GA**

By Ahmed Witwit

Approved:

Committee Chair

Sheryl Strasser Ph.D.

Committee Member

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ABSTRACT

INTRODUCTION: Elder Abuse, Neglect and Exploitation (ANE) is considered as one of the hidden problems in public health. Recent studies report a prevalence of rate of 7.6-10% among individuals 65 and older; however, further research indicates only 1 in 14 cases come to the attention of the authorities. As the US population demographic continues to age (expected to reach 20% of the general population by the year 2030), there is an urgent need to understand ANE through research so that effective prevention measures can be developed, so that older adults can live with dignity and avoid needless suffering at the end of life. The purpose of this study is to examine the saliency of ANE internal and external risk factors in a subset of elder deaths collected from the Fulton County, GA Medical Examiner database of death records.

METHODS: A retrospective cohort design was used to examine death records of 101 cases from individuals recorded to be 65 and older at death from Fulton County for the period from April to May in 2014. Associations of risk factors identified in previous ANE research were examined among the cases having markers/notations of possible violence. Bivariate analysis was performed using Chi-square, and Fisher's exact and logistic regression were run to determine significant associations.

RESULTS: The original dataset included 101 cases for the two-month period selected for this study. Of the 101 cases, 55 cases were included in the analysis after removing cases with missing observations. Out of the 55 eligible cases, 16 (29%) were identified as suspicious of ANE. A chi-square test was run for 7 risk factors that were suggested by the literature (higher age groups, African American, female gender, dementia and chronically ill, living alone or with family, and having an informal caregiver), only 1 risk factors maintained a statistical significance (living situation), after adjusting for living alone as reference group, logistic regression showed that living with family members maintained a statistical significance association (OR= 0.12, P=0.017).

DISCUSSION: While this study utilized a small sample of cases, the results indicate that it is worthwhile to conduct a larger study in the future. The results of this study are important, as the detection of risk factors that may exist during older adults' lives-may reveal important potential windows of opportunity for early intervention and prevention of escalating ANE.

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Chapter I

INTRODUCTION

1.1 Aging of US Population

The global demography is going through an unprecedented change represented by a sharp increase in aging population; this change is currently taking place -with variation- throughout the world, with the exception of 18 countries. For most of human history, the percentage of the elderly population in a given country has not exceeded 3-4% of the total population. Today it comprises an estimate of 15% in the developed world, and that trend is rising (Chand & Tung, 2014; Economic, 2005).

The shift in reproductive cultural traits, represented by declining births combined with increasing life expectancy and the aging of baby boomers, lead to gradual increase of the percentage of the elderly population (persons age above 65) in the general population. This demographic shift will have remarkable implications on economic development, healthcare needs, job market and quality of life (Chand & Tung, 2014).

In the United States, the elder population comprised 12.9% (39.6 million) of the population in 2009. In 2013 it increased to 14.1 % (44.7 million), and by 2030 the percentage estimated to reach 19% of the population (72.1 million) (AOA, 2014).

Alongside this demographic shift, there are other social changes that are reshaping the family structures, resulting in eroding patterns of interdependence between the generations of a family. The social network that had provided support for the elderly has been weakened, sometimes destroyed (Etienne G. Krug, 2002).

1.2 Elder Abuse, Neglect and Exploitation (ANE)

Abuse Neglect and Exploitation of elders, or ANE, can be defined as intentional actions by a caregiver or a family member that cause potential harm to a vulnerable elder; this includes overlooking basic needs (NCEA, 2015). Along with child maltreatment and intimate partner abuse, ANE is considered a type of violence against a vulnerable population. ANE was first described in the 1970s and started to gain more attention in the following two decades with an abundance of descriptive and empirical studies which investigated the nature, risk factors and prevention of the issue; this resulted in a call for more inter-disciplinary interventions to address ANE. To this day, ANE is considered to be a hidden problem since it occurs in the privacy of people's homes. Information on the prevalence of ANE showed that the rate is 4-6 % among older people while the most recent study in 2011 reported incidence of 7.6-10% and suggesting that only 1 in 14 cases comes to the attention of the authorities (Choi & Mayer, 2000; Etienne G. Krug, 2002).

1.3 ANE as a Public Health Problem

ANE was identified as complex issue with multifactorial causes; it has a heavy weight on the health of victims, and poses a burden on the healthcare system and the wellbeing of the society. Public health experts tackled the issue using a scientific approach and interdisciplinary research. Moving away from the premise that ANE is a

pure medical problem, it has now been determined that collective action by diverse sections, as well as the development of robust knowledge from medicine, sociology, psychology and forensic medicine, criminology and epidemiology to push toward a collective action is a must. Violence and elder abuse has shown to be preventable and predictable, although some factors and social themes have been found to be strongly predictive of violence against the elderly, although finding causative factors has been difficult to establish (Etienne G. Krug, 2002).

1.4 Purpose of the Study

The literature suggested several risk factors for ANE which have been classified as internal (related to the demography and health status of the elderly) and external (related to living situation and dependency of the elderly). The aim of this thesis study is to examine these risk factors in a subset of 101 cases of elder death that was collected from Fulton County Medical Examiner database of older adult autopsies.

1.5 Research Questions

Q1. Are risk factors suggested by the literature consistent with suspicious cases in the dataset in Fulton County Medical Examiner database?

Q2. Are external risk factors suggested by the literature consistent with suspicious cases in the dataset in Fulton County Medical Examiner Database?

Chapter II

REVIEW OF THE LITERATURE

2.1 Violence and Public Health

Since the early development of the field of public health, the main focus of the profession was to deal with major infectious epidemics. However, after the advent of antibiotics, immunization campaigns, and the improvement of hygienic methods in the mid-1900s, the focus gradually shifted toward chronic conditions. Violence was described as a chronic condition, since it is episodic and recurrent, rather than an isolated event. Beginning in the 1980s, public health experts started to address violence as a public health issue (Etienne G. Krug, 2002; M. S. Lachs & Pillemer, 1995). WHO defined violence as the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community that either results in or has a high likelihood of resulting in injury, death, psychological harm, mal-development or deprivation (Etienne G. Krug, 2002).

2.2 Violence against Vulnerable Population

The term vulnerable population refers to those with impaired capability of providing for themselves, protecting themselves, or making consensual decisions. Several

population groups fall under definition including children, women and older adults. The vulnerabilities of these groups make them predisposed to be abused by the power of their guardians, intimate partners or caregivers. Several models have been suggested to explain the mechanism that makes this type of violence underreported and prevalent among frail, dependent individuals with a physical or mental impairment. Although the incidence of this type of violence may appear small, the implications cause a societal concern (Choi & Mayer, 2000).

2.3 Elder Abuse, Neglect and Exploitation (ANE)

ANE can be defined as the intentional actions that cause harm or create a serious risk of harm (whether or not harm is intended) to a vulnerable elder by a caregiver or other person who stands in a trust relationship to the elder. This includes failure by a caregiver to satisfy the elder's basic needs or to protect the elder from harm (Bonnie & Wallace, 2003).

The definition of the term "elderly" varies among different societies and cultures but they almost agree on one core concept regarding aging, WHO described it as the age at which the individual can no longer carry out their family or work role. Thus it is considered to be 65 in the US (Etienne G. Krug, 2002).

The issue of elder abuse was first introduced to the literature in the 1970s, in its earliest description was referred to as "granny battering" or "battered older person syndrome" (Burston, 1975; Butler, 1975; Choi & Mayer, 2000). In the following two decades, an abundance of studies had described and investigated the problem and identified possible risk factors. Currently in the United States, all 50 states have laws that address ANE, and 44 states have some form of mandatory reporting. Although in recent

years Adult Protection Services agencies showed an increase in the report of ANE, recent studies still find that progress in detection, prevention and policy making to tackle the issue is still staggering (Choi & Mayer, 2000; NCEA, 2015).

In a nationally representative study conducted in 2010, a sample of 5777 persons aged 60 and older participated in a telephone survey to answer questions about a variety of mistreatment experiences. The results of this study indicate that 11.4% of respondents indicated that they had experienced at least one type of ANE (potential neglect or physical, emotional, sexual abuse) in the last year (Acierno et al., 2010). In another study, 4,100 subjects interviewed and 325 service organizations responded to a survey examining prevalence and incidence of ANE among elders in the state of New York. The authors found a prevalence rate of 141 per 1,000 and incidence rate of 76 per 1,000 incidence rate was nearly 24 times greater than the number of cases referred to the authorities (Aging, 2011).

ANE has also been estimated to cause heavy economic spending and loss, either in the processes of investigation or the actual loss caused by financial exploitation. Bond and Butler estimated that ANE costs tens of billions dollars annually in the United States in healthcare, social services and legal proceedings, and financial exploitation alone amounts to \$2.6 billion per year. Financial exploitation is more often perpetrated by family members and caregivers. That may potentially be higher in times of economic recession (Bond & Butler, 2013)

In two prospective cohort studies, ANE was found to increase the risk of mortality among the elderly with higher levels of depressive symptoms and lower levels of social network and social engagement (Dong et al., 2011). Another prospective study examined

risk of disability and survival analysis of 12000 women aged 70-75 with a history of abuse in Australia. Over the course of 12 years, it was found that women who reported specific components of vulnerability to ANE, such as chronic conditions and mental health, were associated with early death and disability in later years (Schofield, Powers, & Loxton, 2013).

2.4 ANE is a Hidden Problem

ANE is still an underestimated issue; one study found that only 7% of cases is reported to the authorities (NCEA, 2015), while the aforementioned study in the state of New York (Aging, 2011) found that for every case known to the local authorities, 24 are unknown. The following are several factors suggested to play a role in making ANE a hidden problem (Choi & Mayer, 2000; Wallace & Bonnie, 2003):

1. ANE occurs in the privacy of the elder's home by a supposedly trusted figure. Both the elder and the caregiver will avoid reporting to maintain any personal or financial benefits that may be gained by being close to each other, and to avoid the social stigma that makes both the victim and the perpetrator feel ashamed of reporting ANE experience (Quinn & Tomita, 1997).
2. In elders who suffer moderate to severe mental or cognitive impairments, it is more difficult to seek help in reporting and to cooperate with their healthcare providers, social workers or mandated reporters to investigate and substantiate the case of abuse.
3. Differentiation between neglect and self-neglect: Several health issues (e.g. depression) may lead to self-neglect, this makes it harder to identify whether the perpetrator is the caregiver or victim himself.

4. Inconsistent definitions and regulations for ANE, as well as insufficient cooperation between multi-disciplinary agencies and lack of essential training among healthcare providers about ANE leads to lack of knowledge of available resources offered for senior citizens on the state/county level. (S. Strasser, King, Payne, & O'Quin, 2012).
5. Age Discrimination (Ageism): negative beliefs and stereotypes about aging that lead to unequal attention and care. Older adults may be labeled as ill, slow, incompetent, or depressed which in turn may result in overlooking their treatment or complaints (Nelson, 2004).

2.5 Theoretical Basis

Several researchers suggested models to understand the constructs that compose ANE cases. They used social, political, economic, psychological and cultural factors in their approach (Abolfathi Momtaz, Hamid, & Ibrahim, 2013). However, the most relevant model to our study is the Risk-and-Vulnerability model described by Frost and Willette in 1994, which examines the dyadic interaction between the elder and caregiver in order to understand ANE as the outcome of interest.

Risk refers to the environmental factors and stressors related to the caregiver; it may include mentally or financially inadequate caregiver who cannot provide good shelter and care. Vulnerability refers to health status and individual characteristics related to the elderly, and it may include impaired mental health or inability to perform one's own basic daily activities. This model besets both the environmental and elder sources to provide an integrative framework to understand the dyadic relationship between the elder

and caregiver, and it implies that elders who were exposed to ANE have different risk-and-vulnerability profiles than elders who did not experience ANE (Fulmer et al., 2005).

2.6 Risk Factors

While several Risk factors were suggested for ANE, to date, there have been no stereotypical person or place where ANE happens. There are some intervening factors, such as increased frailty with age. However, recent studies have generally failed to find a direct relationship between abuse and poor health, functional impairment, or excessive dependence on the abuser.

2.6.1 Internal Risk Factors

1. Demographic Factors

Age was suggested to be associated with ANE since older adults have more morbidities and disabilities with increasing age, which in turn, makes them more dependent and vulnerable. Female gender was suggested in some studies, but other researchers found weak evidence of this association. Finally, racial minorities are more likely to experience ANE because of lack of social resources (Choi & Mayer, 2000; Mark S. Lachs, Williams, O'Brien, Hurst, & Horwitz, 1997).

2. Health Status

Chronic poor health status in frail elderly individuals lead to higher level of extensive care and dependency, which makes it more difficult for the caregiver to meet their needs or less sustainable to provide an optimum care. Decreased mental and cognitive capability (e.g. history of dementia) is also associated with increased risk of ANE (Bond & Butler, 2013; M. S. Lachs & Pillemer, 1995).

2.6.2 External Risk Factors

1. Living Arrangement

Shared living arrangements found to be associated with higher risk of maltreatment especially in low-income families, while social isolation is more associated with self-neglect (Mark S. Lachs et al., 1997; Shiferaw et al., 1994; S. M. Strasser, Smith, Weaver, Zheng, & Cao, 2013).

2. Caregiver

Elder or caregiver with substance abuse or mental health problems have higher risk for ANE. While family members who are excessively financially dependent on the abuser were found to be associated with financial exploitation (Campbell Reay & Browne, 2001; M. S. Lachs & Pillemer, 1995; Mark S. Lachs & Pillemer, 2004).

2.7 ANE Investigation and Prevention in Georgia.

The Division of Aging Services under Georgia Department of Human Services is the state agency that manages the state services for senior citizens, their caregivers and families; it also carries out the investigation and prevention of ANE through its state Adult Protective Services (APS) (DAS, 2011).

APS serves both elderly persons over the age of 65 and disabled persons over the age of 18, the agency covers all of the 159 counties in the state of Georgia and is in charge of investigating the reports of ANE and provide solutions to the victims of ANE to prevent further maltreatment. The solutions may include finding other residence, offer education to the caregivers, arrange medical assistance and request intervening of law enforcement if necessary (DAS, 2011).

During State Fiscal year 2014 (from July 2013 to June 2014), the agency received a total of 42,352 reports, from which 13,595 (32.1%) were investigated. The majority of these reports were issued from mandated reporters and were referred to community resources to address the issues that have been reported. Over the last five years, the percentage of cases investigated by DAS rose gradually from 49% to 58% and 72% in 2010, 2011, 2012 respectively (Bulot, 2010, 2011, 2012).

Chapter III

METHODS AND PROCEDURES

3.1 Background

Fulton County Medical Examiner's office is the agency that performs the official investigation of deaths in Fulton County. The medical examiner is required to be a physician with a special training in Pathology to perform the postmortem examinations and autopsies when required. The office investigates approximately 2500 deaths per year. When a death is reported to the office, the staff of investigators assesses whether accept or decline jurisdiction, and an investigator may visit the death scene and obtain medical and social history of the deceased. The body is then transported to the FCME for investigation and, if necessary, the investigation includes postmortem investigation and autopsy. A report then issued to document the findings and a death certificate is produced, the records kept at the possession of FCME for future use (FCME, 2011).

3.2 Study Design

A retrospective cohort design was used to examine death reports of 101 cases from individuals recorded to be 65 and older at death from Fulton County for the period from April to May in 2014.

The data was obtained from the database of the Fulton County Medical Examiner's office (FCME) and included de-identified information of demographics, circumstances of death, pre-mortem living situation, reported medical history at the time of death, information obtained from next of kin, post-mortem investigative procedures including autopsy reports and lab information if requested. Obtaining the data was determined by the GSU IRB as Not Human Subject Research.

3.3 Data Variables

I. Independent variables

1. Internal Factors:

- a) Age: the age was determined by subtracting the date of death from the date of birth to avoid any incorrect or inaccurate entry in the FCME database. The age was grouped into three categories (65-74, 75-84, 85 and above).
- b) Race: was directly taken from the death record, the available options listed were Black, White, Hispanic, Black Hispanic, White Hispanic, Native American, Pacific Islander, and Native American. The randomly selected dataset contained only black and white.
- c) Gender: Gender was taken from the record, available options were only male and female.
- d) Condition before death: was determined by the researcher based on the medical history of the deceased, medications, family members or next of kin's statements, and scene information collected by FCME investigator. Grouped into 5 categorized: well, acutely ill, chronically ill, disabled, bedridden, and unknown.

- e) History of dementia: binary variable, was taken from the medical history section of the death record, or the scene information section.
2. External factors:
- a- Living Situation: was determined by the researcher based on the information found in the investigator's notes (narrative), address of next of kin if similar to the decedent's address. Grouped into alone, with family, healthcare facility, with unrelated and unknown.
 - b- Caregiver: determined by the notes in the scene information, medical history. Categorized into: Informal, formal, no caregiver needed or unknown which refers to not applicable or no information available to determine how to categorize the case.

II. Dependent Variables:

- a- History of falls: binary variable, the information was obtained from medical history and refers to any falls that was mentioned by the decedent's family or healthcare provider.
- b- Unexplained bruises: binary variable, the finding was taken from autopsy report or body examination's photographs that is attached to death record, if an examination was necessitated.
- c- Non-compliance on medicine: binary variable, from medical history, investigator's notes and medication count that is done during the investigator's visit.
- d- Suspicion of abuse: a set of variables determined by the researcher, built on either the investigator's notes obtained from the findings in the scene information or

family member statements', or the researcher's concern because of contradictory information. Categorized into neglect, self-neglect, physical, financial and sexual. All of these variables were grouped into a one variable named suspicion of abuse. Obtaining the data was determined by the GSU IRB as Not Human Subject Research. In order to answer the research questions, different signs identified as suspicious for ANE (History of falls, unexplained bruises at post-mortem examination, non-compliance on medicines, suspicion of physical, financial, neglect and self-neglect) were combined in one category and tested against other potential factors to test their association with the markers of ANE.

3.4 Statistical Analysis

Bivariate analysis was performed using Pearson's Chi-square since for binary and categorical variables, fisher's exact was also used because of the small number of cases in the subset. Logistic regression was run for the variables that maintained significant association to test for the power and direction of the association. The analysis was performed using STATA 11.2.

Chapter IV

RESULTS

4.1 Study Demographics

Among the 101 cases included in the study, 55 cases were included in the bivariate analysis after excluding missing values, 16 cases were found to meet the suspicious criteria of ANE. The study flow was depicted in Figure 1 below.

Among these 16 cases, 9 cases (16.36%) were females, 7 cases (12.73%) were males. 8 cases (14.55%) were African American and 8 cases (14.55%) were white. The 16 cases of abuse comprised 8 cases of history of falls, 11 cases of suspicion of physical, financial, neglect or self-neglect, 1 case of unexplained bruises, no case of non-compliance on medications remained in the dataset after removing the missing values. The overall demographic features of the sample are shown in table 1 below.

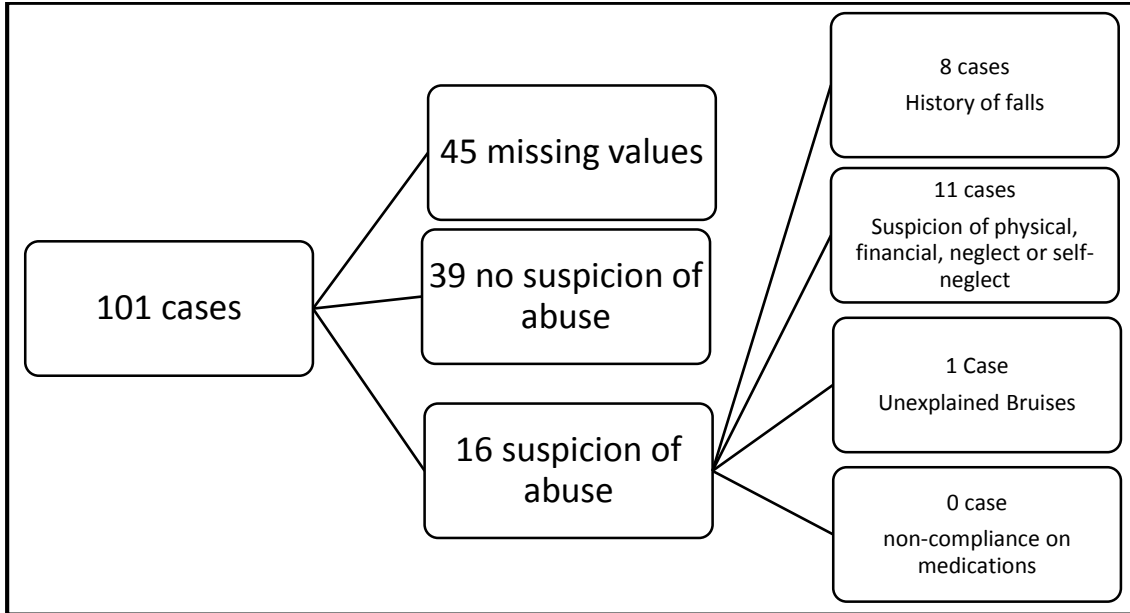


Figure 1 – Study Flow

Table 4.1- Demographic Profile of Sample.		
Race	Percent	Frequency = n
White American	49.09	27
African American	50.91	28
Gender		
Male	41.82	23
Female	58.18	32
Age		Value
Mean		81.6
Standard deviation		8.5
Minimum		65
Maximum		103

4.2 Associations of ANE Suspicion and Risk Factors

4.2.1 Bivariate Analysis

A chi-square test was run to test for the association of suspicion of abuse against internal and external risk factors, after setting the confidence interval to 95%, The only variable that showed significant p-value ($< .05$) was living situation, the variables caretaker and history of dementia showed a slight higher p-values (0.089, 0.08, respectively). The results are shown in Table 4.2.

Table 4.2 Bivariate analysis of suspicion of abuse and 7 different variables.											
	Variables	Total (55)	%	Suspicion of abuse (16) 29%	%	No suspicion of abuse (39) 71%	%	Pearson's Chi	p-value	Fisher's exact	
1	Age	65-74	13	23.64	4	25.00	9	23.08	0.788	0.674	0.698
		75-84	20	36.36	7	43.75	13	33.33			
		> 85	22	40.00	5	31.25	17	43.59			
2	Gender	Female	32	58.18	9	56.25	23	58.97	0.035	0.85	1.00
		Male	23	41.82	7	43.75	16	41.03			
3	Race	White	27	49.09	8	50.0	18	46.15	0.008	0.931	1.00
		Black	28	50.91	8	50.0	20	51.28			
4	Living Situation	Living Alone	10	18.18	6	37.50	4	10.26	9.189	0.027	0.022
		With family	20	36.36	3	18.75	17	43.59			
		Healthcare facility	24	43.64	6	37.50	18	46.15			
		With unrelated	1	1.82	1	6.25	0	0.00			
5	Caregiver	Formal	24	43.64	6	37.50	18	46.15	5.853	0.054	0.089
		Informal	21	38.18	4	25.00	17	43.59			
		No Caretaker needed	10	18.18	6	37.50	4	10.26			
6	Condition before death	Well	3	7.69	1	6.25	3	7.69	2.878	0.578	0.628
		Acutely ill	9	23.08	3	18.75	9	23.08			
		Chronically ill	19	48.72	10	62.50	19	48.72			
		Disabled	3	7.69	2	12.50	3	7.69			
		Bedridden	5	12.82	0	0.00	5	12.82			
7	History of dementia	Yes	13	23.64	1	6.25	12	30.77	3.779	0.052	0.080
		No	42	76.36	15	93.75	27	69.23			

4.2.2 Logistic Regression

After running the logistic regression for living situation, living with family maintained a statistical significance of 0.017 (OR= 0.12). The results of logistic regression are shown in table 4.3.

Table 4.3 Logistic Model Exploring Association between Living Situation and Suspicion of Abuse.					
Effect		Odds Ratio Estimates OR	95% Confidence Interval		p-value
Living Situation	Living Alone	Reference			-
	With Family	0.118	.020	.686	0.017
	Healthcare Facility	0.222	.046	1.065	0.06
	With Unrelated	-	-	-	-

Chapter V

DISCUSSION AND CONCLUSION

5.1 Discussion of Research Questions

5.1.1 Association between Internal Risk Factors and Suspicion of Abuse

Bivariate analysis showed no significant association between age, race, gender, and health condition before death while history of dementia showed to have a weak association. These results are not consistent with the literature, this may be caused by the small sample size of the study and it may indicate that ANE suspicion is not associated with a particular demographic subgroup and all older adults may be at risk in Fulton County.

5.1.2 Association between External Risk Factors and Suspicion of Abuse

The bivariate analysis showed significant association between suspicion of abuse and external risk factors (living situation). After adjusting for living alone as the reference group, logistic regression showed that living with family has a protective effect (OR=0.22, p-value=0.01), the result is inconsistent with previous studies that showed association between ANE and living with family members (Choi & Mayer, 2000; Mark

S. Lachs et al., 1997). However, this may be attributed to high number of missing values under these variables (12) A possible explanation is that half of the suspicious cases of abuse in the dataset had a history of falls (8 cases of 16) which may cause them to be at a healthcare facility at the time of death. Hence living with family is protective among the cases in this dataset.

5.2 Study Strengths and Limitations

Strength: the study sheds light on quality of documenting the death records of elderly, using quantitative and qualitative data as investigator's notes and death scene observations.

Limitation: The small sample size of the study and presence of high percentage of missing values, limited the capability to include more variables in the analysis as well as having a statistically significant results. In addition, the detection of suspicious ANE cases was basically concluded from the investigator's notes and findings which may limits the objectivity of the process and may lead to over or underestimating the actual magnitude of the issue.

5.3 Future Directions and Prevention Strategies

It would be beneficial to link ME cases with Adult Protection Services data to examine whether individuals who have died of suspicious causes may have had supports. There may be missed opportunities for early intervention that can be explored. Added to this is the need to have more thorough information related to the financial situation of the deceased and the caregiver about the social history of the deceased to reveal potential cases of financial exploitation. It would also be important to include a question to the

healthcare provider about any suspicion of ANE when signing the death certificate as a required step to determine the body disposition of the decedent.

5.4 Conclusion

The study found that among internal and external factors, living with family members is inversely associated with potential ANE, while age, sex, race, history of dementia, health condition before death and type of caregiver did not show a statistically significant association with suspicion of abuse, however, it revealed the need for more robust ME data for future research. While this study utilized a small sample of cases, the results indicate that it is worthwhile to conduct a larger study in the future. The results of this study are important, as the detection of risk factors that may exist during older adults' lives-may reveal important potential windows of opportunity for early intervention and prevention of escalating ANE.

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