

Should College Students Self-defense Against Armed Attacks? --A Laboratory Study on Chances of Injuries

Gong Chen, San Jose State University

Peggy Plato, San Jose State University

Zhanjie Liu, Beijing Capital Institute of Physical Education

Abstract

The purpose of this research was to investigate the risk level of injuries when fighting back against armed-with-knives attackers in a laboratory situation by using different techniques. It is expected that the results will add essential knowledge to self-defense education, and provide instructors research-based data for more scientific instruction in self-defense. The subjects were 582 university students.

The result indicated that barehanded fighting against knife was extremely dangerous since the general chance of injury is about 80%. The chances of injury and severe injury were higher when attacked by males than females. The chances of injury were very individualized depending on the defender and attacker. Using a stick, chair, or sweatshirt, can significantly reduce the chances of injury at knife-point. It is suggested that students try their best to avoid putting themselves at the knife-point, and they try other alternatives instead of fighting back barehanded unless they have no choice.

Introduction

Knives are widely used by criminals in violent crimes in the United States. About 95% of the attackers in school settings used knives or other weapons against victims in aggravated assaults (Bureau, 1995). In the general aggravate assaults in America, nearly a million Americans were assaulted annually (Bureau, 1998) in violent crimes. Furthermore, about 29% of the other crimes (murder, rape, and robbery) in the United States involved in the usage of knives or guns (Conklin, 1999).

Since a large percentage of the violent crimes involved in the usage of knives, teaching students self-defense at knife-point should be a major and critical part of the self-defense curriculum, and quality instruction of self-defense has significant implications to the lives of millions of university students at campuses and in their workplaces. However, although different fighting back skills have been taught in different classes in nationwide self-defense courses (Chen, 1998) and in self-defense textbooks (An, 1994) as well as in most martial arts such as Chinese Wushu (Yang, 1995), Qin-na (Du, 1988), Jujitsu (Kirby, 1993), Hapkido (Spear, 1988), Aikido (Maruyama, 1984), Bodyguard training (Ju, 1993), and Police training (Steiner, 1986), there is no study on chances of injuries using these skills or on the effectiveness of these skills (Chen, 2004; Zhang & Chen, 2004). In another word, fighting-back skills at knife-point is probably taught in self-defense curricula without any research to support the theories and instruction while students are taught to use skills in life or death situations without knowing how effective these skills are and how much chance they have to survive or to be stabbed. Teaching students self-defense at knife-point concerns the lives of millions of people annually and research on this topic is absolutely critical and urgent.

The purpose of this research was to investigate the risk level of injuries when students fight back against armed-with-knives attackers in a laboratory situation. It is expected that the results will add new and critical knowledge to self-defense instruction, and provide self-defense instructors research-based data for more effective and scientific instruction in self-defense to benefit millions of people. The identified risk level will help students make right decisions on if they should fight back or adopt other self-defense strategies.

Method

The document analysis technique was used to analyze the records of classroom assignments. These assignments were originally designed to help each individual student understand their own chances of survival and to motivate students to practice more under pressure. The subjects were totally 582 male and female students in university self-defense classes. These students had average 20 hours training in self-defense skills. These subjects participated in four experiments in the classroom assignments as a normal procedure of regular self-defense classes: fighting-back barehanded (225 subjects for distance fighting-back at knife-point and 43 for close fighting), fighting-back using a sweatshirt (112 subjects), fighting back-with a chair (126 subjects), and fighting-back with a stick (66 subjects). The subjects were overlapped and some subjects participated in two, three, or four experiments. The rubber knife was used as the attacking weapon for attacker while sweatshirts, chairs (with rubber feet protection), and sticks (with a boxing glove on the top to prevent injuries were used as the defensive weapons for the defenders in the assignments. The records of assignment were used as the raw data.

Subjects were paired randomly as the defender and attacker for each of the four assignments. In barehanded distance fighting-back, the attacker pointed the knife at the defender in two-yard distance and started stabbing the defender without risking their own safety. The defender fought back using skills such as distance fighting or joint control skills to avoid the stab and to put the attacker under control. The trial stopped whenever the defender was stabbed and the injury part (where the rubber knife touched) of the body was recorded as the first trial. If the attacker could not stab the defender in 20 seconds, the trial also stopped and the case was recorded as the defender "Escaped" as the first trial. Every subjects tried 10 times on one experiment. The percentages of Escaped or Stabbed were calculated, and the percentages of injuries on different body parts were also calculated. Two categories were used to indicate the degree of injuries. Stabs on head/neck, chest/upper-back, and belly/low-back were recorded as Severe Injury while stabs on hip/leg/feet and arm/shoulder/hand were recorded as Non-severe Injury. Then the attacker and defender switched their roles and conducted 10 trials again. The barehanded close fighting back was conducted when the attacker pressed a knife against defender's belly, the attacker started stabbing the defender as soon as the defender started the first fighting-back motion. The other three experiments with protections were conducted in the same way, except the defender used a stick, or a chair, or a sweatshirt (in all three situations, the defenders held with two hands in front of the defender's body for more protection). When using a stick or a chair, the defenders were instructed not thrust too far toward the attacker to avoid potential injuries and when they tried to kick the attacker's knee, they should just showed the motion to the calf and thigh without actually touching and stopped when there was a chance of injuries. The attackers were also instructed not to try any dangerous movements which may result in injuries and stopped when there was a chance of injuries. The assignments were conducted for several semesters without any injuries. The results were given back to students so that they knew their individual chance of injury using different techniques at knife-point.

The percentage of stabs during the 10 trials was used to describe the risk of injuries. The Z Test for Comparison of Two Proportions (Bloomer & Forsyth, 1977) was also used in the study to compare the differences of males and females, and effectiveness of different skills. A a-test was used to analyze the differences of injuries between barehanded and using a sweatshirt, between using a sweatshirt and using a chair, and between using a chair and using a stick.

This research was done in a lab situation in order to provide a basic idea about the chances of injury when subjects fighting back at and knife-point instead in the real life-threatening situations, therefore it has some limitations. For example, the force used by the attacker and defender in the

experiment can not be as violent as in the real situations. Therefore, the chance of injury based on the results of this study probably will be a little different in real life situations. Furthermore, the experiment tried to avoid any potential injuries, therefore, some skills (such as strike the groin or face or knee, or bite) can not be used in the experiment and that has some impact on the applications of the results in real situations.

Results and Discussion

1. Chance to be stabbed when fighting back barehanded in 2-yard distance for the defenders (combined males and females) by attackers (combined males and females)

In general, when subjects were fighting back at knife-point barehanded in 2-yard distance, the chance of injury was about 80%, and the chance to escape was about 20% (Table 1). There was a significant difference between the chances of escaped and stabbed. If we count stabs at head, chest, and belly as severe injuries, there was a significant difference between the severe and non-severe injuries. The defenders had about 53% chance to suffer severe injuries and 47% chance to be stabbed on non-vital parts of the body whenever they were stabbed. But stabs on arms or legs, although not severe in the first place, may results in reduced fighting-back or running-away ability, therefore the defenders might be stabbed more later. This result indicated that fighting back barehanded at knife-point in about 2-yard distance is extremely dangerous, even when the defenders have had about 20-hour training on different types of self-defense skills.

Table 1. Chance to be stabbed for the defenders (combined male and female) by attackers (combined male and female)

	Number of trials	Percentage	
Total trials	2250	100.0%	
Escaped	441	19.6%	$z=24.3 p<.01$
Stabbed	1809	80.4%	
<i>Severe injuries (head/neck, chest/upper-back, and belly/low-back)</i>			
	954	52.7%	
<i>Non-severe injuries (leg/hip/feet and hand/arm/shoulder)</i>			
	855	47.3%	$z=2.35 p<.05$

2. Chances to be stabbed for the defenders (combined male and female) by male attackers or female attackers

Table 2 listed the chances of injuries when defenders (combined males and females) were attacked by male or females attackers. If the subjects were attacked by male attackers which counted more than 90% of the attackers in real life situations (Conklin, 1999), the chance of injury was 84% and the chance to escape was 16%. If the subjects were attacked by female attackers, the chance of injury was 78% and the chance to escape was 22%. There was a significant difference between the chance of injury when fighting back against male and female attackers. But practically, even it is little more chance of injury to face male attackers, the difference is not significant. Fighting-back barehanded at knife-point against either male or female attackers who holds a knife was all very dangerous.

If the subjects were attacked by male attackers, at 57% of the time, the subjects were cut severely and 43% of the time the subjects were cut on arms or legs. If the subjects were attacked by female attackers, about 50% of the time the subjects were stabbed severely and about 50% of the time the subjects were stabbed on arms or legs. There was a significant difference on the chance of severe

injury between facing male and females attackers, and there was a significant difference on the chance of non-severe injury between facing male and females attackers. These results indicated that defenders will have more severe injuries when they fighting back against male than female attackers at knife-point while will have more non-severe injuries when they fighting back against female attackers.

There was also significant difference on the chance of severe injury and non-severe injury when facing male attackers, but no significant difference was found when facing the females attackers. That means that fighting back against male attackers not only have a greater chance of injury but also have a greater chance of severe injury than facing female attackers.

Table 2. Chance to be stabbed when fighting back barehanded for the subjects (combined male and female) by male or female attackers

	<u>Male attacker</u>		<u>Female attacker</u>		z-value	p-value
	Trials	Percentage	Trials	Percentage		
Total trials	880	100.0%	1370	100.0%		
Controlled	140	15.9%	301	22.0%		
Stabbed	740	84.1%	1069	78.0%	3.21	<.01
<i>Severe injuries</i>						
	423	57.2%	531	49.7%	$z=2.5$	$p<.05$
<i>Non-severe injuries</i>						
	317	42.8%	538	50.3%	$z=2.34$	$p<.05$
		$z=5.14$		$z=0.19$		
		$p<.01$		$p>.05$		

3. Percentages of combined defenders who were stabbed a certain times by combined, or male, or female attackers

The general chance of injury when fighting back at knife-point was very individualized. Some subjects were stabbed less during the 10 time trials while others were stabbed more. No one could totally avoid the injury and as high as one third subjects were injured every time (Table 3).

The chances of injury when fighting back at knife-point of male attackers or female attackers were also very individualized. Some subjects were cut less during the 10 time trials while others were cut more times. All defenders were cut more than three times and as high as about 40% defenders were injured every time when they were attacked by male attackers. About 30% subjects were injured every time when they were attacked by female attackers and most defenders were stabbed more than five times.

Table 3. Percentages of subjects (combined males and females) who were stabbed a certain times by combined, male, and female attackers in barehanded fighting-back

Times	<u>Combined</u>		<u>Male attackers</u>		<u>Female attacker</u>	
	# of subjects	%	# of subjects	%	# of subjects	%
0	0		0		0	
1	1	0.4%	0		1	0.7%
2	1	0.4%	0		1	0.7%
3	3	1.0%	2	2.3%	1	0.7%

4	8	3.6%	2	2.3%	6	4.4%
5	18	8.0%	4	4.5%	14	10.2%
6	19	8.0%	5	5.7%	14	10.2%
7	33	14.7%	12	13.6%	21	15.3%
8	23	10.2%	9	10.2%	14	10.2%
9	44	19.6%	20	22.7%	24	17.5%
10	75	33.3%	34	38.6%	41	29.9%

*There was no significant difference between males and females.

4. Chances to be stabbed for the defenders (combined males and females) using different skills against attackers (combined males and females)

When defenders used different techniques to deal with an attacker who was armed with a knife, there were significant differences on the chances of injuries. Using a stick, or a chair, or even a sweatshirt dramatically reduced chances of injuries in the combined male and female defenders dealing with combined male and female attackers (Table 4). Using a stick can reduce the chance of injuries to 44%, using a chair can reduce to about 54%, and using a sweater shirt can reduce the chance to about 65% from the barehanded chance of about 80%. The reasons why these equipment worked better than barehanded were not studied, but based on the classroom observation and conversations with subjects, it is believed that using a stick threatened the attacker's safety and made them scared and less aggressive, and using a chair not only impaired the attackers' ability to attack but also had some threat to the attacker since the feet of a chair can cause injuries, while using a sweatshirt impaired the attacker's ability to stab effectively.

The severe injuries were also reduced when using stick, chair, or sweatshirt. While the barehanded had about 53% severe injuries, using a stick had about 50% although statistically not significant, Using a chair had about 35%, and using a sweatshirt had 37%. Using sweatshirt and chair had less chance of sever injuries than barehanded and using stick.

Table 4. Chance to be stabbed for the defenders (combined male and female) using different techniques against attackers (combined male and female)

	<u>Barehanded</u>		<u>Use a Sweater</u>		<u>Use a Chair</u>		<u>Use a Stick</u>	
	n=225		n=112		n=126		n=66	
	#	%	#	%	#	%	#	%
Total trials	2250	100.0%	1120	100.0%	1260	100.0%	660	100.0%
Escaped	441	19.6%	394	35.2%	582	46.2%	371	56.2%
Stabbed	1809	80.4%	726	64.8%	678	53.8%	289	43.8%
			<i>z=5.2</i>		<i>z=3.67</i>		<i>z=3.03</i>	
			<i>p<.01</i>		<i>p<.01</i>		<i>p<.01</i>	
<i>Severe injuries</i>								
	954	52.7%	268	36.9%	238	35.1%	144	49.8%
			<i>z=4.51</i>		<i>z=2.94</i>			
			<i>p<.01</i>		<i>p>.05</i>		<i>p<.01</i>	
<i>Non-severe injuries</i>								
	855	47.3%	458	63.1%	440	64.9%	145	50.2%
			<i>z=5.27</i>		<i>z=3.13</i>			
			<i>p<.01</i>		<i>p>.05</i>		<i>p<.01</i>	

5. Chances to be stabbed for the defenders (combined males and females) using different techniques against male attackers

When subjects used three different techniques to deal with male attackers at knife-point, there were significant differences on the chances of injuries (Table 5). Using a stick can reduce the chance of injuries to about 47%, using a chair can reduce to 50%, and using a sweater shirt can reduce the chance to about 69% from the barehanded chance of 84%. Using a stick or chair had similar effect against male attackers and they were the most effective ways to fight back at knife-point among the four techniques. Using a sweatshirt had better effect than barehanded but was not as effective as using a stick or chair when dealing with male attackers.

The severe injuries were also reduced when using chair, sweatshirt, or stick based on the actual percentages. While the barehanded had about 57% severe injuries, using a chair had about 38%, using a sweatshirt had about 48%, and using a stick had about 50%. However, these differences failed to reach the statistically significant level even though they were close.

Table 5. Chances to be stabbed for the defenders using different techniques (combined male and female) against male attackers

	<u>Barehanded</u>		<u>Use a Sweater</u>		<u>Use a Chair</u>		<u>Use a Stick</u>	
	n=88		n=42		n=53		n=36	
	#	%	#	%	#	%	#	%
Total trials	880	100.0%	420	100.0%	530	100.0%	360	100.0%
Escaped	140	15.9%	129	30.7%	265	50.0%	191	53.1%
Stabbed	740	84.1%	291	69.3%	265	50.0%	169	46.9%
			<i>z</i> =5.29	<i>z</i> =4.6		<i>z</i> =0.62		
			<i>p</i> <.01		<i>p</i> <.01		<i>p</i> >.05	
<i>Severe injuries</i>								
	423	57.2%	140	48.1%	101	38.1%	84	49.7%
			<i>z</i> =1.86		<i>z</i> =1.67		<i>z</i> =1.57	
			<i>p</i> >.05		<i>p</i> >.05		<i>p</i> >.05	
<i>Non-severe injuries</i>								
	317	42.8%	151	51.9%	164	61.9%	85	50.3%

6. Chance to be stabbed for the defenders (combined males and females) using different techniques against female attackers

When subjects used three different techniques to deal with female attackers at knife-point, there were significant differences on the chances of injuries (Table 6). Using a stick can reduce the chance of injuries to 40%, using a chair can reduce to about 57%, and using a sweater shirt can reduce the chance to about 62% from the barehanded chance of 78%. Using a stick was the most effective way fight back against female attackers. Using a chair or a sweatshirt were more effective than barehanded but not as effective as using a stick.

The severe injuries were also reduced when using chair or sweatshirt. While the barehanded had about 50% severe injuries, using a chair had about 33%, and using a sweatshirt had about 29%. However, using a stick had about similar chance of severe injury as barehanded although the general chance of injury was almost half as barehanded (40% stick vs 78% barehanded).

Table 6. Chances to be stabbed for the defenders (combined male and female) using different techniques against female attackers

The chances of severe injuries were not statistically significant different between barehanded distance fighting and close fighting. But from the actual percentage, close fighting seems to have less severe injury than distance fighting.

8. Implications of the results in teaching self-defense

This result informed self-defense students and self-defense instructors that barehanded fighting against knife is extremely dangerous no matter the attackers are males or females, although the chances of injury and severe injury are higher when attacked by males. The chance of injury is higher when the defender is a couple of yards away from the attacker than the knife is pressed at defender's body, and the chances of injury is very individualized. Students should try their best to avoid putting themselves in this kind of situations, and they should try other alternatives instead of fighting back barehanded unless they have no choice.

Using some protections can reduce the chances of injury at knife-point and students should try more of these skills than using barehanded fighting. However, even though using some protections (sweatshirt, chair, stick) can reduce the chances of injury, it is still very dangerous to fight back at knife-point. Furthermore, in real situations, the defenders may not have these protections available.

Instructors should take the chances of injury into consideration when they arrange their curricula. It is suggested to provide students information on chances of injury when using other strategies such as running so that students can compare the effects of these different strategies in order to make right decisions. Instructors should also let students try different fighting back skills (such as using a stick, chair, sweatshirt, or backpack) on different opponents to find out which fighting back skills gives each individual student the best chance of survival so that students will understand their own capacity and ability handling the situation at the knife-point.

Conclusion

1. Barehanded fighting-back at knife-point in distance is very dangerous due to the fact that the chance of injury is about 80%, no matter the defender is a male or a female, and no matter the attacker is a male or a female although male attackers are more dangerous and the chance of injury is higher when encountering with male attackers. Most defenders will be stabbed more than five times out of ten times. The results suggest that students try other options instead of fighting-back barehanded against armed-with-knife attackers unless they have no other choices. However, the chance of injury will be reduced when the knife is pressed on the defender's body and the defender started first although it is still very dangerous.

2. The chance of injury is situational and individualized when fighting-back at knife-point barehanded. Students may need to find out their own chances and capacity in order to make right decisions on if they should fight back at knife-point or what skills they should use.

3. Using a stick, a chair, or a sweater as protections can significantly reduce the chance of injury for defenders when fighting back at knife-point. The general chances of injuries using the following protections are about: 44% for stick, 54% for chair, and 65% for sweater. Using a stick is the most effective way to deal with a knife, using a chair is the second best, and using a sweatshirt is the third. All of them work better than barehanded fighting-back. When dealing with male attackers, using stick (47% injury) and chair (50%) work more effectively than using sweater (70%) and barehanded (84%). When dealing with female attackers, using stick (40% injury) works much better than chair (57%) or sweater (62%). All of these three skills work better than barehanded.

Reference

An, Z. (1994). Self-defense. Beijing Physical education University Publisher, China: Beijing.

- Bloomer, P.J., & Florsyth, R.A. (1977). Elementary statistical methods in psychology and education. Boston, MA: Houghton Mifflin Company.
- Bureau of Justice Statistics. (1995). Criminal Victimization in the United States. MD: Annapolis Junction.
- Bureau of Justice Statistics. (1998). Criminal Victimization in the United States. MD: Annapolis Junction.
- Chen, G. (1998). A study on subjects taught in nationwide university self-defense courses. Journal of International Council of Health, Physical Education, Recreation-Sport and Dance XXXV(1). 29-33.
- Chen, G. (2004). A comprehensive guide to self-defense. Kendall/Hunt Publishing Company. IW: Dubuque.
- Conklin, J. E. (1999). Criminology. Macmillan Publishing Company: New York.
- Du, Z., & Du. Z. (1988). Joint locks and counters. Beijing Physical education University Publisher, China: Beijing.
- Ju, S. (1993). Bodyguard training. Beijing Physical education University Publisher, China: Beijing.
- Kirby, G. (1993). Jujitsu. Ohara Publication, Inc. CA: Santa Clarita.
- Maruyama, K. (1984). Aikido. Japan Publications, Japan: Tokyo.
- Spear, R. K. (1988). Unique Publications, Inc.. CA: Burbank.
- Steiner, B. J. (1986). No second chance. Paladin Press, CO: Boulder.
- Yang, J. (1995). Qin Na. YMAA Publication Center, MA: Jamaica Plain.
- Zhang, R., & Chen, G. (June 2004). Safety Education and Self-defense. Beijing University of Physical Education. China: Beijing.