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TeddyGuard: A Multifunctional Personal Safety Device for Women, Children, and Individuals with Disabilities

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ABSTRACT

Safety is of paramount importance for everyone, especially women and children. However, despite its significance, guaranteeing safety remains a challenge due to prevalent cases of theft, rape, and robbery. Consequently, women and even handicapped individuals must be well-equipped with safety tools to mitigate such dangers effectively. While the market offers various safety tools, yet, none comprehensively address the multifaceted needs for personal security. Hence, this research focuses on developing a safeguard device specifically to protect women, children, people with disabilities, and senior citizens from criminals, especially when they are walking alone. The design of the study uses a quantitative design approach through the survey method. The survey study was carried out based on references on matters related to sampling, measurement, and data analysis. This study aims to identify TeddyGuard's ability to protect users and the new features available in TeddyGuard casing. The result shows that this device combines four essential functions into one tool: an alarm, pepper spray dispenser, retractable blade, and sim-card GPS. The first function serves as an alarm, warning people nearby with a 110 dB sound wave, indicating the danger faced by the user. The second function, the pepper spray dispenser, acts as a long-range defense by temporarily blinding the criminal with pepper spray powder. By developing inclusive safety tools tailored to the specific needs of women, children, and handicapped individuals, we can enhance overall safety and security for everyone in our communities.

Keywords: safety tools; women and children; personal safety tools; tools; handicapped individuals.

1. INTRODUCTION

TeddyGuard is an innovative personal safety device designed specifically to protect women, children, people with disabilities, and senior citizens from criminals, especially when they are walking alone. Statistics from the Social Welfare Department (JKM) last year showed that a total of 7,520 children nationwide needed preservation and protection. Reports in Negeri Sembilan recorded an increase, from 302 in 2022 to 405 last year (Mohd Amin, 2024). Although the issue of security and safety for women, children, the disabled, and the senior citizens often receives attention, the increase in crime cases against them is still rampant. Thus, this study has produced a personal protective tool that is easy to carry around.

This device combines four essential functions into one tool: an alarm, pepper spray dispenser, retractable blade, and sim-card GPS. The first function serves as an alarm, warning people

nearby with a 110 dB sound wave, indicating the danger faced by the user. The second function, the pepper spray dispenser, acts as a long-range defense by temporarily blinding the criminal with pepper spray powder. However, it's important to note that this effect is only temporary. The final function is the knife integrated into the device, which can be used for self-defense in close-range attacks. By combining all four functions, women, children, people with disabilities, and senior citizens can defend themselves in various ways and thereby reduce the risk of becoming victims of crimes such as mugging, bullying, kidnapping, and sexual harassment. In conclusion, TeddyGuard has a positive impact on both individual users and society as a whole by providing them with an effective tool to protect themselves in potentially dangerous situations. Child safety is an increasingly important aspect in today's dangerous era.

2. METHODOLOGY

This research employs a quantitative research design approach through the survey method. The survey study was carried out based on references on matters related to sampling, measurement, and data analysis. This study aims to identify TeddyGuard's ability to protect users and the features available in TeddyGuard.

2.1. Sampling of locations and respondents

In this study, the research respondents consist of local residents from SMK Panchor and its surrounding areas. 20 research respondents were randomly selected and were divided into age categories as in Table 1.

Table 1. Respondents

| Gender/Age | 7 to 12 years old | 13 to 17 years old | 18 years old and above | Total |
|--------------|-------------------|--------------------|------------------------|-----------|
| Male | 3 | 3 | 10 | 16 |
| Female | 1 | 3 | 0 | 4 |
| Total | | | | 20 |

2.2. Research instrument

A research instrument is a precise tool used to measure and gather specific data and information. Acquiring knowledge about research tools is crucial when designing a study to gather data (Cresswell, 2008). The study will utilize questionnaires and data obtained from two types of parameter measurement studies as research instruments. During the survey, participants are required to indicate their responses by selecting either "Yes" or "No" for a total of 8 questions in questionnaire 1 and 7 questions in questionnaire 2. Meanwhile, the measured outcomes of the trials are displayed in Table 2 below.

Table 2. Measurements

| Tested Device | Tested Parameters | Unit |
|------------------------|-------------------|--------------|
| Alarm | Sound Wave | Decibel (dB) |
| Pepper Spray Dispenser | Distance | Metre (m) |

3. RESULTS AND DISCUSSION

3.1 Alarm testing

Table 3. The Alarm Test Data

| Application | Original Sound | Enclosed space | 10-meter distance |
|---------------|----------------|----------------|-------------------|
| Decibel X | 112.3 dB | 68.6 dB | 83.0 dB |
| Decibel Meter | 100.0 dB | 77.0 dB | 82.0 dB |
| Decibel | 106.0 dB | 72.0 dB | 85.0 dB |
| Average | 106.4dB | 72.86dB | 83.33dB |

The average sound strength conducted resulted from using 3 types of smartphone applications. The average original sound is 106.4dB, the strength in an enclosed space is 72.86dB, and the sound strength at a distance of 10 meters is 83.33dB. In conclusion, all three average sound levels exceed the normal human hearing threshold and align with the purpose of TeddyGuard, which is to produce a loud sound to startle criminals and attract the attention of bystanders. This conclusion is drawn based on Steven W. Smith's study on sound strength.

3.2 Pepper spray distance testing

Table 4. The Pepper Spray Test Data



| Sample | Label | Unit | Formula |
|--------|-------|------|---------|
| | | | |
| | | | |

The average spray distance used is 0.89 meters. This distance is suitable for long-distance defense between the victim and the perpetrator.

3.3 Product description

TeddyGuard is a personal security device (pepper spray) holder (case) that has 3 in 1 feature. These innovations allow a person to save themselves in various emergencies. TeddyGuard has a special feature which is a single pull system where it will work with only one pull. The system also allows people with disabilities to use it easily. Table 4 below shows the step by step on how to use TeddyGuard:

Table 5. Steps to Use TeddyGuard

| Step | Description |
|---|--|
|  | 1. Attach TeddyGuard casing to the desired area. |
|  | 2. Pull TeddyGuard and the alarm will go off immediately |



3. Point the nozzle at the criminal and press the pepper spray.

4. CONCLUSION

TeddyGuard is essential for various groups in society, particularly children, individuals with disabilities, working women, senior citizens, university, and school students. It provides protection against abduction for unsupervised children, aids individuals with disabilities with weak physical strength, and offers GPS functionality for monitoring elderly parents with conditions like dementia. Additionally, it safeguards working women who travel alone at night from potential mugging or robbery.

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