Original Article

SAFE Mobile Application: Prevention of Violence Against Women

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Abstract - The research focuses on women who have experienced or are currently experiencing some form of violence, whether it be within their family or from individuals close to them, who, due to fear or lack of information, do not approach authorities to report their abusers. The objective is to design a prototype of a user-friendly mobile application that can provide assistance to victims of violence by offering information about women's emergency centers and necessary resources to file complaints. A hybrid methodology was employed, along with the Canva tool, as they were deemed suitable for the project development. The outcome is that users who have experienced any form of violence can access information within the application regarding women's support centers and how to report their abusers. It was concluded that users agree that the use of technology can greatly assist in addressing these social issues, allowing victims of violence to feel secure and empowered to report incidents and receive the necessary help. This research contributes to tackling the pressing social problem of violence against women, benefiting both young people and children in society who may be experiencing violence within their immediate circles.

Keywords - Mobile application, Violence, Hybrid methodology, Social problem, Victims.

1. Introduction

Violence against women affects up to two out of three women in Peru. It is considered violence when it is physical, psychological, or sexual [1-5]. Violence against women does not discriminate and occurs across all socioeconomic strata [6].

Therefore, every 25th of November is recognized as the International Day for the Elimination of Violence against Women, established by the United Nations (UN) to prevent and eradicate violence. Additionally, violence against women is not only a problem in the country but also a global issue [7]. During the first six months of the year 2022, until June 30th, a total of 69,860 women were assisted in Women's Emergency Centers (CEM) for various types of violence, including psychological, physical, sexual, and economic violence. Reports from the Ministry of Women and Vulnerable Populations (MIMP) indicate that Lima accounts for 26% of the cases, followed by the regions of Arequipa, Cusco, Piura, Ancash, and La Libertad.

Furthermore, some of the most common causes of violence are alcoholism, intolerance, drug addiction, ignorance, and lack of control [8]. A survey conducted among women who have been victims of violence revealed that 76% reported living in constant fear, and 64% expressed fear of experiencing further violence [9, 10].

Surveys, as a tool for collecting information, help us understand reality, and through the design of a mobile application using the design thinking methodology, can undertake the arduous and continuous work of creating a prototype. Nevertheless, it is indicated that many victims do not report their abusers because they believe the macho behavior of their partners is normal, as they witnessed similar mistreatment of their mothers in their own homes.

Despite the awareness talks provided to female victims, a smaller percentage tend to return to their abusers because they believe they can change or often blame themselves for the mistreatment they receive.

It is also important to mention that violence against women also occurs in public spaces, where they are often harassed by strangers solely based on their appearance and how they dress [11, 12]. Many of these cases involve violence and sexual assault, and the accused often defend themselves by claiming that the victims provoked them due to their clothing or being alone [13-15].

Presently, the ability of a person to walk alone in the streets can indicate danger, as one never knows what kind of threat they may encounter [16, 17]. Hence, the decision to develop this mobile application design is to ensure that all women in the country and around the world can feel safe and seek help if they are victims of violence.

Latin American countries are making efforts to reduce aggression within their nations; however, due to the insufficiency of political efforts, the formation of villages and non-governmental organizations dedicated to protecting women has become necessary [5, 18-20]. Annually, the United Nations has initiated the incorporation of public budget allocation from the GDP to address women's issues [3, 19]. Cases of femicide and domestic violence have gained significant attention, but a macro-social development initiative has introduced the importance of respecting women and promoting non-aggression in schools.

The importance of this work lies in helping women who are victims of violence within their homes, workplaces, or in public spaces. Therefore, the objective of this study is to design a mobile application that provides women with access to help centers, information, and a sense of security to report their abusers.

This work is structured as follows: Section 2 presents a literature review, Section 3 describes the methodology used for the mobile application, Section 4 presents the results obtained, Section 5 provides detailed discussion and Section 6 provides the conclusion.

2. Literature Review

The author [21] aimed to determine the prevalence of intimate partner violence against women in several countries and analyze the associated health consequences of this form of violence. A standardized methodology was used to collect information on intimate partner violence, including demographic data, relationship characteristics, and experienced violence. The study's results revealed that intimate partner violence is a widespread problem in the ten countries examined. Between 15% and 71% of women were found to have experienced some form of physical or sexual violence from their partners at some point in their lives. Furthermore, a strong correlation was observed between intimate partner violence and physical and mental health problems in women. It was concluded that the article provides a comprehensive understanding of the magnitude of intimate partner violence against women in different countries, highlighting the need to address this issue from a public health perspective. The study's findings support the importance of implementing preventive measures and intervention programs to reduce intimate partner violence and mitigate its negative impacts on women's health.

Similarly, the author [22] reveals that the objective of their research study was to evaluate the feasibility and acceptability of face-to-face interviews conducted by trained male interviewers using a methodology developed by the World Health Organization (WHO) to measure violence against women. The study's results indicated that the WHO methodology, administered by trained male interviewers, was feasible and acceptable. Women showed a reasonably high

willingness to participate in the interview and felt comfortable sharing their experiences of violence. Additionally, it is highlighted that the use of male interviewers could facilitate greater openness and honesty in women's responses, as some women may feel more comfortable speaking with men about gender-based violence. However, it is also acknowledged that there are challenges regarding safety and confidentiality, and the importance of properly training interviewers and ensuring the necessary support and resources to protect the safety and well-being of participants is emphasized.

Furthermore, the author [23] focuses on understanding violence against women as part of a system of oppression exerted by some men. The objective is to examine and analyze the different types of violence experienced by women, relating them to the inequality they face in today's society. A methodology involving reviewing secondary data as official sources was used to examine violence from the perspective of the violence triangle. The results reveal the interconnection of these forms of violence, highlighting that in all of them, women's lack of power and inequality compared to men are explanatory factors in the generation of violence.

Likewise, the author [24] analyzes gender-based violence in Latin America from a theoretical perspective, considering the different forms in which it manifests and the strategies used to prevent and eradicate it. A literature review was conducted using various databases to gather information. Gender-based violence has affected women in various aspects of their lives, such as economic, political, social, and cultural spheres. Currently, there are national legislations and strategies based on international norms to prevent and eradicate gender-based violence, but weaknesses in the implementation and execution of these measures are evident, as demonstrated by the alarming violence figures reported in the region. This indicates that there are still obstacles to guaranteeing and protecting women's rights to live a life free from violence.

To conclude, the author [2], in their article titled "Violence against Women and Emotional Dependence in the Sacsamarca Tarma-Peru Rural Community," indicates that women who have been victims of physical and sexual violence have experienced various abuses due to high levels of emotional dependence. This means they fear being alone and are willing to tolerate acts that jeopardize their well-being. Women's Emergency Centers (CEMs) are found in different regions of the country, offering support to women who suffer violence by providing them with the possibility to report their abusers and receive psychological support.

The author [25] focuses on determining the risk factors associated with spousal violence against women. Several significant factors were found, including stress, jealousy,

witnessing family arguments and fights, alcohol consumption, and economic problems. For this descriptive and explanatory study, a methodology was employed to determine the highest percentage of risk factors. The results revealed that jealousy accounted for 85% of the risk factor, stress reached 87%, job insertion was 65%, and violence during childhood presented 80%. In conclusion, it was determined that the socio-demographic characteristics of women who experience spousal violence in the Junín region, located in the central highlands of Peru, mostly correspond to women between 30 and 39 years old. The significant risk factors for spousal violence against women are multiple, with jealousy and stress stemming from responsibilities both inside and outside the home being notable within the personal risk factor.

3. Methodology

In this research work, a hybrid methodology was applied, which combines the Soft Systems Methodology and Design Thinking [26]. This hybrid approach, known for its problem-solving capabilities, enables the generation of innovative proposals. The main benefits lie in addressing real challenges and having the ability to regress to previous stages to retrieve data or modify proposed final outcomes [27, 28]. In the case of this research work, the first two stages of the Soft Systems Methodology (Sections A and B) and Design Thinking (Sections C, D, E, and F) will be considered.

3.1. Informal Situation

In this stage, an interview was conducted with 7 women ranging in age from 15 to 30 years old, addressing topics related to violence against women and how a mobile application could contribute to its prevention. The survey included the following questions:

A. For you, what is violence against women?
B. What kind of attitude do you consider violence?
C. Have you been a victim of violence?
D. In your family environment, have you seen violence against women?
E. Do you know any safe line to alert that you are being a victim of violence?
F. Do you know the centers that help women who have suffered some type of violence?
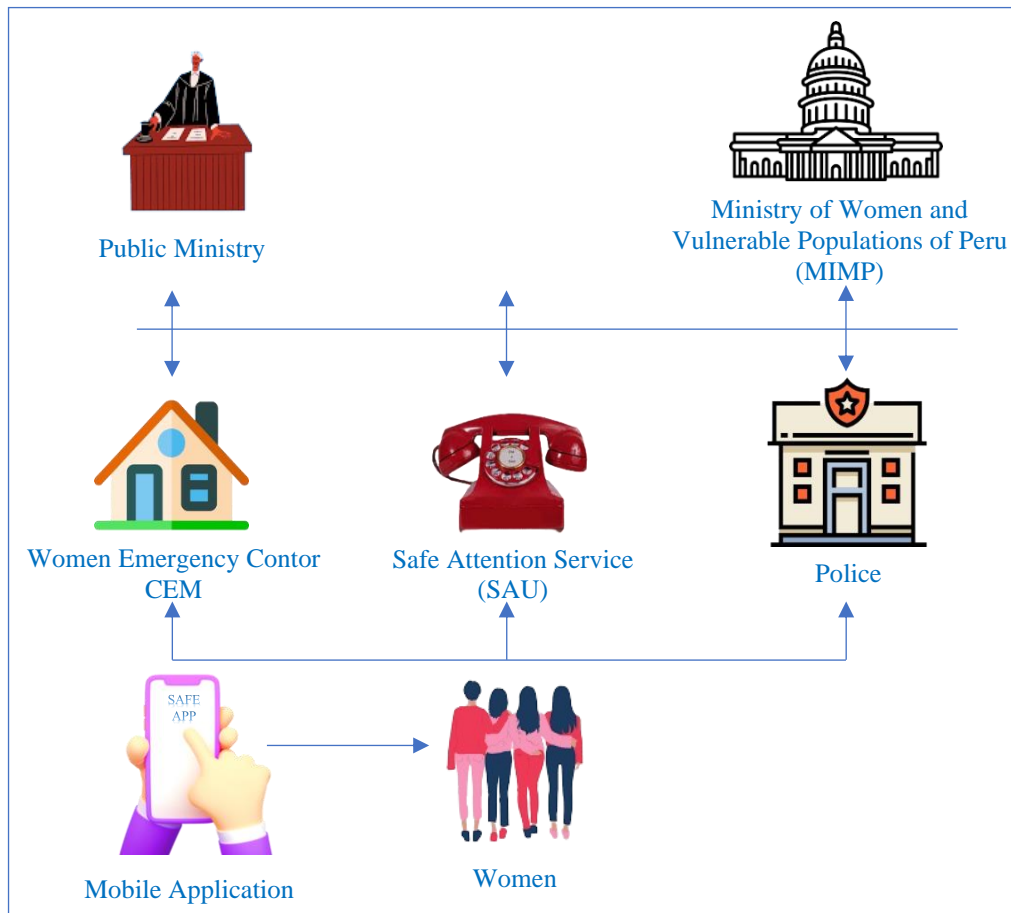G. Do you think that a mobile application could help prevent and alert if you suffer from some type of violence?

Fig. 1 Stakeholder structure

3.2. Structured Situation

All stakeholders involved in the research work are identified in this stage, including the materials, entities, etc. For the development of the research, the stakeholders involved are women victims of violence, the Center for Women's Emergency (CEM), Emergency Response Service (SAU), the National Police, the Public Prosecutor's Office, and the Ministry of Women and Vulnerable Populations (MIMP). These will be represented in a pictorial table, as shown in Figure 1.

3.3. Define

Currently, the use of mobile phones has become an integral part of everyday life, whether at work, school or on the street. A survey on the use of mobile phones indicates that people prefer using them because they can find everything they need on their phones, such as recommendations for safe places, emergency contact numbers, or to request a safe taxi [26].

Therefore, it is worth noting that the majority of people have a smartphone that allows them to download and use applications without leaving their homes.

3.4. Devise

The aim is to design a mobile application called SEGURA that allows all women who have been or are victims of violence to report and seek help. In this way, it helps to prevent and eliminate violence against women. Many women who have experienced violence state that they did not report it because they believed that the behaviors of their abusers were normal, as they had witnessed similar behaviors in their parents. They also mentioned that they felt ashamed and hesitant to seek help at a police station.

3.4.1. Technological Tools
1) Android Application: The tools for developing the mobile application include programs, frameworks, environments, libraries, etc. These tools are highly beneficial in creating mobile applications as they enhance their security, efficiency, simplicity, etc.
   A) Framework de la Aplicación: It is a set of development tools where all applications use the same APIs and the same Framework.
   B) Biblioteca: Libraries have been created using C/C++ as they are the foundations that constitute Android.
   C) Android Studio: It is an Integrated Development Environment (IDE) based on JetBrains' Intellij IDEA.
2) Application Hybrid: To develop a hybrid application, it has been found that the correct choice would be Xamarin, as it allows us to generate versions for Android, iOS, Windows Phone, etc. Additionally, it offers continuous integration, is easy to install, and is easy to learn.

3.5. Prototyping

The following programs were used to carry out the research work, as they were the most suitable for conducting the survey and prototype design.
1. Google Forms: This tool was used to conduct surveys, gather data, and perform evaluations, as it can be connected to a spreadsheet [29]. This allowed us to obtain statistical data from the survey conducted with a group of people and understand how can develop the prototype while gaining insights into the causes and consequences of violence against women.
2. Canva: It is a web-based platform that offers various free design tools, making it accessible even for non-professionals in graphic design. Canva enables users to design, edit, and create brochures, posters, mobile and web app prototypes [30].

3.6. Evaluate

Smartphones, or rather, smartphones, are what allow people to have all the necessary resources at their disposal simply by downloading and installing them.

Moreover, smartphones, through their location feature, enable users to find places and, most importantly, share their location in case of danger. Additionally, thanks to Google Maps, you can locate safe havens, police stations, hospitals, and more.

4. Results
4.1. About the Prototypes

In this section, the designs of the mobile application that will help prevent violence against women are presented. The prototypes have been developed according to the requirements of violence victims. In this mobile application design, users will find information, appropriate contact numbers (police stations, INABIF, women's emergency centers, etc.), and other resources that will assist victims in reporting their aggressors.

Figure 2 displays the main screen where the name and logo of the mobile application are shown. The logo is inspired by the hands of struggle that women exhibit today against various acts of violence, not only in the country but around the world.

Additionally, the mobile application offers several features, including a self-help test to determine if one is a victim of violence in their environment or family, a map displaying nearby help centers based on the user's location, such as police stations, hospitals, and women's support centers, a police button to enable users to report incidents and communicate with the police, emergency contact numbers, an online psychological support feature, and information on preventing and seeking help for violence against women.

Fig. 2 Mobile prototypes

Figure 3 displays a test that allows users to identify the actions associated with experiencing violence, such as the aggressor's behavior. This will enable users to recognize if they are being victimized and seek help. Similarly, a map is included, showing nearby service locations based on the user's location. For this feature to work effectively, users need to have their location turned on, making it easier to access nearby facilities such as hospitals, police stations, and women's emergency centers.

Fig. 3 Questionary and ubication

Therefore, in Figure 4, the window of the police reporting module is displayed. It consists of two buttons: the first one is for submitting your report online, and upon selecting this option, it will automatically redirect you to the portal for submitting your report. The second button allows you to make an automatic call to the police in case you need to report or seek assistance if you are experiencing violence in your home or surroundings. Additionally, the emergency numbers module is shown on this screen, where you can find

the numbers you need to dial in case of an emergency, such as the police, hospital, fire department, helpline number 100 if you need to report ongoing violence and ambulance.
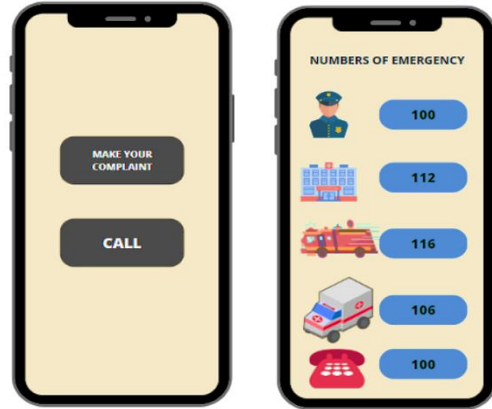

Fig. 4 Emergency buttons and numbers

In Figure 5, the online psychological support module is shown, which allows you to contact a psychologist who will address your concerns and, most importantly, listen to how you feel. This feature has been implemented because many women hesitate to report violence due to feelings of shame. Through this chat, you can have anonymous conversations and seek personal assistance when you feel ready. Additionally, information on preventing violence and identifying different types of violence and the behaviors of the perpetrator will be available.

Fig. 5 Attention to psychological and information

4.2. About the Survey

A) Expert Judgment Validation: The survey aims to gather information to provide feedback and improve future mobile application updates, enhancing user experience in terms of convenience. The results in Table 1 were obtained through the form, for which 5 evaluation criteria and 4 scoring criteria were established. The table content represents the sum of individuals who selected each evaluation criterion (Excellent, Good, Fair, and Poor).

Table 1. Criteria evaluation

Criteria	Excellent(5)	Well(3)	Regular(2)	Deficient(1)
Creativity	10	5		
Innovation	9	6	10	
Adaptability		15		
Authenticity	5	10		
Motivation	5	6	4	

B) Interview Analysis: Qualitative analysis of the interviews conducted with 7 women between the ages of 15 and 30 allowed for identifying the following categories. The letter "E" represents the interview.

C) Knowledge about violence: The question posed to the interviewees was: "In your opinion, what is violence against women?" The purpose of this question was to assess the interviewees' understanding of what constitutes violence against women and its scope. The following responses were obtained:
- E1: It is the physical and verbal mistreatment that a woman can face in a given situation.
- E2: It is the abuse from an ignorant man.
- E3: It is a violation of women's human rights. Being subjected to violence, mistreatment, or abuse.
- E4: It refers to physical and psychological mistreatment.
- E5: It encompasses all types of acts that harm women.
- E6: It includes any form of physical, verbal, psychological, or sexual aggression, regardless of the perpetrator.
- E7: It refers to any act that undermines women's rights.

D) Attitudes: The question posed to the interviewees was as follows: "What kind of attitude do you consider as violence?" This aims to understand what types of attitudes are considered as violence by the respondents and to determine if they are aware that certain attitudes can also be considered as violence.
- E1: Insults, aggression, and belittling a woman's emotions and expressions.
- E2: Shouting, indifference, and physical aggression.
- E3: When a man disrespects a woman, that is already an act of aggression.
- E4: When they insult and hit you.
- E5: Starting from raising one's voice, attempting to persuade, using derogatory terms, and any behavior that aims to dominate another person.
- E6: Intentionally negative attitudes.
- E7: Physical abuse, mistreatment, insults, etc.

E) Victims of violence: The following question was asked to the interviewees: Have you been a victim of violence? Figure 6 shows the answer graphically, where 58.8% answered no, while 23.5% said yes and 17.6% did not want to answer.
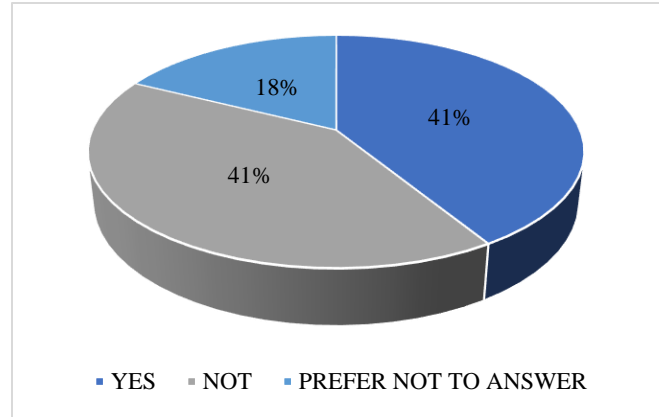
Fig. 6 Answer on whether they have experienced violence

F) Family environment: The following question was asked: "Have you witnessed violence against women in your family environment?" In Figure 7, the responses to the question are shown, where an equal proportion of 41.2% indicated that they had not witnessed it and had witnessed it in their homes, while 17.6% preferred not to respond.
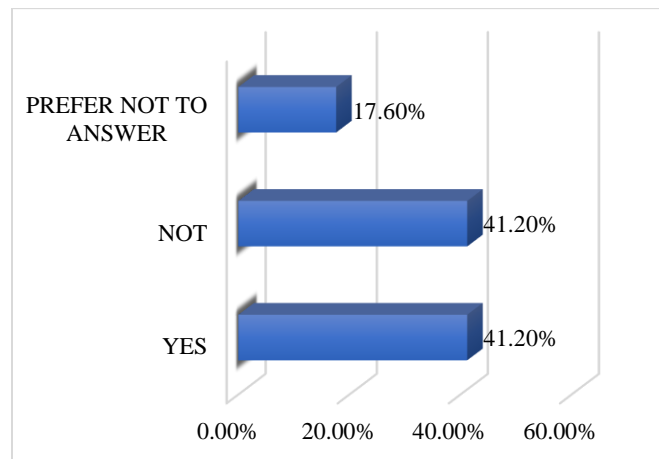
Fig. 7 Answer on whether they have observed violence in their family environment

G) Help centers: The following question was asked of the interviewees: "Are you familiar with centers that provide assistance to women who have experienced any type of violence?" As seen in Figure 8, only 3 individuals are aware of the centers that help women who experience violence. At the same time, 1 interviewee is unsure, and the remaining 3 either do not know or were not aware of the existence of such centers.
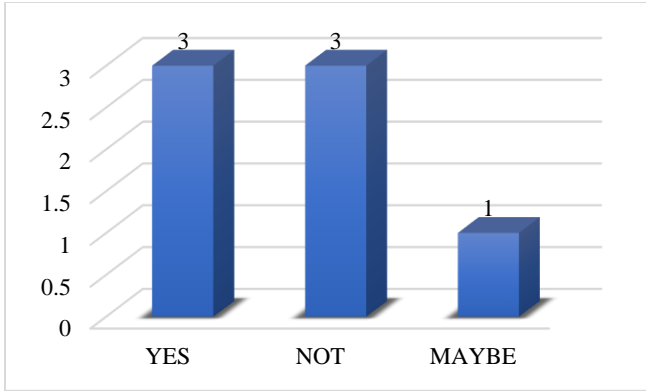
Fig. 8 Answer about the knowledge of the help centers

H) Mobile application: The following question was asked to the interviewees: "Do you believe that a mobile application could help prevent and alert if you experience any type of violence?" By obtaining the responses from the interviewees, we will be able to determine if the users will properly accept the application.
- E1: Yes, it would be a resource that many women could have at their disposal.
- E2: Definitely, I believe it would prevent many things.
- E3: Yes, because there are often women who cannot even leave due to manipulative men, and I think that if there was an application, they could at least ask for help.
- E4: Yes, especially with topics like self-esteem, empowerment, and leaving at the first sign of aggression. It would also provide information for prevention.
- E5: Yes, it would be a quick and easy way to send an alert.
- E6: Yes, if I have the option to send an alert or ask for help from selected contacts or the appropriate authorities without making a call, that would alert my aggressor.
- E7: I believe that technology nowadays is very helpful, and it would be even more so if an application could help feel safe.

I) Contributions: The question posed to the interviewees was as follows: "What would be your contribution to the SEGURA application?" This question aims to gather the necessary requirements that the application might have so that users can find what they need and, above all, become aware of the types of violence that exist.
- E1:...A suggestion for the application would be to track your exact location if you are in danger at that time.
- E2:.. My contribution would be to let you know about the application with all my family and friends so that they do not feel alone or alone because

violence is in both genders.
- E3:...Make it hidden, and pretend it is another application so the aggressor does not suspect.
- E4:..Chat with the state to attach the distress button.
- E5:.. Make it a hidden application.
- E6:.. That allows you to connect with secure contacts to ask for help if necessary.
- E7:..Manage to execute it to be able to make it real.

5. Discussión

The development of an application based on a survey related to and targeted at women affected by violence places its use at a necessary and non-dependent level. While the prototype includes a chat for required and assisted support, it is also necessary to have a chatbot that directs the conversations, connects with an expert in the field, and ensures that the various institutions mentioned earlier attend to the emergency button.

Compared to [21], the results, where aggression is addressed to focus on a current social issue, present the prototyping under the design thinking methodology. The proposal aims to quantify and take action in response to a report or act of violence. Similarly, in [22], where the psychological relationship between children and the violent environment is measured, it serves as a foundation for the development of the application. In both cases, the violent environment is taken into account to generate a quantification of the level of distress in the victims, and the app measures and quantifies the violent effects, directing them to the responsible authority.

Regarding [23], their research allowed us to understand how implicit violence is distorted and generated in women. Therefore, in developing the application, this point could be addressed as knowledge to avoid and not normalize violence against women. In [24], the goal was to analyze violence as a level of blindness to make rights known and valued by the aggressor and public entities. Hence, the present app will provide access to emergency numbers, directing assistance to the responsible entity for the affected individuals. However, in [2] and [25], they emphasized the socio-cultural normativity of violence as part of upbringing. Like the research, they found the importance of elevating the state of victims in Peru to a higher level.

6. Conclusión

The objectives set at the beginning of the research have been successfully achieved, meeting the requirements and standards established to develop the design of the mobile application. In this way, a hybrid methodology was used to have well-structured phases and find the correct solution to the social problem of violence against women. One limitation that the research work may present is that not all victims may have access to mobile devices or the internet, which could

prevent them from using the application and gaining knowledge about its use and the benefits it would bring. As a future work, it is recommended to continue researching and developing applications and web platforms to prevent and eliminate violence against women so that each of them can feel safe and protected. Being a victim of violence should not be about fear or shame.

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