

Empowering Safety: A Comprehensive Survey on IoT-Based Women Safety Devices

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Abstract—Internet of Things technology has spurred the development of innovative solutions aimed at enhancing women's safety. This paper presents a comprehensive survey of IoT-based women safety devices, focusing on their design, functionality, effectiveness, and societal impact. The survey covers a wide range of devices including wearable gadgets, mobile applications, smart alarms, and location tracking systems, among others. Through a detailed analysis of existing solutions, this paper aims to provide insights into the current landscape of IoT-enabled safety devices for women, identify key challenges and opportunities, and propose directions for future research and development. By empowering women with advanced technological tools, we can strive towards creating safer and more inclusive environments for all.

Keywords— Women's Safety, Women's Empowerment Survey, Safety devices, Personal Safety, Smart Devices.

I. INTRODUCTION

The Constitution of India contains the idea of gender parity. The Constitution is not limited to allows women to have equal rights, but also allows the state to ensure justice, empower women, and eliminate the social and economic policies they face. Women have the right not to be discriminated against based on gender and to equal protection of the law. It is an important responsibility for all citizens to put an end to practices that harm women's dignity. Women's empowerment is a pathway that enables women to fight for equality and to unleash their full potential in business, culture, society, and politics. This success must be accompanied by the freedom to make decisions both inside and outside the house, as well as the capacity to shape societal change. The Ministry has taken a number of actions, which are outlined below, to empower women and guarantee their safety. The increasing concerns over personal safety, particularly for women, there has been a surge in the development of IoT-based devices aimed at empowering women to navigate their surroundings with confidence and security. This comprehensive survey delves into the landscape of IoT-based women safety devices, exploring their functionalities, effectiveness, and impact on enhancing personal security [1]. By examining a wide array of devices, ranging from wearable gadgets to smart applications, this survey aims to provide insights into the current state of the market, the challenges and opportunities in this rapidly evolving field.

1.1. LEGISLATIVE FRAMEWORK FOR WOMEN

From a legal perspective, the Ministry of Labor works to ensure that women who are most at risk are protected by law. Work continues to ensure the effectiveness of laws targeting women.

1.2. SEXUAL HARASSMENT IN THE WORKPLACE

The goal of the Prevention of Violence Against Women at Workplace (Prevention, Protection and Safety) Act, 2013 is to protect women's rights to equality and freedom while also ensuring that they work in a safe setting. This rule shields women from sexual harassment in all workplaces, whether they are organized or not, regardless of their age or employment [1]. The bill applies to domestic workers, students, employees, and even women who are visiting businesses or workplaces.

The Sexual Harassment Electronic Box (She-Box) is an online complaint handling system that the Ministry designed in order to efficiently administer the Law. Through the system at [<https://www.shebox.nic.in/>], women can report sexual harassment in the workplace online, irrespective of their employment status—whether they work for a private company or a union. Complaints may also be made to the Local Committee (LC) or Internal Committee (IC) formed under the Violence Against Women at Work (Prevention, Prohibition, and Remediation) Bill, 2013. It can be transmitted over this link as well. The portal offers women who are experiencing workplace harassment quicker resolutions. Whenever a grievance is raised Once the portal has received it, it is routed straight to the Ministry has also published guides and training materials on the Law to help people understand and comply with the Law. Training modules can be changed according to the organization's service policy [2].

1.3. CHILD MARRIAGE

The Ministry of Labor has taken important steps to eradicate the detrimental societal impacts of child marriage. In 2006, the Prohibition of Child Marriage Act was passed in order to penalize individuals who encourage, practice and enforce child marriage. States/Union Territories should always monitor the effectiveness of the Child Marriage Prohibition Act, 2006. Preventing child marriage and protecting girls is an important part of the National Action Plan. Children 2016. Some of the philanthropic actions taken to prevent child marriages include contacting state governments and requesting that they work specifically to stop child marriages, and participation in unique occasions like Akshaya Tritoia/Akha Teej, which is the customary day for these kinds of unions [3].

We raise awareness through media and electronic media in order to raise awareness of the issue of child marriage. Under 2020 Budget - 21, establish a working group to study the relationship between maternal age and (i) maternal and child health infant/infant/child during pregnancy, birth and through treatment and nutrition; (ii) infant mortality rate (IMR), maternal mortality rate (MMR), total fertility rate (TFR), sex

ratio at birth (SRB), and other important factors and (iii) other details related to health and nutrition in this topic [4]. In an effort to equalize males, the Ministry of Women and Child Development has introduced the Child Marriage Prohibition (Amendment) Bill, 2021 to 21 after carefully reviewing the working group's and other parties' proposals. The Indian Christian Marriage Act of 1872, the Parsi Marriage and Divorce Act of 1936, the Sharia Implementation Law of 1937, the Special Law, Marriage Act of 1954, the Hindu Marriage Act of 1955, and the Foreign Marriage Act of 1969 were also included in the revision. These laws collectively establish the minimum age of marriage in India. The bill in question has been assigned to the Committee on Education, Women, Children, Youth, and Sports (EWCY&S) of the House of Representatives [5].

II. PROPOSED PLAN

(BBBP) BETI BACHAO BETI PADHAO

BBBP is a change in mindset through multi-role intervention focusing on zero-budget advertising helps raise awareness among girls and supports more capital in the following projects. Platforms like The purpose of Beti Bachao Beti Padhao (BBBP), International Women's Day, and National Girls' Day is to draw attention to and increase awareness of issues pertaining to women, including child marriage and other matters.

The initiative, which was formerly put into effect in 405 districts, has been extended to all areas of the nation, impacting a variety of activities. The BBBP plan will continue in the 15th Budget period and has been authorized as a crucial component of the Shakti Mission Sambal sub-plan [6,7]. The Ministry of Minority Affairs and the Ministry of Skill Development and Entrepreneurship have now also joined. forces to support girls through knowledge-based support. The strategy has been extended to all regions of the country, affecting various activities. Sex difference at birth (SRB) has been recorded keeping in mind the regional status of payment for 2020-21 as per BBBP provision. Counties with SRBs less than or equal to 918 receive \$4 million annually, counties with SRBs between 919 and 952 receive \$3 million annually, and counties with SRBs greater than 952 receive \$2 million annually. million US dollars in aid. The provinces provide money to the regions for a variety of projects, while the central government provides the program's funding. To help with operations at the district level in this situation, an operational handbook has been created. (<https://wcd.nic.in/sites/default/files/Beti%20BachaoBeti%20Padhao-English.pdf>) this link is on ministry's website where the BBBP workbook is available. For every location, a thorough and comprehensive calendar of events has been created to involve girls, their families, and the community all year long [8-10].

OBJECTIVES - The program aims to prevent the elimination of gender discrimination; ensuring females' survival, safety, education, and growth describe in table 1.

TARGET GROUP - Beti Bachao Beti Padhao targets the following groups:

TABLE:1

Primary	<ul style="list-style-type: none"> • Young people and new parents and expectant mothers • Young people (girls and boys) and young people • Family and community
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Secondary	<ul style="list-style-type: none"> • schools and AWC, • Doctors/physicians, Hospitals, care houses, laboratories etc. • Leaders, PRI/ULB, Frontline Worker-, • Women Collective and SHG, Civil Society Organization, Wodiya, Business Community, Religious Leaders etc.
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PROJECT COMPONENT – Multiple interventions in every area of the nation: This part seeks to record no revenue and encourage greater investment in activities that have an impact on the ground, such as the promotion of sports for girls, self-defense, and school construction. girls' bathrooms, training on the provision of sanitary napkins and private sanitary napkins in buildings, information on the PC-PNDT Act, etc. The funds are being used by the government for the implementation of various projects and the district level [11].

A. **Service Program – BBBP** was expanded to cover all regions of the country with the intervention of various departments during the 15th Budget period. In the past, the BBBP plan was implemented in phases. The detailed stages of the BBBP project are as follows: discuss in table 2.

TABLE:2

2014-15	2015-16	2018-19	2018-19 to 2021-23
“B B B P” And on 22 January 2015 To 100 districts covering all States/Union Territories in the first phase	Phase 2 spread from 11 states to 61 districts	Pan India Expansion Multi-Sectoral Interventions 244 Promotion, Promotion and Promotion 640	640 districts (according to 2011 census)

B. **Monitoring Mechanism:** As a crucial component of Mission Shakti, BBBP is observed at the national, state, and district levels of implementation.

C. **Financial Situation** - Financial details of the BBBP scheme since its inception described in table 3.

TABLE:3

(₹ Crore)

Sl. No.	Financial Year	Revised Estimates (R.E)	Total Expenditure by Ministry
1	2014-15	50	34.84
2	2015-16	75	59.37
3	2016-17	43	28.66
4	2017-18	200	169.10
Sl. No.	Financial Year	Updated Approximations (R.E)	Total Amount Spent by Ministry
5	20188-19	280	244.73
6	2019-20	200	85.78
7	2020-21	100	60.57

8	2021-22	100	57.13
9	2022-23	222	40.57*

based women's safety devices are not merely tools for personal protection in table 4; they are catalysts for social change, empowerment, and the creation of safer, more equitable societies for all.

D. Achievements - The program supports collective efforts to change public opinion and recognize the rights of girls. The program increases the awareness and sensitivity of the groups. This raises concerns about the decline of civil society in India. BBBP found a place in public discourse thanks to the awareness of those who supported the movement. Improvements in:

- The nation's birth-to-sex ratio grew from 918 in 2014–15 to 934 in 2021–2022. (Source: MoHFW HMIS data, April–March, 2014–15 and 2021–22) [12-18].
- Gross Enrollment Ratio (GER): The number of students in secondary education increased from 75.51% in 2014-15 to 79.4% in 2021-22. (Source: U-DISE plus, M/o Education).

Regions focused on awareness and dissemination and implemented strategic initiatives to change perceptions. Interventions implemented across the region aim at social inclusion, improving gender during pregnancy, enhancing birth registration, encouraging the celebration of female children, competition from male-centered rituals and rebranding plans to encourage reverse social norms, girls. go back to school etc. Emphasis on initiatives for girls. The ministry brought together great leaders in different fields at different times. Information provided by the Ministry [13].

E. Organization Plans - A special campaign called Kanya Shiksha Pravesh Utsav was launched on 7 March 2022 for the re-admission of Girls in Schools (OoS AG) from 11 years to 14 years. The key elements of the program are social support and awareness and motivation for AWW counseling and guidance. In this event, the district is leading a partnership to raise awareness at the grassroots level of the community and families so that young girls can return to school voluntarily [13].

III. SOCIETAL IMPACT AND EMPOWERMENT

This enhanced security translates into increased mobility and participation on various aspect of life, including education, employment, and social activities. The deployment of women's safety devices contributes to a broader cultural shift in attitudes towards gender-based violence. available resources, and self-defence techniques. By arming women with information and tools to protect themselves, these devices foster a sense of self-reliance and autonomy. available resources, and self-defence techniques. By arming women with information and tools to protect themselves, these devices foster a sense of self-reliance and autonomy [21]. Women's safety devices often facilitate community engagement and solidarity through features like crowd-sourced safety maps, anonymous reporting mechanisms, and social media integration. By connecting users with one another and enabling collective action, these platforms create a sense of belonging and mutual support among women facing similar safety challenges. It's crucial to acknowledge the intersectional nature of gender-based violence and ensure that women safety devices are accessible and inclusive of diverse communities, including women of color, LGBTQ+ individuals, and those with disabilities [14]. By centering the experiences and needs of marginalized groups, these devices can truly empower all women to live free from violence and fear. IoT-

TABLE:4

S. No.	Name of the State	No. of OoS enrolled in Schools after identification
1	Andaman And Nicobar Islands	7
2	Andhra Pradesh	7228
3	Assam	11
4	Bihar	131
5	Chhattisgarh	762
6	Delhi	649
7	Gujarat	177341
8	Himachal Pradesh	11
9	Jammu And Kashmir	79
10	Jharkhand	412
11	Karnataka	34
12	Kerala	1
13	Madhya Pradesh	1080
14	Maharashtra	819
15	Meghalaya	6
16	Mizoram	1003
17	Odisha	303
18	Punjab	33
19	Tamil Nadu	3483
20	Telangana	115
21	Uttar Pradesh	66881
22	West Bengal	397
	TOTAL	100786

NATIONAL CONFERENCE ON GIRLS' SKILLS FOR NON-PROLIFERATION WAS HELD ON 11 OCTOBER 2022 (BETIYAN BANE KUSHAL). TWO MEMORANDA OF UNDERSTANDING (I) BILATERAL MEMORANDUM OF UNDERSTANDING BETWEEN MWCD AND MSDE AND (II) TRIPARTITE MEMORANDUM OF UNDERSTANDING BETWEEN MWCD, MSDE AND MoMA

- Honor National Girl Child Day on January 24, 2022. - Women and Child Development Ministry (MWCD) - 24 January 2022
Celebrate National Girl Child Day Virtual/Online Model focuses on COVID-19 situation.
The details of the organization are as follows:
- As A virtual event was held as part of Azadi Ka Amrit Mahotsav to honor children's accomplishments.
- with the support of Pradhan Mantri Rastriya Bal Puraskar (PMRBP) 2022 beneficiaries. 2022 winners experienced virtual interaction.
- The Ministry of Women's and Child Development, along with UNICEF, celebrated 'Kanya Mahotsav', the celebration of the girl child, with Minister for Women and Child Development Hon'ble Smt. Smriti Irani along with nine others from different states at the event. Young people and children Do. online appointment [15].
- The Ministry of Trade the Ministry of Science and Technology, as well as Industry
- also organized several online forums where leaders interacted with young women, encouraging them to believe they have their own ideas and follow their hearts.
- The webinar was organized by the The National Institute for Public Cooperation and Child Development (NIPCCD) and the National

Commission for Women (NCW) are behind the "Saving the Girl Child" concept [16-20].

- with the theme 'Solutions'. Needs of the Girl Child in India #ladkianjahankhusiyanwahan" and the theme of the National Commission for Protection of Child Rights (NCPCR) is " Legal Rights of the Girl Child".
- Also, Education In cooperation with the Ministry of Youth Affairs, Sports, and Skills Development, as well as the Ministry of Science and Technology it aims to prepare documentary webinars on various topics and inform them of Achievements achieved Projects Education, health, Organizations that provide support in areas such as cleanliness, marriage, empowerment, equality of women with men, etc [21,22].

IV. CONCLUSION

Throughout this exploration, we have witnessed the evolution of wearable gadgets, mobile applications, and smart infrastructure that leverage connectivity and data-driven intelligence to provide real-time monitoring, rapid response mechanisms, and effective communication channels. From personal alarms and GPS trackers to smart jewellery and mobile apps, the market offers a plethora of options catering to different needs and preferences. However, while IoT-based women's safety devices offer promising solutions, there are several considerations to be mindful of. Privacy concerns, data security, interoperability, and accessibility remain paramount. Moreover, the effectiveness of these devices depends not only on their technical capabilities but also on societal factors such as awareness, education, and support systems in place.

Looking ahead, continued innovation and collaboration among stakeholders including tech companies, policymakers, advocacy groups, and end-users are essential for advancing the field of women's safety technology. By prioritizing user-centric design, inclusive approaches, and ethical practices, we can ensure that IoT-based solutions truly empower women, enhance their safety, and contribute to building a more secure and equitable society for all. as we embrace the potential of IoT in safeguarding women, let us remain vigilant in our commitment to promoting safety, dignity, and empowerment for every individual, regardless of gender. as we embrace the potential of IoT in safeguarding women, let us remain vigilant in our commitment to promoting safety, dignity, and empowerment for every individual, regardless of gender.

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