



Original Article

Evaluating the effectiveness of *Swastha Sangini* health camp as a screening tool in the Indian Air Force

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ABSTRACT

Objectives: This article evaluates the effectiveness of the *Swastha Sangini* Health Camps, conceptualized and executed as a preventive health initiative in the Indian Air Force (IAF) w.e.f 2012 as a proactive step to screen wives of air warriors in the age group of 20–60 years for the early detection of non-communicable diseases, enhance health awareness, and promote early diagnosis and lifestyle modification.

Materials and Methods: Data from 2017 to 2024 were analyzed using MS Excel 2022, SPSS 23.0 and Soscistatistics software.

Results: Findings revealed high rates of lifestyle diseases followed by anemia, with a significant number of participants being previously undiagnosed. The unique IAF initiative has proved to be effective in facilitating early identification and referral, thereby contributing to improved health.

Conclusion: The outcome of the campaign affirms the need for continued community outreach and preventive health initiatives, and it demonstrated that proactive community health engagement is both feasible and effective within the armed forces ecosystem.

Keywords: Disease prevention, Health camp, Maternal health, Screening tool, *Swastha Sangini*

INTRODUCTION

Primary prevention remains the cornerstone of effective disease control, significantly reducing the burden of illness on individuals, families, and society, and thereby contributing to national development. Among the most effective strategies in this regard is disease screening, which, by virtue of early detection and timely intervention, lowers both the health and economic impacts of disease. While nationwide screening initiatives may not be feasible in a country as vast and diverse as India, targeted screening within closed cohorts – such as the Armed Forces – offers a practical and impactful solution for preventing advanced stages of disease.

In alignment with this approach, the *Swastha Sangini* health campaign was conceptualized and launched in 2012 as a proactive preventive healthcare initiative by the Indian Air Force (IAF). The program is specifically designed to screen wives of serving personnel – referred to as “Sanginis” – aged 20-60 years for common non-communicable diseases (NCDs). The objectives of the initiative include enhancing health awareness, promoting early diagnosis, encouraging lifestyle modification, and institutionalizing preventive healthcare practices within the Air Force ecosystem.

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Conducted annually, the campaign combines clinical examinations and laboratory investigations with targeted Information, Education, and Communication (IEC) sessions. Participation is voluntary and the screening routinely covers conditions such as hypertension, diabetes, anemia, and cervical and breast cancers.

The program aims to:-

- Facilitate early detection of disease in otherwise asymptomatic individuals
- Enable timely and appropriate treatment to prevent complications
- Promote sustained adoption of healthy lifestyles as both preventive and health-promoting measures.

Given the importance of evidence-based program management, a comprehensive review of the *Swastha Sangini* campaign was undertaken to evaluate its implementation, outreach, outcomes, and impact from 2017 to 2024. This analysis is intended to inform future course corrections and ensure the long-term sustainability and effectiveness of the initiative in safeguarding the health and well-being of Air Force families.

The perspective that this article offers is the importance of “Screening” as a tool of early detection and effective intervention. To the best of the author’s knowledge, an evaluative account of the preventive measures among dependents of the armed forces personnel has not been brought out quantitatively in the IAF and in the other sister armed forces; thereby giving this article its novelty and offering a valuable perspective toward screening for diseases as a tool of intervention and effective control of disease.

The idea is to take cognizance of the fallout of domestic health issues in an aviator’s professional life as well. An aviator or allied services air warrior, or any air warrior in general, is likely to exhibit a drop in professional motivation and work output in the face of health concerns affecting his family. A study conducted by Liu *et al.*,^[1] titled “Can family-work conflict influence safety behavior in airline pilots? The mediating role of fatigue and the moderating role of extraversion,” published in *Safety Science*, April 2023, brings out that Family-work conflict negatively influences safety compliance and safety participation in airline pilots. Similarly, several studies have brought out the negative effects of domestic fallouts in aviators as a concern for not only their health but also flight safety in general. Hence, we believe that this article contributes to the paradigm of flight safety in terms of the importance of the health of the dependents in promoting safe practices and overall efficiency.

MATERIAL AND METHODS

The *Swastha Sangini* health campaign specifically targets the wives of serving officers and personnel of the IAF.

Participation in the program is voluntary and encouraged, but neither mandated nor enforced. Consequently, the study sample for this analysis was derived through a data record retrospectively and hence was non-random in nature. The period under review spans from 2017 to 2024. However, due to disruptions caused by the COVID-19 pandemic, the campaign could not be conducted across the IAF in 2020–2021; thus, data for that period are unavailable.

All participants included in the analysis were female and fell within the 20–60 years of age group. The health conditions screened during the *Swastha Sangini* camps primarily focused on common non-communicable and lifestyle-related disorders. These included obesity, type-2 diabetes mellitus, dyslipidemia, hypertension, anemia, thyroid disorders, electrocardiographic (ECG) abnormalities, refractive errors, and breast and cervical cancers. The structured approach of the screening and standardized data collection enabled a focused assessment of disease prevalence and health trends within this defined cohort.

Although the screening program has been ongoing since 2012, data were partially available or unavailable in the format as has been brought out in this study; hence, the data before 2017 were not included.

RESULTS

The total strength of the spouses in the IAF kept fluctuating over the years, with the average in the 6-year period being 73163 individuals. The camp was not conducted during the COVID-19 years, namely 2020 and 2021; hence, no data are available from the said period.

Participation rate against the strength of each year has been tabulated hereunder.

The participation rate remained relatively stable from 2017 to 2019. A dip occurred in 2022, which further deteriorated to 24.23% in 2024 [Table 1, Figure 1].

It was seen that lifestyle disorders have more or less the highest detection rate, peaking in 2022 (22.23%) and 2024 (23.23%) [Table 2]. Refractory errors increased sharply in 2022 (11.14%). Anemia showed a gradual increase over the years, peaking in 2024 at 9.98%, highlighting the need for nutritional intervention. Thyroid disorder detection rose over the years, reaching 3.97% in 2024. ECG abnormalities remained relatively low, but a slight increase in 2022 and 2024 suggests a need for cardiac screening, especially among younger participants. The increasing trend was found to be statistically significant (X^2 [5, $n = 207379$] = 964.810, $P < 0.0001$) [Figure 2].

Disease-wise detection rates were also analyzed under the following categories: lifestyle disorder (with its breakdown of deranged sugar, deranged lipid profile, hypertension, the

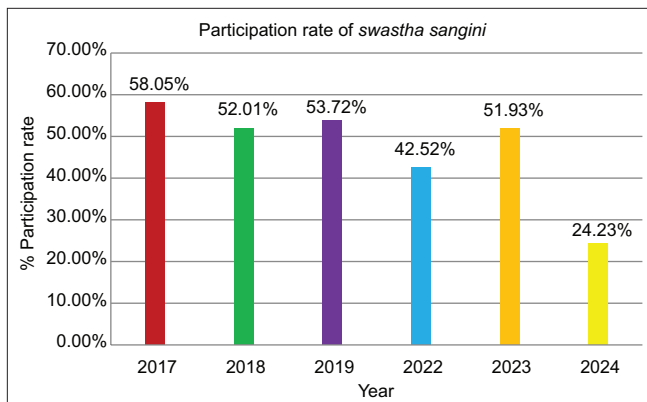


Figure 1: Participation rates over the years.

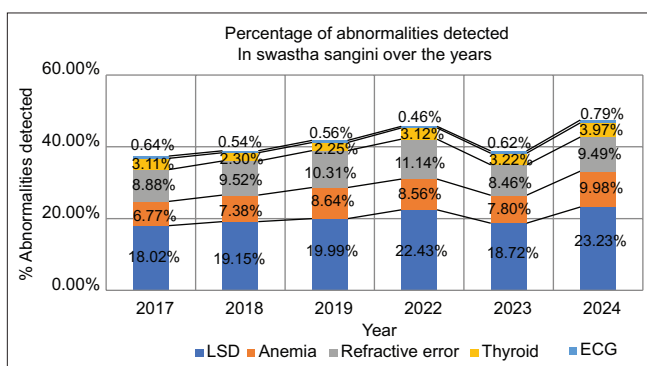


Figure 2: Detection rate of various abnormalities in the camp. LSD: Lifestyle disorders, ECG: Electrocardiogram.

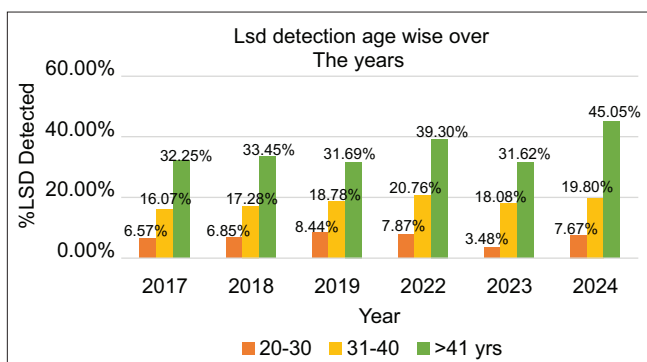


Figure 3: Age-wise distribution of lifestyle diseases (LSD) detected over the years.

Year	Participation rate (%)
2017	58.05
2018	52.01
2019	53.72
2022	42.52
2023	51.93
2024	24.23

National Family Health Survey [NFHS]), anemia, thyroid disorder, ECG abnormality, and refractive errors.

The highest prevalence of lifestyle diseases (LSDs) was found in *Sanginis* aged 41 years and above. Significant rise in 2022, which may be linked to post-pandemic lifestyle changes. The rising trend, both overall and age wise, was found to be statistically significant ($X^2 [5, n = 229581] = 513.55, P < 0.0001$ and $X^2 [10, n = 208236] = 236.46, P < 0.0001$, respectively) [Figure 3].

It was thus seen that among lifestyle disorders, obesity, hypertension, and blood sugar level abnormalities were most prevalent.

An overall rising trend was observed, with the highest detection rate in 2024 (9.98%). The age group of 41 years and above showed the highest prevalence, except in 2019, where the age group of 20–30 years had the highest rate. The rising trend, both overall and age wise, was statistically significant ($X^2 [5, n = 210278] = 311.74, P < 0.0001$ and $X^2 [10, n = 207769] = 255.93, P < 0.0001$, respectively).

Thyroid disorders detection over the years has shown an increasing trend, peaking in 2024 at 3.97%. Most commonly detected in 41+ age group, likely due to hormonal changes and metabolic factors. The rising trend, both overall and age wise, was statistically significant ($X^2 [5, n = 208245] = 216.85, P < 0.0001$ and $X^2 [10, n = 207840] = 202.43, P < 0.0001$, respectively) [Figure 4].

As shown in Figure 5, ECG abnormalities detection over the years has shown a slight increase with a notable rise in 2022 (0.94%). Higher prevalence in the age group of 41 years and above indicates a need for better cardiac screening. The rising trend, both overall and age wise, was statistically significant ($X^2 [5, n = 207379] = 24.73, P < 0.0001$ and $X^2 [10, n = 207395] = 228.98, P < 0.0001$, respectively).

Refractive errors detection has shown a rising trend over the years, with a sharp rise in 2022 (11.14%). Higher detection in the age group of 41 years and above points toward age-related vision deterioration. The rising trend, both overall and age-wise, was significant ($X^2 [5, n = 207389] = 1888.40, P < 0.0001$ and $X^2 [10, n = 207379] = 228.17, P < 0.0001$, respectively) [Figure 6].

As shown in Figure 7, the percentage of women detected with abnormality in Pap smear is high, with peak detection in 2019.

The percentage of women detected with abnormality in breast examination remains low and shows reduced detection over the years.

For comparison with the national data, the average participation of *Sanginis* in the *Swastha Sangini* Camp was considered as the denominator to understand the average prevalence of the various LSDs in comparison with the

Table 2: Breakdown of lifestyle disorders as detected over the years.

Year	Blood sugar abnormality	Percentage	Dyslipidemia	Percentage	HTN	Percentage	Obesity	Percentage
2017	1585	3.61	1068	2.43	2324	5.3	2925	6.67
2018	1448	3.6	1087	2.7	2325	5.78	2840	7.06
2019	1506	3.92	1164	3.03	2059	5.36	2953	7.69
2022	1537	5.05	1096	3.60	2110	6.94	2077	6.83
2023	1584	4.26	1127	3.03	2064	5.56	2177	5.86
2024	1021	5.89	719	4.15	1119	6.46	1166	6.73

HTN: Hypertension.

Table 3: Comparison between NFHS data and *Swastha Sanginis* data.

	Blood sugar abnormalities (%)	HTN (%)	Obesity (%)
NFHS 5	4.9	21.3	6.4
<i>Swastha Sangini</i>	4.18	5.78	6.81

NFHS: National Family Health Survey, HTN: Hypertension.

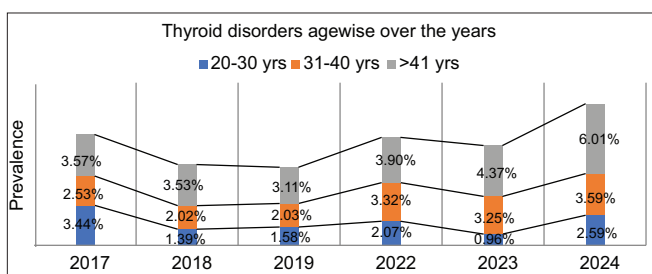


Figure 4: Prevalence of thyroid disorders as detected over the years.

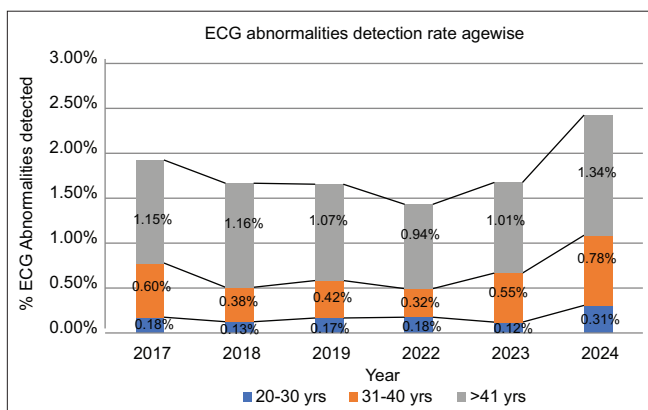


Figure 5: Prevalence of electrocardiographic abnormalities as detected over the years.

national prevalence as brought out by the latest NFHS data published in 2021.

As brought out above, the findings of the prevalence of lifestyle disorders as detected in the *Swastha Sangini* camp closely

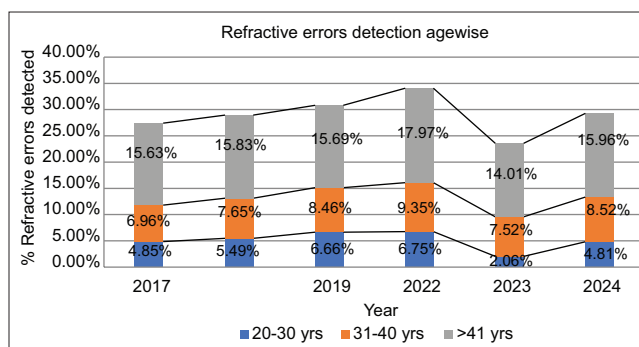


Figure 6: Age-wise distribution of the refractive errors detected through the years.

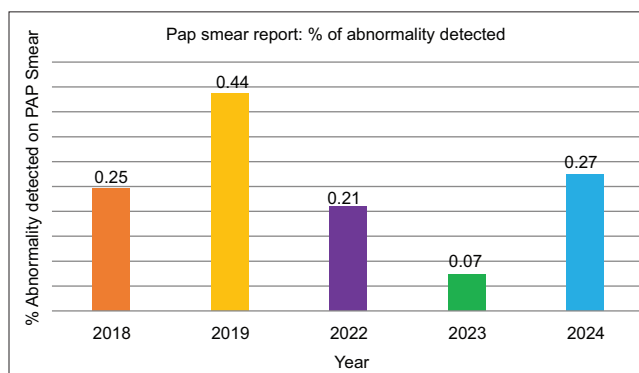


Figure 7: Prevalence of abnormality detected in Pap smear over the years.

align with the national NFHS data,^[2] confirming the reliability of the program. Blood sugar abnormalities were found to be on similar lines to the national data. Hypertension was found to have a prevalence of 5.78% as opposed to the national prevalence of 21.3%. The prevalence of obesity was at 6.81% in our study, as compared to the national prevalence of 6.4% as brought out by NFHS 5 [Table 3]. While the NFHS 5 data are stratified differently, we chose to compare it to a larger database of our sanginis to ensure inclusivity of our entire data sample, both in terms of the study and the representative population. The criteria used to measure overweight and obesity in our study population were the same as those used in NFHS 5.

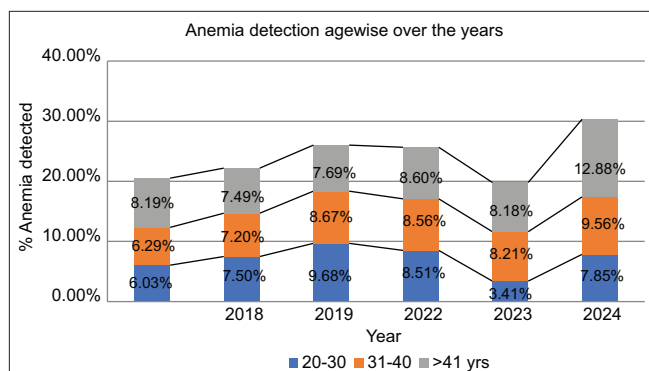


Figure 8: Prevalence of anemia as detected over the years.

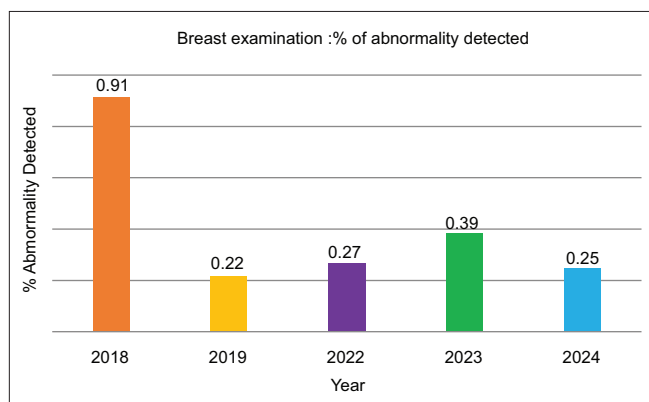


Figure 9: Prevalence of abnormality detected in breast examination over the years.

DISCUSSION

The participation rate in the *Swastha Sangini* health campaign remained relatively stable during the initial years, from 2017 to 2019. However, the reduced turnout in 2022 can be attributed to the lingering impact of the COVID-19 pandemic, including apprehension and stigma associated with voluntary visits to healthcare facilities. The overall lower participation rate may also be explained by the voluntary nature of the program and the participants' individual perception of their need for screening. The reason for the decline in 2024 remains unclear; however, it underscores the need for revitalized IEC strategies and stronger administrative support to enhance engagement and participation in future iterations of the program.

The *Swastha Sangini* initiative included screening for common NCDs and lifestyle disorders such as obesity, type-2 diabetes mellitus, dyslipidemia, and hypertension, along with anemia, thyroid dysfunction, ECG abnormalities, and refractive errors. Over the years, there has been a consistent upward trend in the prevalence of these conditions – a pattern that mirrors national data.^[3,4] A study published in the *Journal of Family Medicine and Primary Care* in 2024^[5]

reported a similar national rise in LSDs, while other regional studies corroborated increasing trends in anemia^[6] and thyroid-related morbidities.^[7]

Analysis of the campaign data revealed a higher burden of lifestyle disorders among women aged 41 years and above, aligning with findings from a study conducted among women in North India.^[8] Among the lifestyle disorders, obesity, and hypertension emerged as the most prevalent conditions. These findings are consistent with data published by a task force constituted by the National Academy of Medical Sciences and endorsed by the Directorate General of Health Services and the Ministry of Health and Family Welfare, which identified obesity and hypertension as leading public health concerns.^[9]

Anemia was most observed in participants over the age of 40 years, a trend also documented in national studies among women of reproductive age.^[6] Similarly, thyroid disorders were more prevalent in women above 40 years, with comparable trends reported in a large-scale epidemiological study conducted across eight Indian cities.^[10] Notably, this association between age and thyroid dysfunction was found to be statistically significant at a 95% confidence interval in our analysis [Figure 8].

Cardiovascular screening findings also highlighted a higher incidence of ECG abnormalities in participants aged 41 and above, reinforcing the need for enhanced cardiac screening in this age group. These observations are in concordance with a study published in *BMC cardiovascular disorders*, which demonstrated a direct correlation between age and increasing ECG abnormalities.^[11]

Refractive errors, too, were more prevalent among women over 40 years of age. This trend has been well-documented in literature, with age-related changes in the crystalline lens and reduced efficacy of the ciliary muscles being the primary contributors to deteriorating vision. One such study comparing refractive errors in elderly women confirmed this pattern.^[12]

The findings from the *Swastha Sangini* screening program for lifestyle disorders closely mirrored the national trends observed in the NFHS-5 data.^[2] Blood sugar abnormalities were similar when compared to the national data, whereas the prevalence of hypertension and obesity was found to be lower than that of the national prevalence. Nonetheless, lifestyle disorders remained a primary health concern in our study. As per the NFHS 5 data, 1.2% of women had a cervical examination, and 0.6% had a breast examination done. The findings in our study with respect to cervical cancer screening showed a similar trend (1.24% in total). However, the percentage of Sanginis having had a breast examination conducted was higher in our study and stood at 2% [Figure 9].

CONCLUSION

The *Swastha Sangini* health campaign has proven to be an effective screening initiative for the wives of serving IAF personnel. Its core objective – proactive identification of prevalent health conditions – has been successfully met, as evidenced by findings that closely align with national data and are statistically significant. Considering these outcomes, it is strongly recommended that the program be continued on an annual basis, with renewed emphasis on expanding participation.

To enhance the reach and effectiveness of future camps, it is essential to increase awareness among all stakeholders regarding their roles and responsibilities in the successful conduct of the program. Establishing a structured post-camp healthcare delivery mechanism is also advisable to ensure that individuals with abnormal findings receive timely follow-up consultations, accurate diagnosis, and early initiation of treatment.

Moreover, incorporating a feedback system could provide valuable insights into the experiences and expectations of the Sanginis. This will help tailor future interventions to efficiently fulfil their needs. Based on the findings and observed trends, the following specific recommendations are proposed:

- **Enhance Participation:** An active pre-camp IEC campaign by all the stakeholders, with particular emphasis on the involvement of Station Commanders and air force families welfare association (AFFWA) head, can help increase the participation of Sanginis. The same shall also help address the barriers toward reduced participation
- **Strengthen post-screening follow-up:** A robust referral and follow-up protocol may be developed to ensure early intervention and continuity of care for those diagnosed with medical conditions.
- **Focused awareness campaigns:** Initiate targeted awareness drives addressing prevention and lifestyle modification, particularly for obesity, hypertension, and anemia, which were identified as high-burden conditions.
- **Increasing scope of screening:** In addition to the existing screening test for Vitamin B12, Vitamin D deficiency, bone density test, and mammogram may be considered depending upon feasibility and availability.

By implementing these strategies, the *Swastha Sangini* initiative can further evolve into a comprehensive, community-centered model for preventive healthcare, significantly contributing to the overall well-being of Air Force families.

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Declaration of patient consent: Patient's consent not required as patients identity is not disclosed or compromised.

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Conflict of interest: There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation: The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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