

RESEARCH ARTICLE

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Awareness about Cervical Cancer and Acceptance of Pap Smear for Screening among Women Attending a Tertiary Care Center

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Abstract

Objectives: Our main objective was to increase the number of pap smears taken amongst women in the age group of 25-60 years (excluding antenatal women) attending the gynecology out-patient department of our hospital. To achieve our outcome goal, process goals were established. The process goals were to improve awareness on cervical cancer prevention and vaccination in both healthcare workers and patients/family attending the gynecology clinic. **Methods:** This study was done using the A3 methodology for quality improvement through the EQuIP India (Enable Quality Improve patient care) program which came about as a collaboration with PC-PAICE (Palliative Care-Promoting Assessment & Improvement of Cancer Experience) program of Stanford. The A3 quality improvement (QI) tool has well defined steps to identify the root cause of any given problem and to derive interventions to solve the stated problem. The steps are as follows (i) Process mapping and Gemba walk for analyzing contributors to the stated problem (ii) Pareto chart- to derive key drivers (iii) Run chart- to measure impact of interventions and sustainability. The progress was monitored biweekly and recorded as run charts for the study period of 9 months. **Results:** There was an increase in uptake of pap smear rate from 30% to 70% among women in the general gynecology clinic during the study period of 9 months. **Conclusion:** The application of A3 methodology was very valuable to identify contributors towards a low pap smear rate and to develop interventions to improve cervical cancer awareness and pap smear rates in our hospital.

Keywords: Quality improvement- A3 methodology- Pap smear- EQuIP

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Introduction

Cervical cancer is a preventable cancer with effective vaccination and screening tests. In spite of this, an estimated 604,000 women were diagnosed with cervical cancer worldwide in 2020 with India contributing to almost one-fourth of the global burden of cervical cancers [1]. About 25% of global mortality due to cervical cancer occurs in India [2].

While cervical cancer (CC) cases are declining in the developed world, they pose a heavy burden on developing countries, where the risk of developing cervical cancer is 35% greater compared to developed countries. Unfortunately, low- and middle-income countries have not been able to emulate the screening services offered in developed nations. This is probably due to financial, social and logistic problems.

Screening for cervical cancer can either be done on an opportunistic basis or as an organized screening

program. It has been demonstrated that only organized mass screening of the populace that targets all women is known to be effective [3]. The World Health Organization (WHO) called for global elimination of cervical cancer and has mandated countries to reach the 90-70-90 targets by 2030. The proven superiority of HPV testing has led WHO to recommend primary HPV- based screening and consequently, many programs are transitioning from cytology to HPV testing. However, in low-income countries cost for HPV testing remains a major factor. In India, VIA /VILI and Pap smears are used for cervical cancer screening though HPV is recommended where resources are available [4].

India does not have an organized screening program. However, we find that even opportunistic screening using pap smears when women attend gynecology clinics for other problems is very low. We set out to understand the factors that contributed to the low uptake of pap smears in women attending the general gynecology clinic.

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This study was done as a quality improvement program by EQuIP (Enable quality improvement patient care) India in collaboration with the National Cancer Grid (NCG). NCG is an organization with more than 300 cancer institutes in India with a vision to promote standards for high quality and uniform cancer treatment across India. The EQuIP India program offers the A3 methodology as a template to improve quality in patient care. This program is run in collaboration with PC-PAICE (Palliative Care-Promoting Assessment & Improvement of Cancer Experience) program of Stanford [5].

Aim of the study

To assess the baseline rate of pap smears amongst women in the age group of 25-60 years attending the gynecology outpatient department (excluding antenatal women) in a tertiary care center. Using the A3 methodology process goals were initially established. The process goals included improving awareness on cervical cancer prevention and vaccination in both healthcare workers and patients/family attending the general gynecology clinic. Our outcome goal was to increase the number of pap smears amongst women in the age group of 25-60 years attending the gynecology clinic.

Materials and Methods

The flow chart of the methodology used is given in Flow chart 1.

A. Questionnaire survey

To assess awareness of cervical cancer prevention and vaccination a validated questionnaire- Cervical cancer awareness measure (Cervical CAM) toolkit developed by the UCL Health Behavior Research Centre, in collaboration with the Department of Health Cancer Team and The Eve Appeal was used. It is based on a generic CAM developed by Cancer Research UK, University College London, King's College London and Oxford University in 2007-08 [6]. The CAM was developed so that researchers could systematically assess the impact of interventions designed to target gaps in public awareness of cancer.

The CAM enables researcher to evaluate and compare the impact of their activities. The questionnaire had about

9 questions to assess the knowledge on the risk factors and clinical features of cervical cancer. Of the 9 questions few were open statement questions which helps to assess the knowledge about cervical cancer of the respondent unaided, for e.g. "There are many warning signs and symptoms of cervical cancer. Please name as many as you can think of." There were few closed questions which were used to assess the level of agreement of the respondent to that particular question on cervical cancer, for e.g. "The following may or may not increase a woman's chance of developing cervical cancer. How much do you agree that each of these can increase a woman's chance of developing cervical cancer?". The questionnaire is attached as a supplement.

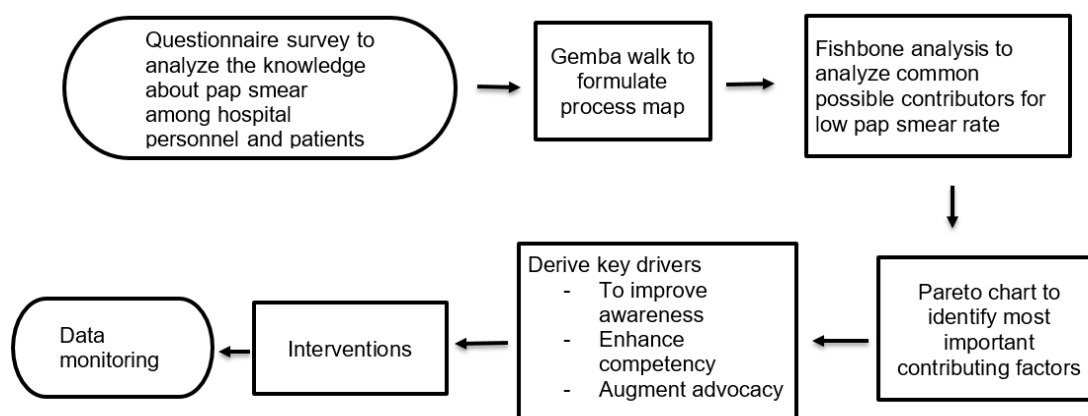
The questionnaire was administered to a total of 15 health care workers to assess their baseline knowledge about cervical cancer and its prevention. The health care workers included staff nurses, receptionists, department administrative workers who came in contact with patients in gynecology out-patient department. Subsequent to awareness programs, a follow up survey was conducted to determine if there was an improvement in the awareness score.

The same questionnaire was also administered to patients (except antenatal women) and their families every 2 weeks. This was filled by the patients attending the gynecology clinic on that particular day. Of all the patients who attended the clinic about 60% women agreed to fill the questionnaire. Patient and attenders were requested to fill in the questionnaire after explaining the purpose of the study. Women who were willing to participate were given the questionnaire in their preferred language. The answers were then scored with the help of score sheet provided by the cervical cancer awareness measure toolkit [6].

B. Baseline pap smear rate

Baseline pap smear rate was calculated as a percentage using the total number of pap smears over a period of 6 months (prior to start of study) as a numerator and the total number of women from 25 to 60 years eligible for a pap smear as a denominator. This data was obtained from the hospital labs for the number of pap smears and from the electronic medical records for the denominator.

C. A3 methodology



Flow Chart 1. Flow Chart of the Methodology

The A3 methodology provided systematic tools to understand the problem, analyze it and to determine significant contributors to the problem. This was further used to decide on interventions that would increase pap smear rates. The A3 methodology comes in a template with each of the subheadings given below.

1. SMART goal

The initial step using the A3 tool was to outline the problem statement and set a SMART (Specific, Measurable, Achievable, Relevant and Time bound)

goal. Our goal was to increase the number of pap smears amongst women in the age group of 25-60 years attending the gynecology clinic. To achieve our outcome goal, process goals were established. The process goals were to improve awareness on cervical cancer prevention and vaccination in both healthcare workers and patients/family attending the gynecology clinic.

2. Process map

A gemba walk was done to understand the patient pathway in gynecology OPD. Gemba walk is a workplace

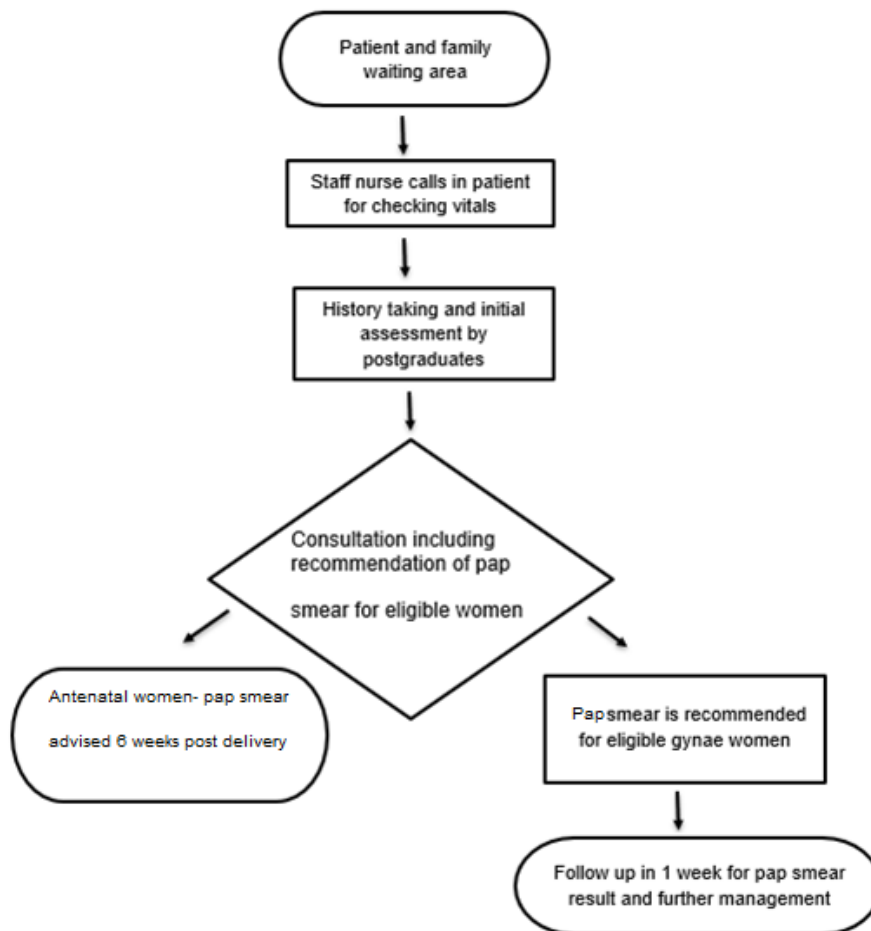


Figure 1. Process Map. Arrow, indicate the direction in which the process is flowing from one step to the next. Oval symbol, Indicates start or end of a process. Diamond symbol, Indicates decision. Rectangle symbol, Represents process.

Table 1. Interventions Done

Date	Interventions done
5/27/2021	Pamphlets
6/17/2021	Class for health care workers
6/24/2021	Role play for health care workers
6/29/2021	Implementation of stamps on case sheets
7/1/2021	Awareness class for patients and displaying PowerPoint presentation on led monitors
7/8/2021	Awareness class for patients and putting up of posters
7/29/2021	Reminder to switch on television
7/29/2021	Flash cards at desk where vitals are taken
8/9/2021	Distribution of leaflets before taking vitals and in scan room
8/9/2021	Post graduates to explain about pap smear and documenting in case sheet
8/28/2021	Pre printed seal placed in all out patient departments case sheet

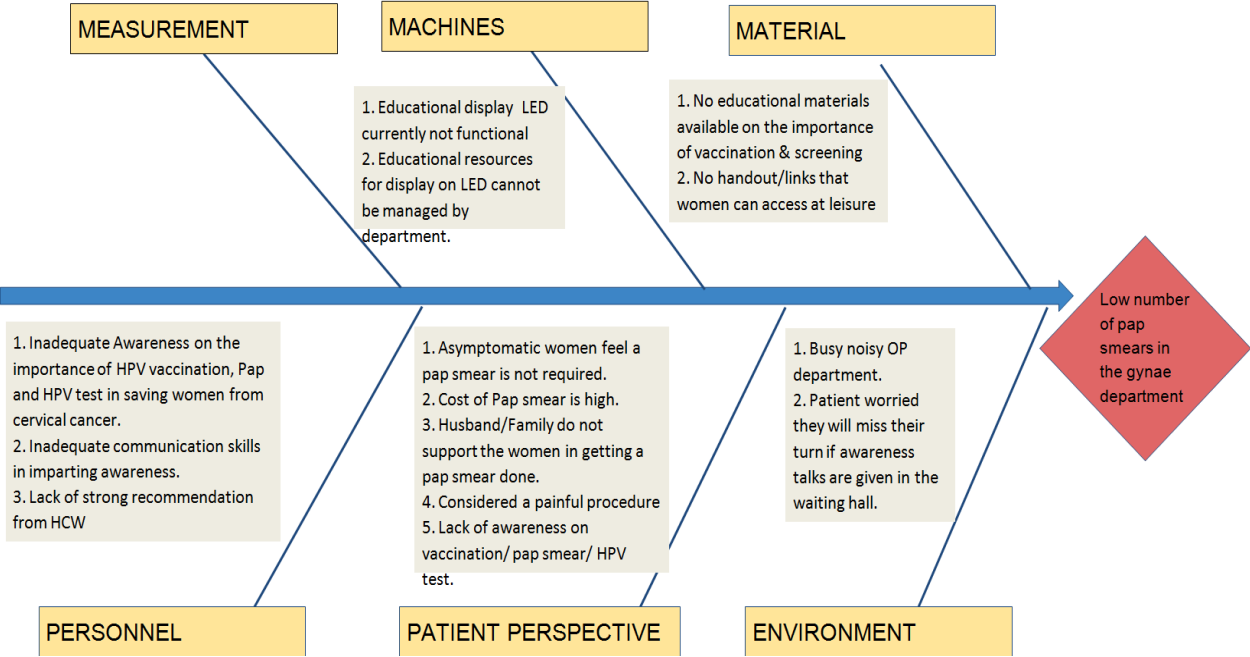


Figure 2. Fishbone Analysis

walkthrough where the quality improvement (QI) team visit the workplace to understand processes, identify areas of improvement and to reduce wasted time and effort. During the gemba walk, the QI team walked through the entire patient pathway in the gynecology clinic observing and noting down the steps that patients had to undergo prior to their consultation and a process map was formed (Figure 1). The observations were done without disturbing the routine work flow of the out-patient department. This gemba walk helped the QI team to understand the possible factors contributing to the low pap smear rate in the OPD.

3. Fishbone analysis

A team meeting was called for following the gemba walk and the contributing factors noted during the gemba walk were discussed. The fish bone analysis is a quality improvement tool that is part of the A3 methodology. It has a template with categories such as machines, material, personnel, patient perspective and environment. The fish bone analysis helped the QI team slot the identified contributing factors under the headings given in the fish bone template (Figure 2).

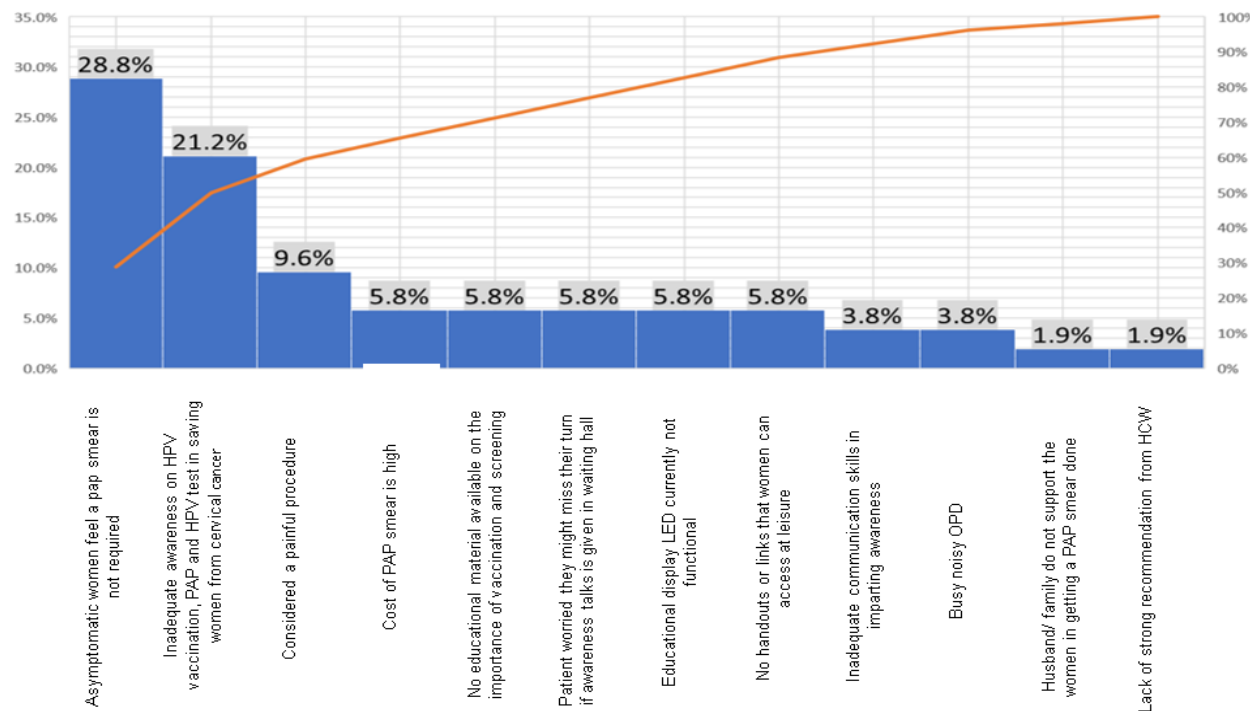


Figure 3. Pareto Chart

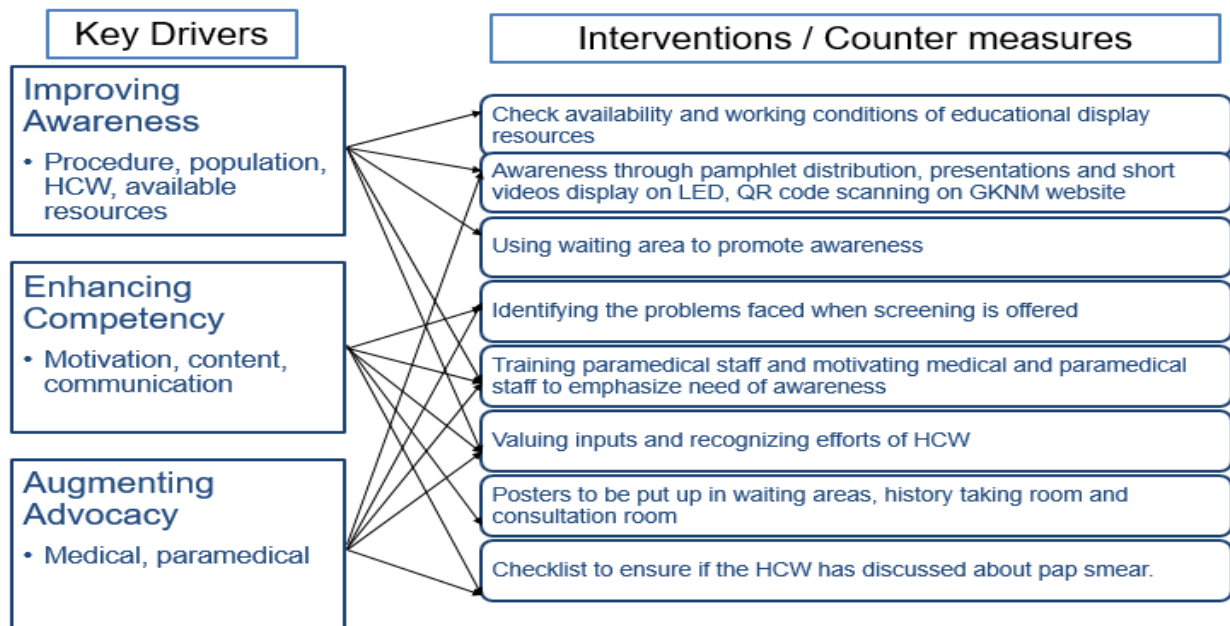


Figure 4. Key Drivers

4. Pareto chart

Subsequent to classifying the contributing factors under headings in the fish bone analysis, a team meeting was held to understand which of the factors contributed most to low pap smears. This helped the QI team to identify three factors that contributed most to the problem. The Pareto chart was done using Microsoft excel which helps to highlight the major contributing factors for low pap smear rate (Figure 3). The Pareto chart works on the 80:20 principle that states that 80% of results come from 20% of effort and that focusing on the 20% will lead to the highest returns for our time and effort. It is a decision-making technique which identifies the factors that contribute most to the stated problem. The pareto chart is used in any QI program to identify the ‘elephant in the room’ and helps to manage resources efficiently.

5. Key drivers

Following this, we moved to the right side of the A3 template where key drivers were derived (Figure 4). The conditions contributing to a particular problem needs to be addressed as a whole to ensure that improvements can happen consistently. Key drivers are 3-6 things that must happen consistently for us to reach the stated goals. The QI team had a brain storming session to identify the conditions that needed to be addressed to improve pap smear rates in the OPD. The key drivers derived for our study were improving awareness, enhancing competency and augmenting advocacy. Each key driver can have multiple interventions. While the interventions are context specific the key drivers can be generalized to similar situations.

6. Interventions

With the key drivers in place, our next step i.e., interventions were planned (Table 1). Interventions are specific changes that needed to be made to achieve our

SMART goal. The following interventions were done as part of the A3 methodology. Information leaflets were placed in gynecology OPD, educational classes were conducted for health care workers, educational information was displayed on the LED monitors, a pre-printed seal was placed in the case notes to remind postgraduates to speak to eligible women about pap smears. Each intervention was handed over to a team member who took the responsibility to implement it in a monitored time bound manner [7].

Results

A. Questionnaire

Baseline data obtained following the questionnaire survey showed that awareness about HPV vaccination and CC screening among health care workers was about 77% while awareness of CC in the patients/ family cohort was only 50%.

B. Baseline pap smear rate

Our baseline pap smear rate before the start of the study was 34% as obtained from our hospital data over a period of 6 months.

C. A3 methodology

1. SMART goal

Our outcome goal was to increase the number of pap smears amongst women in the age group of 25-60 years (excluding antenatal women) from a baseline of 34% to 70% over a study period of 9 months. To achieve our outcome goal, process goals were established:

- To improve the awareness on cervical cancer vaccination and prevention of healthcare workers in the general gynecology clinic from a baseline of 77% to 100% over a study period of 9 months.
- To improve the awareness on cervical cancer

prevention by vaccination and screening amongst patient/family attending general gynecology clinic from 50% to 80% over a study period of 9 months.

2. Process map

The Gemba walk helped the QI team to figure out the patient pathway in the OPD and to identify contributing factors to low pap smear rate (Figure 1). The Gemba walk is detailed in Figure 1.

During this gemba walk, we noted that there were no information leaflets on HPV vaccination and screening. The LED monitor that could have been used for creating awareness was not functional, and there was no strong recommendation from health care workers about having cervical cancer screening done. There was no educational material available on the importance of vaccination and screening and no handouts or links were available that women can access at leisure time.

Conversation with patients/ family helped realize perspectives from patients and personnel working in OPD.

3. Fishbone analysis

The categories under which the factors were classified in the fish bone or cause effect diagram were machines, material, personnel, patient perspective and environment (Figure 2). A team meeting was held to categorize the factors. The headings of the fish bone analysis are given within brackets. Educational display LED were not functional and educational media for display were not available (Machines). Educational material on the importance of vaccination and screening were not available nor were there any links / QR code that women could access at leisure (Materials). Inadequate awareness on the importance of HPV vaccination and screening, inadequate communication skills in imparting awareness and lack of a strong recommendation from health care workers were also identified (Personnel). Asymptomatic

women felt pap smear was not required; a few considered cost of pap smear to be high. Some women assumed that pap smear would be a painful procedure while others mentioned that their husband/ family would not support them in getting a pap smear done (Patient perspective). Patient and family were worried they would miss their turn to meet the doctor and hence would prefer not to have ongoing awareness talks in the busy noisy out-patient department (Environment).

4. Pareto chart

A pareto chart was drawn using the factors derived from the fish bone which helped us identify the most important contributing factors that we had to tackle to improve the pap smear rate in the gynecology clinic. The Pareto chart identified that one of the major contributing factors was that asymptomatic women did not feel the need of having a pap smear done as they did not realize that screening was actually meant for asymptomatic women. The second important factor was a lack of awareness on the importance of HPV vaccination, pap smear and HPV testing in effectively preventing cervical cancer (Figure 3).

5. Key drivers

The next step in the quality improvement process using the A3 methodology was deriving key drivers. The key drivers we derived were (Figure 4) Improve awareness, Enhance competency, Augment advocacy. For each key driver we derived multiple interventions to activate the key drivers. Each intervention had only a single point action. Each intervention was handed over to a team member who took the responsibility to implement it in a monitored time bound manner (Table 1).

6. Interventions

The first intervention was to place information pamphlets in the gynecology clinic to be distributed to the patient and attenders. The second was educational

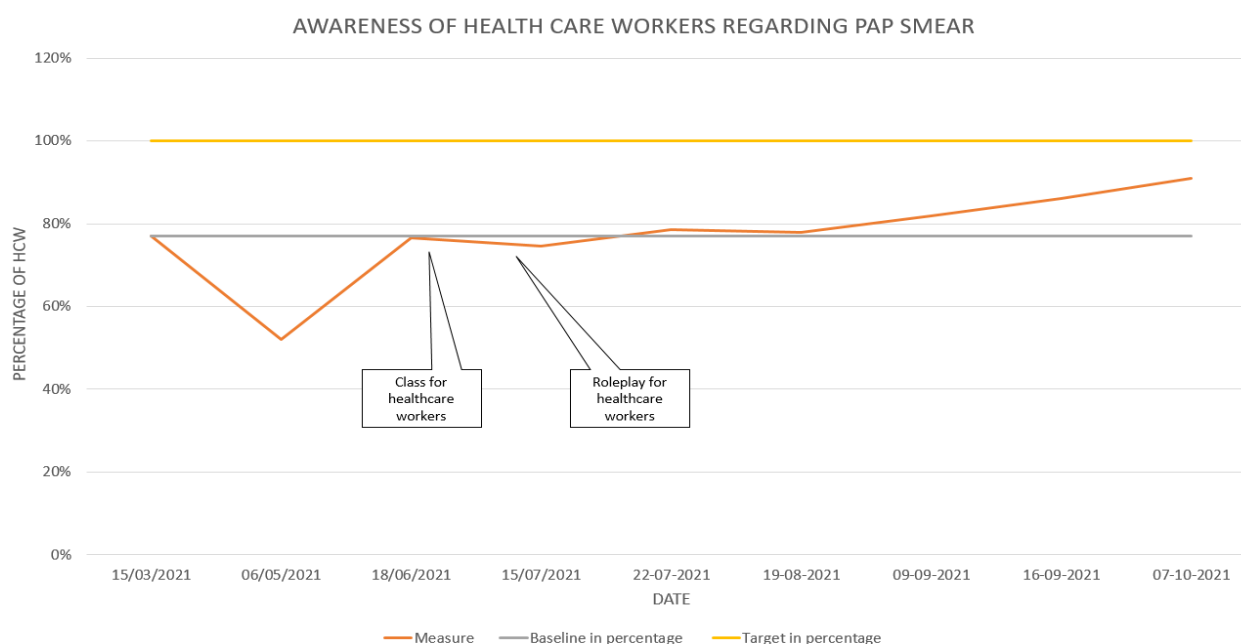


Figure 5. Awareness of Healthcare Workers

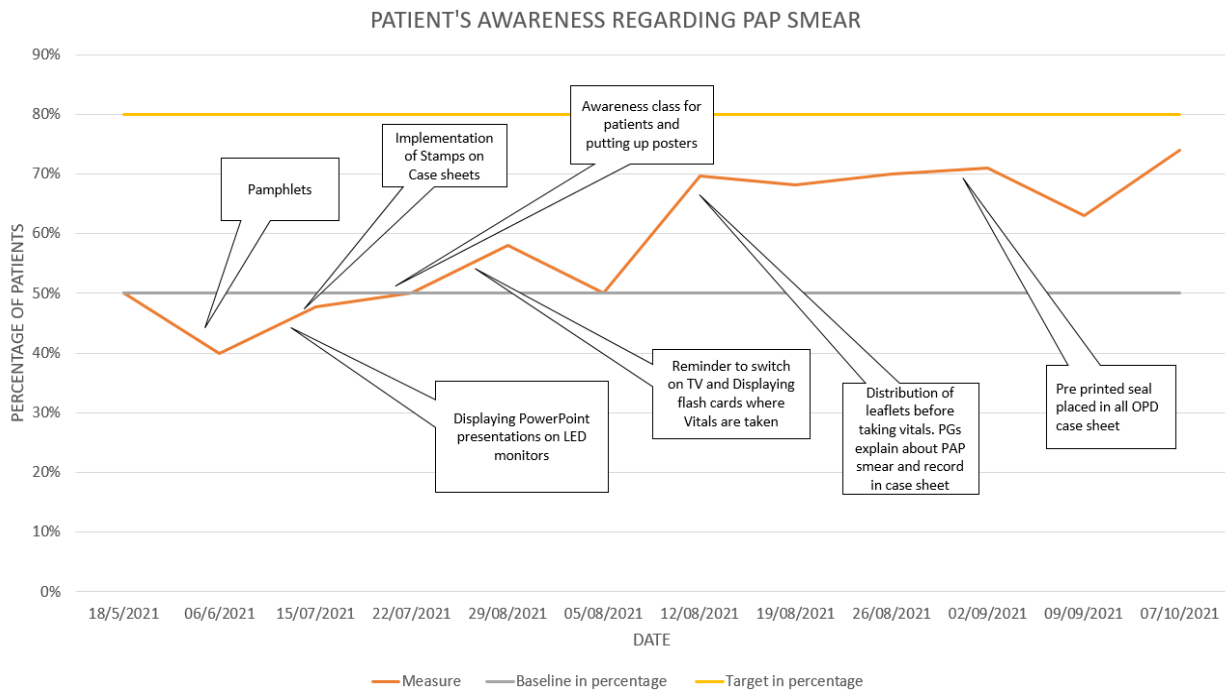


Figure 6. Awareness of Patients

classes for health care workers including role plays to improve their knowledge of cervical cancer screening. Educational information about pap smear and cervical cancer screening for patients was put up in the LED monitors in the gynecology clinic waiting area. Pap smear rates were checked every two weeks to see if there was an increase over the baseline percentage of 34%. Interventions like displaying a power point presentation on HPV vaccination and cervical cancer screening on LED monitors, reminding staff to switch on the monitors on a

daily basis, providing flash cards to patient and family members helped in increasing pap smear rates marginally (Table 1). Fortnightly classes for health care workers on screening improved their awareness and enabled them to communicate better to patients on the importance of screening and increased their awareness scores to 100%.

Of the multiple interventions tried, the two most effective were to distribute information leaflets to the patient and attenders in the waiting area and asking the postgraduates to explain about the importance of having

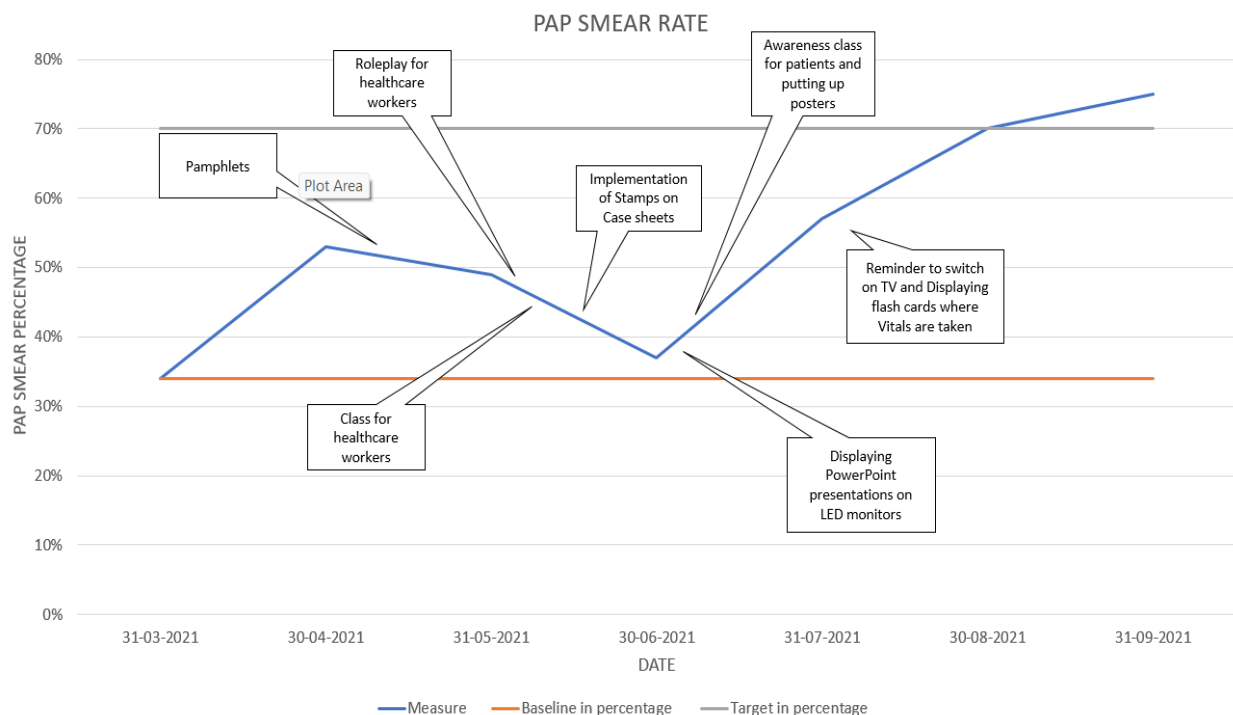


Figure 7. Pap Smear Rate

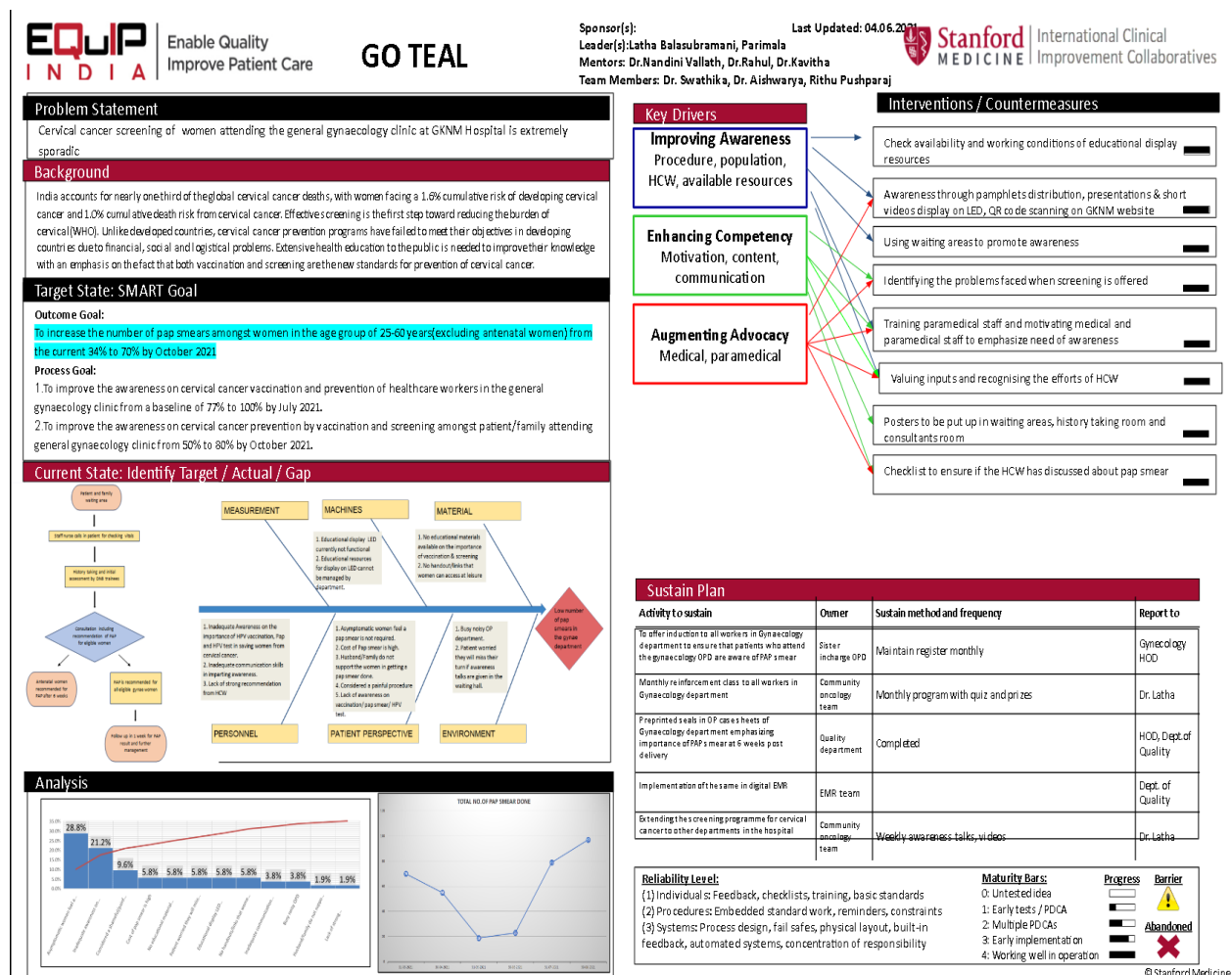


Figure 8. Summary

a pap smear done to patient and attenders. These two interventions improved the awareness of patients to about 80% from a baseline of 50%. A pre-printed seal was placed in the case notes to remind postgraduates to speak to eligible women about pap smears and this helped in reiterating the training given to the OPD staff. An increase in awareness of CC cancer prevention and screening among patients and health care personnel resulted in a gradual increase in the number of pap smears taken from 34% to 70% at the end of the study period.

Data Monitoring

The baseline data was charted on the run chart initially. As and when each intervention was implemented, questionnaire data was collected from health care workers and patients /family on a two-weekly basis (process goal). Likewise, the number of pap smears were also monitored every fortnight (outcome goal). On implementation of the above-mentioned interventions, we noted an improvement in the awareness and knowledge of the health care personnel and the women accessing the gynecology clinic. The data has been represented in the run charts (Figures 5, 6 and 7). Only the impact of important interventions has been shown in the run charts.

As shown in run chart (Figure 7), we were able to increase the Pap smear rate from 34% to 70% after

increasing the awareness regarding PAP smear among health care workers and patients (Figures 5, 6).

Sustainability

In order to sustain the increase in pap smear rate, we continued with awareness class every month and ensured that all new staff had to attend an induction program on the importance of cervical cancer screening. We were able to extend the screening program for cervical cancer to patients attending other departments in our hospital. With these small steps we were able to sustain the pap smear uptake well beyond the study period.

Discussion

The A3 methodology is a structured problem-solving tool and can be used in quality improvement processes. It encourages a systematic way of thinking that helps in problem solving and organizes data in a clear and objective manner to achieve the established goal.

The problem statement was to improve the uptake of pap smear among women attending a tertiary care center. The use of the A3 methodology also increases inclusiveness enabling all the team members to participate and to take ownership of various steps in the entire process. Documenting each step on the A3 template made sure that

the entire team were aware of the steps taken and made data review objective and easy. We were able to constantly monitor the progress using run charts which helped us decide which of the interventions were most effective. The project outcomes were discussed with the hospital management leading to emergence of clear mandates that helped us in sustaining the improvement of pap smear uptake in the gynecology clinics.

The appreciable outcomes were (1) We established regular classes on the importance of cervical cancer screening to all health care workers in gynecology department and eventually included other department healthcare workers as well (2) The health care workers gained better knowledge on the screening options for cervical cancer which helped in confident communication to patients (3) We implemented pre-printed seals in outpatient case records to document discussion regarding pap smear (4) Recommendation for a pap smear at the 6 weekly postnatal visit was added to the postnatal discharge summary (5) We were able to scale up the project to offer screening to women attending other departments as well.

While we have used the A3 methodology to improve the uptake of pap smears, this can be used for any quality improvement process for better patient care and outcomes. The A3 methodology was therefore found to be a versatile and effective tool to help improve QI competency for both medical and paramedical staff. (Figure 8).

Author Contribution Statement

The idea of the study was given by Dr. Latha Balasubramani, the data collection was done by Dr. Aishwarya. All the authors contributed equally to writing and revising the manuscript. Dr. Rahul krishnatry and Dr. Nandhini Vallath supervised the conduct of the study and reviewed the manuscript.

Acknowledgements

Ethical committee

Ethical approval was obtained from Institutional ethics committee G Kuppuswamy Naidu Memorial Hospital, Coimbatore, Tamil Nadu.

Any conflict of interest

The authors declare that there is no conflict of interest

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