

**IMPACT OF INTERVENTION OF WASH PROJECT IN HEALTH,
HEALTHCARE FACILITIES AND KAYAKALP**

A Capstone Project

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ABSTRACT

WASH in India is a sector that has been under-estimated for its pertinence in health for a long time. A fundamental reason for it is the near absence of appropriate monitoring methods able in quantifying its impact on health. While the significance of WASH has been steadily gaining cognizance, its effective implementation and practice is faced with many hurdles still. WASH inadequacies not only contribute to the risk pool for maternal and infant mortality, but also provides base for malnutrition, stunting, cognitive impairments, psychological disturbances, security, and gender inequalities.

This study explores the impact of a WASH intervention implemented in 108 PHCs from 9 districts of Madhya Pradesh. The intervention was designed on the parameters of Kayakalp award scheme that also served as a yardstick for the Star Grading Tool used. The study seeks to determine associations of WASH indicators implemented across the PHCs on parameters of location, evaluation of performance and recognition for Kayakalp award. Collaterally, the strength of Star Grading Tool is also tested in transparently conveying the performance of PHCs.

The performance measurements recorded over a year help visualize significant association between the performance indicators, the 9 districts of intervention, and the stars received upon grading. The study interestingly notes the insignificant association between the star grading and Kayakalp award reception and explores the arguable reasons for it.

This study will help urge public health professionals in deciphering the causes of slow uptake of WASH practices in differing geographic locations and devising solutions customized to the need of the community.

ACKNOWLEDGMENT

“True guidance is like a small torch in a dark forest. It doesn’t show everything at once but gives enough light for the next step to be safe.”

Swami Vivekanand

The foundations of this report are the hard work of my guide, Dr. Goutam Sadhu, but the time I have spent enjoying it makes me wish I were a part of it too. For this I am grateful to him for introducing me with not just this interventional program but also the necessity of WASH in the world. His kindness and graduated lessons gave me an invaluable atmosphere of exploration and learning that sparked my interest, awareness, and curiosity in this field. I feel fortunate to have his support, blessings and guidance.

I am sincerely grateful to Hemant Kumar Mishra Sir who has been a beacon for me in crisis. He is one of the subtle teachers that leave you with numerous lessons without you comprehending the treasure. He stepped in the time of greatest need, clarifying my doubts before I could ask them. Without him I would have been lost.

Only after my teachers shall I be grateful to the Creator, for positioning me in a place worthy enough to thank Him.

Dr. Shantam Mishra

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LIST OF ABBREVIATIONS

ARWSP	Accelerated Rural Water Supply Program
CAG	Comptroller and Auditor General
CRSP	Central Rural Sanitation Program
HCAI	Healthcare Associated Infections
IIHMRU	Indian Institute of Health Management and Research University
JSSK	Janani Shishu Suraksha Karyakram
MDG	Millennial Development Goals
MDWS	Ministry of Drinking Water and Sanitation
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MoHFW	Ministry of Health and Family Welfare
MRD	Ministry of Rural Development
NBA	Nirmal Bharat Abhiyan
NGP	Nirmal Gramin Puraskar
NRC	Nutrition Rehabilitation Care
NRDWP	National Rural Drinking Water Program
OD	Open Defecation
ODF	Open Defecation Free
SBM	Swachh Bharat Mission
SNCU	Special Newborn Care Unit
SSS	Swacch Swasth Sarvatra
SDG	Sustainable Development Goals
TSC	Total Sanitation Campaign
UHC	Universal Health Coverage
WHO	World Health Organization

INTRODUCTION

“We have to tackle the triple malady which holds our villages fast in its grip: want of sanitation, deficient diet and inertia.”

Mahatma Gandhi

In the light of achieving the target of Universal Health Coverage by 2030, India has revamped and introduced several schemes and programs keeping in mind the nationwide disparities that keep the people from accessing healthcare equitably. The starkest of them is the urban-rural divide that witnesses stronger healthcare workforce, quality, infrastructure, and accessibility resulting in better service provision in the urban sector. The results of this divide can be observed on the unmet basic needs of the rural population. With handsome efforts concentrated in the urban populace, the rural India troubles still over adequate supply and quality of water in households and public places like schools and healthcare facilities (HCF), over properly managed sanitation and hygiene facilities like toilets, menstrual hygiene, and handwashing, over waste management and over infection control practices in healthcare facilities among various variables.

The Government's efforts in the direction of UHC by expansion of institutional deliveries and aversion of immense maternal and newborn health adversities with schemes like Janani Suraksha Yojna (JSY) and Janani Shishu Suraksha Karyakram (JSSK) under the National Health Mission have born remarkable results over the years. But the improving strength of institutional deliveries and the rural population seeking healthcare through a HCF necessitates ensuring a safe environment for the patients at the HCF. While efforts are being made to attract more institutional deliveries and increase the demand in pregnant women for it, less attention is given though to their safe deliveries through practice of infection control,

sanitation, and hygiene. The result of unsafe and unhygienic health practices is that national schemes like JSSY fail to achieve full potential with the resultant maladies of maternal and infant mortalities, increased duration of hospital stay owing to additive diseases, increased expenditure, and patient dissatisfaction with the health system.

There is a dearth of appropriate studies especially in the low-and-middle-income countries due to a lack of documentation and improper data that can succeed at implicating the impact of water, sanitation, and hygiene (WASH) on maternal and child health outcomes. However, many independent studies conducted worldwide and a few small-scale studies in rural areas of India have been conducted in the pursuit of said evidence. While many historical and recent studies show the association of healthcare associated infections, puerperal sepsis(1), child mortality due to diarrheal infections(2) and helminthic infections(3) with quality of water, status of sanitation, open defecation, waste management and hygienic practices, several other studies steer our attention to their probable role in ectopic pregnancies, preterm births, low birth-weight babies, undernutrition and stunting in children.(8-11)

Along with the evolution of Millennium Development Goals to Sustainable Development Goals, the health service structure of India has been evolving alongside to rise to the targets laid down. The Government of India has been constantly restructuring programs like the Total Sanitation Campaign and its collaboration with MGNREGA scheme to expand the construction and utilization of toilets to eliminate open defecation in the rural India. There have been cross sectoral alliances across ministries like the Ministry of Rural Development, Ministry of Health and Family Welfare and Ministry of Drinking Water and Sanitation to manage and provide adequate water supply necessary for supporting sanitation and hygiene practices like handwashing and maintenance of open defecation free(ODF) status.

Following a worldwide movement of “Clean care is safe care” (4) by WHO, interventions of WASH practices in healthcare facilities were emphasized. Award based schemes like Nirmal Gram Puraskar which focused on household and community cleanliness were converged further to motivate health facilities. Such ideas gave birth to the Kayakalp Award Scheme and Swachh Ratna Awards that recognize significant improvements made in quality of healthcare services in the rural backdrop.

REVIEW OF LITERATURE

THE EVOLUTION OF WATER, SANITATION AND HYGIENE IN INDIA

Before independence in 1947, India was largely a rural and agricultural nation with a bounty of open lands, fields, and forests where the practices of sanitation were undisputed and open defecation was norm. The vast unoccupied lands dulled the nuisances of sanitation like mal-odor, waste treatment or spread of infection. Though the British colonialization introduced water and sewerage technologies in India, they were limited to the households of the British and the upper class. With population growth and the advent of industrialization, and urbanization post-independence the availability of free land gradually became sparse, giving rise to sanitary and hygiene issues.(5)

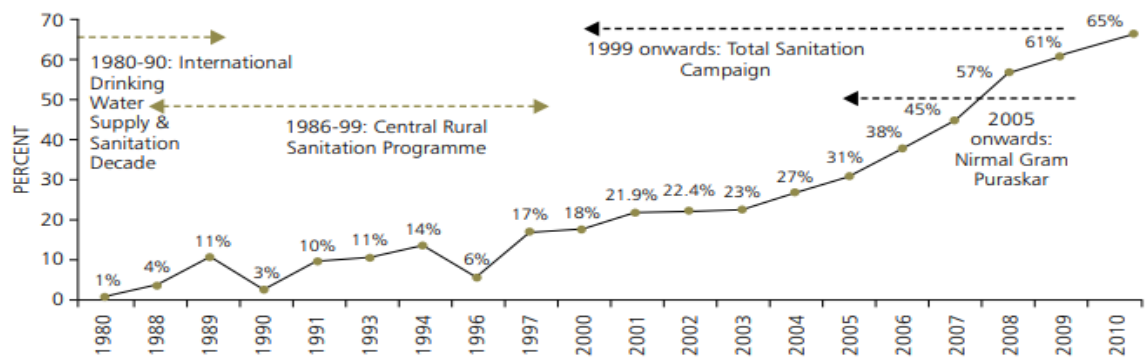
Even as the newly formed government of independent India contemplated the issues of water, sanitation, and hygiene in its 1st Five Year Plan, it was not until 1986, amidst the launch of International Water and Sanitation Decade in 1980, that the sector received prominence and funding from central government. A nationwide **Central Rural Sanitation Program (CRSP)** was initiated by the Ministry of Rural Development (MRD) with assistance from WHO, UNDP, and UNICEF. By the conclusion of 9th Plan of CRSP, 9.45 million subsidized

individual toilets had been constructed for rural utilization. But the Census of 2011 reflected a rural toilet coverage of 21.9 percent and the transition between 1981-2001 saw a mere 1 percent annual increase in coverage.(5) It was soon learnt during review of the program that the number of subsidized toilet constructed was not equivalent to their usage due to several factors, attributable vastly to socio-cultural resistances. On the forefront were the traditional practices of open defecation that lacked cognizance and led one to believe in OD to be healthier. Construction of newer technology-based design of toilets and flushes created apprehension pertaining to their utilization and subsequently many toilets were found to be serving alternate purposes like storage spaces for fodder, agricultural equipment, etc.(5)

The need for restructuring the CRSP was sorely realized leading to the initiation of **Total Sanitation Campaign** in 1999 by the Government of India under MRD. The TSC emphasized deliberately on education, information and communication revolving around the need for sanitation to achieve better behavioral acceptance. To support adequate sanitary utilization, resources were shared through the District Water and Sanitation Committees to the Gram Panchayats. This eased the formation of private baths and toilets improving privacy for females. To promote local leadership and community involvement at the Gram level of rural India, **Nirmal Gram Puraskar** was commenced to be awarded in the October of 2003 that recognized the role of Gram Panchayats in rural sanitation development.

Although the objectives put forth by the TSC were broad, a few qualitative improvements that came to light were momentous. A mid-term evaluation conducted in 2004 saw that sanitation, hygiene and health education had become universal in all schools operating in districts under TSC. And it was the influence of school-going children on the degree of awareness of their families that led to a significant acceptance and construction of toilets in residences. Building of community toilets for families that could not afford private toilets

also saw a rise.(5) Incentivization at the achievement of outcomes rather than subsidizing toilet construction seemed successful at least in attaining better coverage. From the sluggish pace reflected by the CRSP, the TSC gained over three-fold coverage, from 22 percent household toilets in rural India in 2001 to 65 percent by the end of 2010. This rise was emboldened by NGP and can be visualized by the rise in magnitude of the NGP winners from 40 in 2005 to over 22,000 in 2010.(6)



Source: Government of India, Department of Drinking Water Supply <http://ddws.nic.in>. Accessed in March 2010.

Fig. 1 shows the steady increase in rural sanitation coverage in India till the year 2010. (6)

Although the program increased toilet coverage, it could not guarantee for ODF India despite strong allegiances and stakeholder engagements. The planning of the program was deemed weak as the funding dwindled in some instances while it went unused in others.

Seeking to step up sanitation coverage, TSC was renamed as **Nirmal Bharat Abhiyan (NBA)** by the Prime Minister of India in 2012 during the 12th Five Year Plan. NBA renewed its implementational strategies and converged with Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) giving an opportunity to beneficiary to earn a significant amount for constructing a household toilet. NBA with MGNREGA also

encompassed to include infrastructural construction for solid and liquid waste management with defined wages for labors. In its 2 years tenure, the program however failed to adequately utilize funding still and gained a coverage of only 6 percent despite its alliances.(7)

In light of the delays and hurdles faced for total sanitation coverage, the NBA was launched as **Swachh Bharat Mission (SBM)** in 2014 and called for mass movement towards a clean India thus putting responsible sanitary practices in the hands of the community as well. The SBM has two submissions namely SBM-Urban and **SBM-Gramin** for urban and rural areas, respectively. The SBM sought to achieve a clean and sanitized India through improving waste management in rural areas and freeing them of open defecation by 2nd October 2019, the 150th anniversary of Mahatma Gandhi, as a befitting tribute. It introduced the public-private partnership model of management for cost effective technique implementation at various tiers, intensified community motivation and supported the Gram Panchayats for promoting safer and sustainable sanitary environment.(8)

SUPPORTING AGENCIES FOR WATER, SANITATION AND HYGIENE IN RURAL INDIA

The laws and policies revolving around the use of water can be traced well back to the Indus Valley Civilization when elements of the ecosystem were held sacred. The laws in Independent India however still reflect the colonial organization of water laws and to date, water is held as a state subject.(9) It is fairly remarkable though how long a way India has come in understanding the social, cultural and economic needs of the population linked with water availability and in initiating programs at political level to ensure its fulfillment.

Historically, the role of Government of India in providing access to drinking water in the rural sector initiated with the **Accelerated Rural Water Supply Program** (ARWSP) in 1972-73. ARSWP has undergone numerous reforms over the time. It was renamed and highlighted as **National Rural Drinking Water Program** by 11th Plan in 2009 with a stress on quality, sustainability, and equity of water for drinking, cooking, and other purposes. From the use of springs, uncovered wells, handpumps etc. for drinking water, the program aims to expand the use of sources of piped water.(10) In 2011, the responsibilities were transferred to the Ministry of Drinking Water and Sanitation (MDWS) which previously operated under the Ministry of Rural Development. MDWS converged with MRD, Ministry of Water Resources conducting the National Water Mission, and other ministries to help achieve the target. Other than the fact that NRDWP ensured the safety, quality, and availability of household water it also aims to lessen the rapid depletion of groundwater easing the source for irrigation and promoting water sustainability in rural areas. It also converged its efforts with the SBM to provide for schools and Anganwadi centers besides households of safe drinking water.

However slight the results though, given the population size of the nation and its gradually starving water tables, the movement for realization of an integrated approach to safe and sustainable drinking water was a significant progressive step.

GLOBAL CALL FOR WATER, SANITATION AND HYGIENE AND ITS EFFECTS IN INDIA

During the Millennial Summit of 2000, 189 UN member countries including India adopted the 8 **Millennial Development Goals** defined by the UN General Assembly. Water was

addressed in the 7th MDG by the way of ensuring “environmental sustainability”. Although not attended to initially, sanitation was included 2 years later in the final version of goal 7 stating to “halve the proportion of population without sustainable access to safe drinking water and basic sanitation by 2015”.(11) This was a major turning point in the actions directed towards facilitation of WASH globally that gradually led to assertions on service delivery in India.

The MDGs asserted heavily on reviewing the global scenario from the lens of alleviating poverty and hunger, gender disparities and environmental viability. Inequities among water and sanitation coverage had been noted previously during the CRSP reflecting better results in urban areas and in selective rural areas. The remote and more challenging rural areas were being given less effort. Realizing the need to focus on national poverty, gender inequalities, women empowerment and water and sanitation coverage, addressal of WASH became obvious than simply accreting toilets. They were driving force for the TSC to accelerate efforts for achieving improved water safety and sanitary coverage. By 2005, 520 rural districts were covered under TSC and sanitation coverage rose to 33%(12) achieving the target for safe sanitation before deadline by 2007-08 with 14.2 million individual household toilets warranted in rural India by 2013 (13).

In the year 2012 as the United Nations conferred to improvise the MDGs and adopted the **Sustainable Development Goals** in 2015, the NRDWP was in effect and SBM had come into being. The SDGs encompass a total of 17 goals in continuation to the 8 previously described MDGs. Even though the 6th SDG targets universal availability and sustainability of water and sanitation services, the issues surrounding water have been addressed in other SDGs too. It additionally stresses on the sustainability and quality of water resources and the ecosystem. The **target 6.1** addresses access to safe and affordable drinking water and **target**

6.2 that addresses sanitation and hygiene to eliminate open defecation also stressed on the female unmet needs for security and privacy while building a sanitary environment. (11)

Figure 2. SDG indicators related to WASH.

The World Health Organization has continually been stressing on proper WASH services in healthcare facilities as a medium to avoid numerous adverse health events like childhood stunting, nutritional deficiencies, healthcare associated infections that have direct and indirect effects on maternal and child health and mortality, especially in institutions equipped

	SDG global targets	SDG global indicators
	6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all	6.1.1 Proportion of population using safely managed drinking water services
	6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations	6.2.1 Proportion of population using a) safely managed sanitation services and b) a hand-washing facility with soap and water
	1.4 By 2030, ensure all men and women, in particular the poor and vulnerable, have equal rights to economic resources as well as access to basic services...	1.4.1 Proportion of population living in households with access to basic services (including access to basic drinking water, basic sanitation and basic handwashing facilities)
	4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all	4.a.1 Proportion of schools with access to... (e) basic drinking water, (f) single-sex basic sanitation facilities, and (g) basic handwashing facilities
	3.8 Achieve universal health coverage (UHC), including financial risk protection, access to quality essential health care services, and access to safe, effective, quality and affordable essential medicines and vaccines for all	[Proportion of health care facilities with basic WASH services]

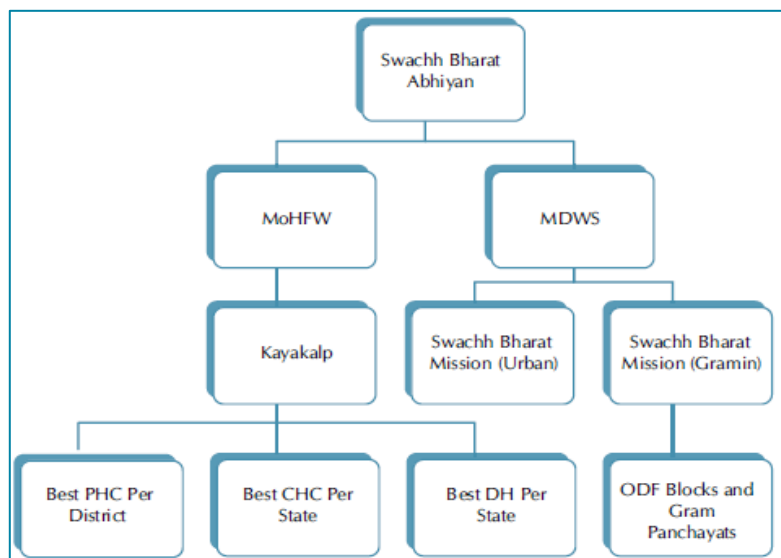
for deliveries in the remote and rural sector. Keeping in view the evidences of unsafe healthcare environment leading to health adversities, the World Health Assembly stressed on patient safety with the oath of “*Primum non nocere*” (First, do no harm)(4) and introduced the World Alliance for Patient Safety in 2004. In a first of its kind collaboration, WHO shifted focus towards patient safety by shaping a safer environment through WASH mediations in health facilities.(4) In the WASH Summit held in 2015, the need for WASH in healthcare system was acknowledged by India.(14)

Towards this end the **Kayakalp Award Scheme** was launched in May 2015 by the Ministry of Health and Family Welfare(MoHFW)(15) to stimulate cleanliness, sanitation, and hygiene in public health facilities by awarding cash prizes to the health facilities meeting expectations

on the parameters of hospital upkeep, sanitation and hygiene, waste management, infection control, hospital support services and hygiene promotion.

The inter-sectoral collaboration between MoHFW and MDWS gave birth to **Swachh Swasth Sarvatra** in 2016 under SBM focusing on prevention of infectious diseases rather than their treatment.(15) The aim of this joint effort is to build capacity and expand ODF status in rural India, leveraging and maintaining the results of SBM-G, utilizing Kayakalp Scheme to capture the respective Gram Panchayat and CHCs, and dissemination of IEC. SSS seeks to expand ODF in Gram Panchayats where Kayakalp recipient PHCs are located and, to leverage ODF Blocks to strengthen CHCs to avail Kayakalp Award(16) thereby integrating community participation and health care facilities giving power back to community. SSS awards such healthcare facilities with **Swachh Ratna PHC/CHC**.

Figure 3. Branching of Swachh Bharat Abhiyan (SBM) to encompass PHC, CHC, DH and Gram Panchayat.



IMPLICATIONS OF WATER, SANITATION AND HYGIENE ON MATERNAL AND INFANT HEALTH

“We shall not defeat any of the infectious diseases that plague the developing world until we have also won the battle for safe drinking water, sanitation, and basic health care.”

Kofi Annan

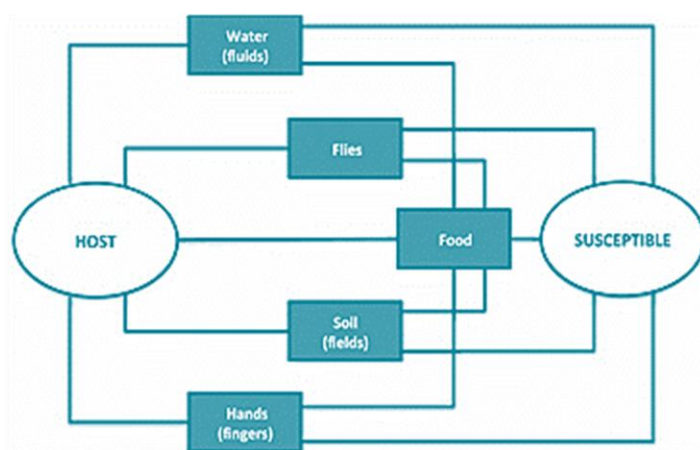
The earliest documentation of importance of inclusion of WASH in health and healthcare facilities comes probably from the works of **Dr. Alexander Gordon MD** who studied the epidemics of puerperal sepsis in Aberdeen during 1789-1792. Dr. Gordon observed the transmission of infectious pathogen of puerperal fever through the healthcare staff and visitors among the patients. He established a connection between erysipelas, a skin disease, and puerperal sepsis that gripped delivering women during childbirth. Gordon suggested fumigation of patients' chambers and proper washing protocols of the hospital staff and their apparels to mitigate its spread.(17) It was later known that both diseases are caused by the bacterium *Streptococcus pyogenes*.

Gordon's works inspired **Dr. Ignac Semmelweis** of Hungary in establishing a relation between cadaveric infection transmission from “cadavers, pus and putrefying organic matter”.((1),85) He theorized puerperal fever to be the cause of maternal mortality in 1847 and introduced antiseptic precautions. He observed a drastic difference between mortality rates due to puerperal sepsis between two obstetric clinics in same hospital department. The First Clinic that was for practice of medical students exclusively reflected a maternal mortality rate of 11.5 percent against the Second Clinic for tutoring of midwives revealing only 2.7 percent of it.(1) When he learned of the death of his fellow friend from sepsis acquired through a cut while performing autopsy, Semmelweis concluded that infectious

particles were transferred from cadavers to the medical students that they but not the midwives dealt with, to pregnant women. He believed that hands of medical practitioners should be free of cadaveric odor and went on to propose that simple handwashing with soap and water be replaced by the more effective chlorine water. Semmelweis was later entitled the “Savior of Mothers” for his work.(1)

The observations of John Snow, Lister, Pasteur, Jenner, and many others are well recorded in history that support the transmission of infectious agents through fluids, fields, flies, food, and fingers to cause diseases. Healthcare facilities that harbor all the above routes therefore forms a significant target of WASH intervention.

Fig 3. Shows the relation between a diseased host and susceptible population through the 5 F of infectious disease transmission.(18)



Since the results and achievements of Semmelweis’s works, handwashing has been noted effective in reducing the burden of infectious disease transmission, hospital acquired infections and spread of antimicrobial resistance through healthcare environment. WHO projects that 10 in every 100 patients hospitalized suffer from at least one **hospital acquired infection** in the developing countries.(19) A study estimates that globally 3.0 million neonates suffer from sepsis annually causing 11-19 percent mortality due to neonatal **sepsis** alone.(20). The GBD Diarrheal Disease Collaborator Study spanning 25 years found **diarrhea** one of the prominent reasons of under-5 mortality, causing 1-3 million deaths worldwide in 2015. These mortalities occur despite treatable disease-causing pathogens like

Shigella, *Escherichia coli* and *Cryptosporidium* that are frequently contracted through healthcare facilities. Diarrhea and **malnutrition** are self-influencers in a vicious cycle. Diarrhea that causes electrolyte and nutrient imbalance gives way to malabsorption causing malnutrition, while malnutrition paves way for a weakened immune system to contract diarrheal diseases frequently.(21) A study by Checkley et al. established an association between frequency of diarrheal episodes by the age of 2 years to have higher odds of causing stunting in children.(22) Malnutrition in children that carries vulnerability to recurrent infections does not only cause physical health adversities but can also cause cognitive and social impairments, negatively affecting academic performance with frequent leaves of absence from school, and work performance later into adulthood too.(23) The GBD study found a reduction of 13.4 percent DALY due to diarrheal diseases with improvement in water use and hygiene practices.(2)

The sanitation and hygiene of healthcare staff should not be the sole focus in preventing adverse disease outcomes, but those of the patients and visitors should be scrutinized too. Toilets used by patients and visitors warrants regular sanitary cleaning to not only prevent spread of infection from a diseased patient to a healthy visitor but also to prevent new infections in patients. In this relation the role of use of soap and water for hand hygiene is complementary and central. And yet the Joint Monitoring Program report of 2019 estimates that in 2016, one in six healthcare facilities globally lacked hygiene services including the use of water with soap at toilets while one in three facilities in east and south east Asia had only basic hand hygiene facilities.(24)

The first 28 days of life of a neonate carries 30 times the risks of mortality than later stages of life, while the first 6 weeks after childbirth hold 15% chances for maternal mortality

caused due to infections.(25)(26) A safe environment and quality of care though fundamental become even more critical for lifetime maternal and child health outcomes. The NITI Aayog reported 31 neonatal deaths for every 1000 livebirths in 2013 in the rural India, which is twice the rate in urban India and, 130 maternal deaths for every 1,00,000 live births nationally during 2014-2016.(27)(28) Infections caused due to unhygienic labor and deliveries, unclean cord care, contaminated water and poor waste management, inadequate maternal hygiene like regular handwashing are immense risk factors for maternal and newborn mortality that need attentive care during the first six weeks.(29) It has been estimated that maternal sepsis causes at least one in ten deaths during pregnancy and childbirth, 95% of which are concentrated in low and middle income countries with an annual 1 million neonatal deaths associated with it.(30)

In this aspect, improvement in WASH conditions in a community and healthcare facilities will also benefit in achieving the **SDG 3** that aims at ending preventable mother and child deaths, reduce maternal mortality rates, combat water-borne diseases and diseases arising from untreated or ill-treated water consumption and use.

	TARGET 3.1	By 2030, reduce the global maternal mortality ratio to less than 70 per 100 000 live births.
	TARGET 3.2	By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1000 live births and under-5 mortality to at least as low as 25 per 1000 live births.
	TARGET 3.3	By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases, and other communicable diseases.
	TARGET 3.9	By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.

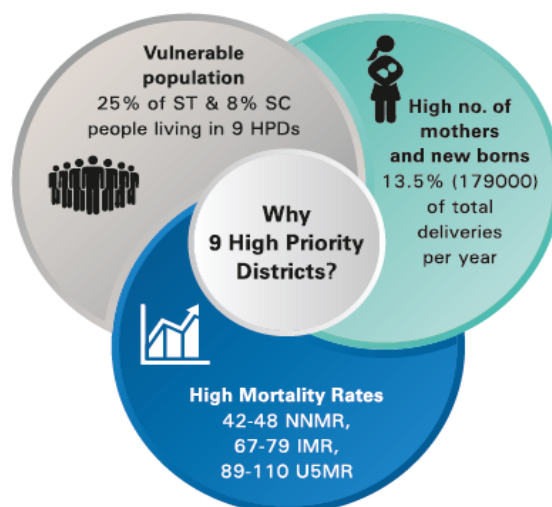
Figure 4. SDG 3 related to WASH

RATIONALE FOR STUDY

People visit healthcare facility for better health outcomes rather to deteriorate it further. The quality of the healthcare environment determines the level of satisfaction a patient gathers upon seeking it which forms a significant contributor in maintaining his trust with the health system. This factor finds more applicability in patient safety in the rural setting than in urban, where infectious diseases are rampant much due to the unhygienic and unsanitary practices. The role of a healthcare facility can be monumental in changing the behavioral norms regarding WASH practices in the community and vice versa, if managed suitably. The efforts made at HCF and community level inseparably reflect the progress made by each towards achievement of SDG 6, and eventually UHC. It also reflects the decision-making capacity a community can hold for their own health, which is necessary after cessation of any interventional support. Moreover, the absence of a standard national database, and a dearth of data and studies challenges the examination of outcomes borne out of interventions of multi-agency collaborations in WASH sector.

In one such attempt to recognize the intricacies of WASH with health, an interventional program was initiated in Madhya Pradesh that owes a MMR of 173, an IMR of 47 and ranks

well below the national average in key health indicators. The program was conducted in 196 HCFs of 9 districts of the state to observe such relations. These districts cumulatively conduct about 13.5 percent of the state's institutional deliveries and were strategically chosen for their suboptimal healthcare services and the consequential poor health status.



Sustainability of any intervention depends largely on the level of community engagement, which Kayakalp fosters. Kayakalp is awarded to facilities that exhibit the fulfillment of over 70 percent of its indicators. The association of improving the WASH status alone in these HCFs of rural and tribal areas, and their recognition for Kayakalp Award, thus, can form a yardstick urging public health professionals to implore deeper into the aspects of WASH that enhance the quality of health in India.

OBJECTIVES

- To assess the impact of WASH intervention in 108 Health Care Facilities on the Star grading tool used.
- To assess the association between Stars achieved and Kayakalp award receptions within these 108 Health Care facilities.

METHODOLOGY

This study is retrospectively based on the secondary data originating from a program initiated by IIHMR University with the support of National Health Mission and UNICEF in the state of Madhya Pradesh in the late 2016. After careful examination of the health scenario of the state, 9 districts were chosen for implementation of WASH interventions in HCF, namely Guna, Sheopur, Shivpuri, Mandla, Anuppur, Shehdol, Umaria, Jhabua and Alirajpur, of which the latter two are tribal. A total of 196 HCF belonging to these 9 districts were engaged comprising of 108 PHCs along with district hospitals, CHCs, sub-

<u>STARS</u>	<u>SCORE</u>
1	Below 40%
2	41%-60%
3	61%-75%
4	76%-90%
5	91%-100%

centers, Nutritional Rehabilitation Centers and, Health and Wellness Centers accounting to a total of 196 HCFs intervened. The intervention was implemented in 2017 and targeted 6 healthcare components viz general section, PNCU, labor room, OPD, SNCU and NRC which were analyzed under indicators of water supply and its quality, bio-medical waste management, state of toilet facility including handwashing practices and overall cleaning care.(31) The indicators were designed in compliance with Kayakalp guidelines and the WHO guidelines on IPC. The compliance of HCFs was monitored on bimonthly basis along these indicators and the cumulative score decided the stars gained over the star grading assessment tool. The data describing the sectional performance across the 4 indicators was taken from the months of July 2018, June 2019, and October 2019. To compare the Star grading with Kayakalp reception, both awarding sessions i.e. 2018-2019 and 2019-2020 were referred with. The analysis was performed on IBM SPSS Statistics Version 22.

INCLUSION AND EXCLUSION CRITERIA

Among all the 196 HCFs in which the intervention was placed, only the PHCs were included in this study as they alone fulfilled the criteria of winning the Kayakalp award during the session 2018-2019 as referred from nhsrcindia.org and so it could be better positioned with the results of 2019-2020. Among all the 6 sections placed under intervention, 4 were included namely, general section, PNCU, labour room and OPD. NRC and SNCU were excluded as they were not present across all 108 PHCs to give valuable results.

ANALYSIS AND OUTCOMES

The indicators applied across the 4 sections of PHCs for scoring against the Star grading Tool cover 68% objectives laid down under the Kayakalp Award Scheme. A total of 6 PHCs were awarded the Kayakalp in the session 2018-2019, whilst 42 PHCs won during the session 2019-2020.

Over the course of verifying the objectives, the variables namely, section wise scores, stars achieved and the placement of PHCs according to districts were analysed simultaneously. To test our hypothesis whether the performance of the 108 PHCs is associated with the star grading and consequently with the reception of Kayakalp several research questions were laid down. These questions sought to answer the following:

- Is there any significant association in the performances of PHCs according to their districts?
- Is there any significant association of performance of PHCs under influence of their tribal placement?
- Is there any significant association between the performance of PHCs and their overall star grading?
- Is there any significant association between the section wise performances of PHCs and their propensity to win the Kayakalp award?
- Is there any significant association between the star grading of PHCs and their propensity to receive the Kayakalp award?

Chi square analysis was conducted amongst these variables to test the hypothesis on several levels. To fulfil the assumptions of chi square testing, the variables, section wise scoring and star grading were converted into two categories.

VARIABLES	NUMBER OF PERFORMANCE INDICATORS	PERFORMANCE CATEGORISATION	
GENERAL SECTION	20	<10	LOW
		>10	HIGH
PNC WARD	14	<7	LOW
		>7	HIGH
LABOR ROOM	14	<7	LOW
		>7	HIGH
OPD	5	<3	LOW
		>3	HIGH
STAR GRADING	5	<3	LOW
		>3	HIGH

CATEGORISED GENERAL SECTION SCORING JULY18	DISTRICTS(n=108)									TOT AL	Chi sq. val ue	P valu e	
	Aliraj pur	Anup pur	Gun a	Jhab ua	Man dla	Shah dol	Sheo pur	Shiv puri	Uma ria				
	1 (LOW)	4 (10.5 %)	3 (7.9%)	5 (13.2 %)	5 (13.2 %)	3 (7.9 %)	6 (15.8 %)	6 (15.8 %)	2 (5.3 %)	4 (10.5 %)	38 (100 %)	6.3 06	0.61 3
	2 (HIGH)	7 (10.0 %)	6 (8.6%)	7 (10.0 %)	10 (14.3 %)	11 (15.7 %)	10 (14.3 %)	4 (5.7%)	10 (14.3 %)	5 (7.1 %)	70 (100.0 %)		
	TOTAL	11 (10.2 %)	9 (8.3%)	12 (11.1 %)	15 (13.9 %)	14 (13.0 %)	16 (14.8 %)	10 (9.3 %)	12 (11.1 %)	9 (8.3 %)	108 (100. 0%)		
	CATEGORISED GENERAL SECTION SCORING JUNE 2019	DISTRICTS(n=108)									TOT AL	Chi sq. val ue	P valu e
		Aliraj pur	Anup pur	Gun a	Jhab ua	Man dla	Shah dol	Sheo pur	Shiv puri	Uma ria			

1 (LOW)	0 (0%)	1 (14.3 %)	1 (14.3 %)	0 (0%)	1 (14.3 %)	0 (0%)	2 (28.6 %)	2 (28.6 %)	0 (0.0 %)	7 (100 %)	9.0 00	0.34 2
2 (HIGH)	11 (10.9 %)	8 (7.9%)	11 (10.9 %)	15 (14.9 %)	13 (12.9 %)	16 (15.8 %)	8 (7.9 %)	10 (9.9 %)	9 (9.9 %)	101 (100 %)		
TOTAL	11 (10.2 %)	9 (8.3%)	12 (11.1 %)	15 (13.9 %)	14 (13.0 %)	16 (14.8 %)	10 (9.3 %)	12 (11.1 %)	9 (8.3 %)	108 (100 %)		
CATEGO RISED GENERA L SEC SCORIN G OCTOBE R 2019	DISTRICTS(n=107)									TOT AL	Chi sq. val ue	P valu e
	Aliraj pur	Anup pur	Gun a	Jhab ua	Man dla	Shah dol	Sheo pur	Shiv puri	Uma ria			
1 (LOW)	0 (0.0 %)	0 (0.0 %)	1 (16.7 %)	1 (16.7 %)	1 (16.7 %)	0 (0.0 %)	1 (16.7 %)	2 (33.3 %)	0 (0.0 %)	6 (100 %)	6.5 86	0.58 2
2 (HIGH)	11 (10.9 %)	9 (8.9 %)	11 (10.9 %)	14 (13.9 %)	13 (12.9 %)	16 (15.8 %)	9 (8.9 %)	9 (8.9 %)	9 (8.9 %)	101 (100 %)		
TOTAL	11 (10.3 %)	9 (8.4 %)	12 (11.2 %)	15 (14%)	14 (13.1 %)	16 (15%)	10 (9.3 %)	11 (10.3 %)	9 (8.4 %)	107 (100 %)		

Table 1. Cross tabulation between General Section performance and districts over a year.

CATEGORISED PNC SCORES JULY 18	District										Chi sq. value	P value
	Alirajpur	Anuppur	Guna	Jhabua	Mandla	Shahdol	Sheopur	Shivpuri	Umaria	Total		
1 (LOW)	7	9	6	5	6	11	8	3	5	60	19.641	0.012
	11.7%	15.0%	10.0%	8.3%	10.0%	18.3%	13.3%	5.0%	8.3%	100.0%		
2 (HIGH)	4	0	6	10	8	5	2	9	4	48		
	8.3%	0.0%	12.5%	20.8%	16.7%	10.4%	4.2%	18.8%	8.3%	100.0%		
Total	11	9	12	15	14	16	10	12	9	108		
	10.2%	8.3%	11.1%	13.9%	13.0%	14.8%	9.3%	11.1%	8.3%	100.0%		

CATEGORISED PNC SCORES JUNE 2019	District (n=108)										Chi sq. value	P value
	Alirajpur	Anuppur	Guna	Jhabua	Mandla	Shahdol	Sheopur	Shivpuri	Umaria	Total		
1 (LOW)	0	2	3	1	4	3	3	3	2	21	6.241	0.620
	0.0%	9.5%	14.3%	4.8%	19.0%	14.3%	14.3%	14.3%	9.5%	100.0%		
2 (HIGH)	11	7	9	14	10	13	7	9	7	87		
	12.6%	8.0%	10.3%	16.1%	11.5%	14.9%	8.0%	10.3%	8.0%	100.0%		
Total	11	9	12	15	14	16	10	12	9	108		
	10.2%	8.3%	11.1%	13.9%	13.0%	14.8%	9.3%	11.1%	8.3%	100.0%		

CATEGORISED PNC SCORES OCTOBER 2019	District (n=107)										Chi sq. value	P value
	Alirajpur	Anuppur	Guna	Jhabua	Mandla	Shahdol	Sheopur	Shivpur	Umari	Total		
1 (LOW)	0 0.0%	2 11.8%	2 11.8%	0 0.0%	1 5.9%	2 11.8%	2 11.8%	6 35.3%	2 11.8%	17 100.0%	18.82	0.016
2 (HIGH)	11 12.2%	7 7.8%	10 11.1%	15 16.7%	13 14.4%	14 15.6%	8 8.9%	5 5.6%	7 7.8%	90 100.0%		
Total	11 10.2%	9 8.4%	12 11.2%	15 14.0%	14 13.1%	16 15.0%	10 9.3%	11 10.3%	9 8.4%	107 100.0%		

Table 2. crosstabulation between PNC performance and districts over a year.

CATEGORISED OPD SCORE JULY18	District										Chi sq. value	P value
	Alirajpur	Anuppur	Guna	Jhabua	Mandla	Shahdol	Sheopur	Shivpur	Umari	Total		
1 (LOW)	10 12.5%	9 11.3%	7 8.8%	11 13.8%	8 10.0%	11 13.8%	6 7.5%	11 13.8%	7 8.8%	80 100.0%	11.681	0.166
2 (HIGH)	1 3.6%	0 0.0%	5 17.9%	4 14.3%	6 21.4%	5 17.9%	4 14.3%	1 3.6%	2 7.1%	28 100.0%		
Total	11 10.2%	9 8.3%	12 11.1%	15 13.9%	14 13.0%	16 14.8%	10 9.3%	12 11.1%	9 8.3%	108 100.0%		

CATEGORISED OPD SCORING JUNE 19	District										Chi sq. value	P value
	Alirajpur	Anuppur	Guna	Jhabua	Mandla	Shahdol	Sheopur	Shivpur	Umari	Total		
1 (LOW)	2	2	5	2	7	5	3	5	1	32		

	6.3%	6.3%	15.6%	6.3%	21.9%	15.6%	9.4%	15.6%	3.1%	100.0%	8.74	0.360
2	9	7	7	13	7	11	7	7	8	76		
	11.8%	9.2%	9.2%	17.1%	9.2%	14.5%	9.2%	9.2%	10.5%	100.0%		
Total	11	9	12	15	14	16	10	12	9	108		
	10.2%	8.3%	11.1%	13.9%	13.0%	14.8%	9.3%	11.1%	8.3%	100.0%		

CATEGORISED OPD SCORING OCTOBER 19	District									Total	Chi sq. value	P value
	Alirajpur	Anuppur	Guna	Jhabua	Mandla	Shahdol	Sheopur	Shivpur	Umaria			
1 (LOW)	0	1	5	2	7	4	3	9	4	35	25.23	0.001
	0.0%	2.9%	14.3%	5.7%	20.0%	11.4%	8.6%	25.7%	11.4%	100.0%		
2 (HIGH)	11	8	7	13	7	12	7	2	5	72		
	15.3%	11.1%	9.7%	18.1%	9.7%	16.7%	9.7%	2.8%	6.9%	100.0%		
Total	11	9	12	15	14	16	10	11	9	107		
	10.3%	8.4%	11.2%	14.0%	13.1%	15.0%	9.3%	10.3%	8.4%	100.0%		

Table 3. Crosstabulation between OPD performance and districts over a year.

CATEGORISED LABOR ROOM SCORE JULY18	District									Total	Chi sq. value	P value
	Alirajpur	Anuppur	Guna	Jhabua	Mandla	Shahdol	Sheopur	Shivpur	Umaria			
1 (LOW)	4	2	6	1	3	7	2	0	0	29	20.59	0.008
	13.8%	6.9%	20.7%	3.4%	10.3%	24.1%	6.9%	0.0%	0.0%	100.0%		
2 (HIGH)	7	5	10	9	13	13	3	10	9	79		
	8.9%	6.3%	12.7%	11.4%	16.5%	16.5%	3.8%	12.7%	11.4%	100.0%		
Total	11	9	12	15	14	16	10	12	9	108		

		10.2 %	8.3%	11.1%	13.9%	13.0%	14.8%	9.3 %	11.1%	8.3%	100.0%				
CATEGORISED LABOR ROOM SCORE JUNE 2019		District										Chi sq. value	P value		
		Alirajpur	Anuppur	Guna	Jhabua	Mandla	Shahdol	Sheopur	Shivpuri	Umari				Total	
1 (LOW)		0	1	0	0	0	1	2	2	0	6	10.932	0.206		
		0.0%	16.7%	0.0%	0.0%	0.0%	16.7%	33.3 %	33.3%	0.0%	100.0%				
2 (HIGH)		11	8	12	15	14	15	8	10	9	102				
		10.8 %	7.8%	11.8%	14.7%	13.7%	14.7%	7.8 %	9.8%	8.8%	100.0%				
Total		11	9	12	15	14	16	10	12	9	108				
		10.2 %	8.3%	11.1%	13.9%	13.0%	14.8%	9.3 %	11.1%	8.3%	100.0%				
CATEGORISED LABOR ROOM SCORE OCTOBER 2019		District										Ch sq. value	P value		
		Alirajpur	Anuppur	Guna	Jhabua	Mandla	Shahdol	Sheopur	Shivpuri	Umari				Total	
1 (LOW)		0	0	0	0	0	1	1	3	1	6				
		0.0%	0.0%	0.0%	0.0%	0.0%	16.7%	16.7%	50.0%	16.7%	100.0%				
2 (HIGH)		11	9	12	15	14	15	9	8	8	101				
		10.9%	8.9%	11.9%	14.9%	13.9%	14.9%	8.9%	7.9%	7.9%	100.0%				
Total		11	9	12	15	14	16	10	11	9	107				
		10.3%	8.4%	11.2%	14.0%	13.1%	15.0%	9.3%	10.3%	8.4%	100.0%	14.27	0.075		

Table 4. Cross-tabulated chi square analysis between labour room performance of PHCs

in all districts 3 months over a year.

Crosstab					
CATEGORISED GENERAL SECTION SCORING JULY 2018	Is the district tribal (n=108)		Total	Chi sq. value	P value
	no	yes			
1 (LOW)	29	9	38	0.005	0.944
	76.3%	23.7%	100.0%		
2 (HIGH)	53	17	70		
	75.7%	24.3%	100.0%		

Total	82	26	108		
	75.9%	24.1%	100.0%		

CATEGORISED GENERAL SECTION SCORING JUNE 19	Is the district tribal (n=108)		Total	Chi sq. value	P value
	no	yes			
1 (LOW)	7	0	7	2.373	0.123
	100.0%	0.0%	100.0%		
2 (HIGH)	75	26	101		
	74.3%	25.7%	100.0%		
Total	82	26	108		
	75.9%	24.1%	100.0%		

CATEGORISED GENERAL SECTION SCORING OCTOBER 2019	Is the district tribal (N=107)		Total	Chi sq. value	P value
	no	yes			
1 (LOW)	5	1	6	0.654	0.201
	83.3%	16.7%	100.0%		
2 (HIGH)	76	25	101		
	75.2%	24.8%	100.0%		
Total	82	26	107		
	75.7%	24.3%	100.0%		

Table 5. Cross tabulation between general section performance of PHCs and districts being tribal over a year.

CATEGORISED PNC SCORING JULY 2018	Is the district tribal (n=108)		Total	Chi sq. value	P value
	no	yes			
1 (LOW)	48	12	60	1.226	0.268
	80.0%	20.0%	100.0%		
2 (HIGH)	34	14	48		
	70.8%	29.2%	100.0%		
Total	82	26	108		

	75.9%	24.1%	100.0%
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CATEGORISED PNC SCORING JUNE 19	Is the district tribal (n=108)		Total	Chi sq. value	P value
	no	yes			
1 (LOW)	20 95.2%	1 4.8%	21 100.0%	5.319	0.021
2 (HIGH)	62 71.3%	25 28.7%	87 100.0%		
Total	82 75.9%	26 24.1%	108 100.0%		

CATEGORISED PNC SCORING OCTOBER 2019	Is the district tribal (n=107)		Total	Chi sq. value	P value
	no	yes			
1 (LOW)	17 100.0%	0 0.0%	17 100.0%	6.488	0.011
2 (HIGH)	64 71.1%	26 28.9%	90 100.0%		
Total	81 75.7%	26 24.3%	107 100.0%		

Table 6. Crosstabulation between PNC performance in PHCs and the districts being tribal over a year.

CATEGORISED LABOUR ROOM SCORING JULY 2018	Is the district tribal (n=108)		Total	Chi sq. value	P value
	no	yes			
1 (LOW)	19 65.5%	10 34.5%	29 100.0%	2.35	0.125
2 (HIGH)	63 79.7%	16 20.3%	79 100.0%		
Total	82 75.9%	26 24.1%	108 100.0%		

CATEGORISED LABOUR ROOM SCORING JUNE 19	Is the district tribal (n=108)		Total	Chi sq. value	P value
	no	yes			
1 (LOW)	6 100.0%	0 0.0%	6 100.0%	2.014	0.156
2 (HIGH)	76 74.5%	26 25.5%	102 100.0%		
Total	82 75.9%	26 24.1%	108 100.0%		

CATEGORISED LABOUR ROOM SCORING OCTOBER 2019	Is the district tribal (n=107)		Total	Chi sq. value	P value
	no	yes			
1 (LOW)	6 100.0%	0 0.0%	6 100.0%	2.067	0.151
2 (HIGH)	75 74.3%	26 25.7%	101 100.0%		
Total	81 75.7%	26 24.3%	107 100.0%		

Table 7. Crosstabulation between Labor room performance and districts being tribal over a year.

CATEGORISED OPD SCORING JULY 2018	Is the district tribal (n=108)		Total	Chi sq. value	P value
	no	yes			
1 (LOW)	59 73.8%	21 26.3%	80 100.0%	0.799	0.371
2 (HIGH)	23	5	28		

	82.1%	17.9%	100.0%	
Total	82	26	108	
	75.9%	24.1%	100.0%	

CATEGORISED OPD SCORING JUNE 19	Is the district tribal (n=108)		Total	Chi sq. value	P value
	no	yes			
1 (LOW)	28	4	32	3.333	0.068
	87.5%	12.5%	100.0%		
2 (HIGH)	54	22	76		
	71.1%	28.9%	100.0%		
Total	82	26	108		
	75.9%	24.1%	100.0%		

CATEGORISED OPD SCORING OCTOBER 2019	Is the district tribal (n=107)		Total	Chi sq. value	P value
	no	yes			
1 (LOW)	33	2	35	9.767	0.002
	94.3%	5.7%	100.0%		
2 (HIGH)	48	24	72		
	66.7%	33.3%	100.0%		
Total	81	26	107		
	75.7%	24.3%	100.0%		

Table 8. Cross-tabulated chi square analysis between the OPD performance of PHCs and the districts being tribal over a year.

CATEGORISED GENERAL SECTION SCORING JULY18	Stars received in July 2018 (n=108)					Total	Chi sq. value	P value
	1	2	3	4	5			
1 (LOW)	22 57.9%	13 34.2%	1 2.6%	1 2.6%	1 2.6%	38 100.0%	59.364	0.000
2 (HIGH)	1 1.4%	18 25.7%	28 40.0%	21 30.0%	2 2.9%	70 100.0%		
Total	23 21.3%	31 28.7%	29 26.9%	22 20.4%	3 2.8%	108 100.0%		

CATEGORISED GENERAL SECTION SCORE OCT19	Stars achieved in October 2019 (n=107)					Total	Chi sq. value	P value
	1	2	3	4	5			
1 (LOW)	3 50.0%	1 16.7%	1 16.7%	1 16.7%	0 0.0%	6 100.0%	40.178	0.000
2 (HIGH)	1 1.0%	6 5.9%	23 22.8%	34 33.7%	37 36.6%	101 100.0%		
Total	4 3.7%	7 6.5%	24 22.4%	35 32.7%	37 34.6%	107 100.0%		

Table 9. Cross tabulation between General Section performance and stars received in 3 months over a year.

CATEGORISE D PNC SCORING JULY18	Stars received in July 2018 (n=108)					Total	Chi sq. value	P value
	1	2	3	4	5			
1	22 36.7%	21 35.0%	13 21.7%	3 5.0%	1 1.7%	60 100.0%	34.449	0.000
2	1 2.1%	10 20.8%	16 33.3%	19 39.6%	2 4.2%	48 100.0%		
Total	23 21.3%	31 28.7%	29 26.9%	22 20.4%	3 2.8%	108 100.0%		

Table10. Crosstabulation between PNC performance of PHCs and stars received in 3 months over a year.

CATEGORISED OPD SCORING JULY18	Stars received in July 2018 (n=108)					Total	Chi sq. value	P value
	1	2	3	4	5			
1 (LOW)	22 27.5%	29 36.3%	19 23.8%	9 11.3%	1 1.3%	80 100.0%	27.997	0.00
2 (HIGH)	1 3.6%	2 7.1%	10 35.7%	13 46.4%	2 7.1%	28 100.0%		
Total	23 21.3%	31 28.7%	29 26.9%	22 20.4%	3 2.8%	108 100.0%		
1 (LOW)	7 33.3%	7 33.3%	3 14.3%	3 14.3%	1 4.8%	21 100.0%	61.995	0.000
2 (HIGH)	0 0.0%	1 1.1%	22 25.3%	29 33.3%	35 40.2%	87 100.0%		
Total	7 6.5%	8 7.4%	25 23.1%	32 29.6%	36 33.3%	108 100.0%		

CATEGORISED LABOR ROOM SCORE JUNE 19	Stars achieved in October 2019 (n=108)					Total	Chi sq. value	P value
	1	2	3	4	5			
1	4 66.7%	2 33.3%	0 0.0%	0 0.0%	0 0.0%	6 100.0%	46.739	0.00
2	3 2.9%	6 5.9%	25 24.5%	32 31.4%	36 35.3%	102 100.0%		
Total	7 6.5%	8 7.4%	25 23.1%	32 29.6%	36 33.3%	108 100.0%		

CATEGORISED OPD SCORE JUNE 19	Stars achieved in June 2019 (n=108)					Total	Chi sq. value	P value
	1	2	3	4	5			
1 (LOW)	6 18.8%	8 25.0%	12 37.5%	5 15.6%	1 3.1%	32 100.0%	49.066	0.001
2 (HIGH)	1 1.3%	0 0.0%	13 17.1%	27 35.5%	35 46.1%	76 100.0%		
Total	4 3.7%	7 6.5%	24 22.4%	35 32.7%	37 34.6%	108 100.0%		

Table 11. Crosstabulation between OPD performance of PHCs and stars received in 3 months over a year.

Table 12. Crosstabulation between Labor room performance and stars received by PHCs in 3 months over a year.

CATEGORISED OPD SCORE OCT19	Stars achieved in October 2019 (n=107)					Total	Chi sq. value	P value
	1	2	3	4	5			
1 (LOW)	3 8.6%	5 14.3%	12 34.3%	11 31.4%	4 11.4%	35 100.0%	19.365	0.00
2 (HIGH)	1 1.4%	2 2.8%	12 16.7%	24 33.3%	33 45.8%	72 100.0%		
Total	4 3.7%	7 6.5%	24 22.4%	35 32.7%	37 34.6%	107 100.0%		

CATEGORISED GENERAL SEC SCORING JULY18	Did the PHC win Kayakalp in 2018-2019		Total	Chi sq. value	P value
	no	yes			
1	38	0	38	3.499	0.63
	100.0%	0.0%	100.0%		
2	64	6	70		
	91.4%	8.6%	100.0%		
Total	102	6	108		
	94.4%	5.6%	100.0%		

CATEGORISED GENERAL SEC SCORING OCTOBER 19	Did the PHC win Kayakalp in 2019-2020		Total	Chi sq. value	P value
	no	yes			
1	5	1	6	0.821	0.365
	83.3%	16.7%	100.0%		
2	66	35	101		
	65.3%	34.7%	100.0%		
Total	71	36	107		
	66.4%	33.6%	100.0%		

Table 13. Crosstabulation between General section performance of PHCS and winning Kayakalp.

CATEGORISED PNC SCORING JULY18	Did the PHC win Kayakalp in 2018-2019		Total	Chi sq. value	P value
	no	yes			
1	59	1	60	3.89	0.049
	98.3%	1.7%	100.0%		
2	43	5	48		

	89.6%	10.4%	100.0%	
Total	102	6	108	
	94.4%	5.6%	100.0%	

Table 14. Crosstabulation between PNC performance of PHCs and winning Kayakalp.

CATEGORISE D PNC SCORING OCTOBER 19	Did the PHC win Kayakalp in 2019-2020		Total	Chi sq. value	P value
	no	yes			
1	17	0	17	10.48	0.001
	100.0%	0.0%	100.0%		
2	54	36	90		
	60.0%	40.0%	100.0%		
Total	71	36	107		
	66.4%	33.6%	100.0%		

CATEGORISE D OPD SCORING JULY18	Did the PHC win Kayakalp in 2018-2019		Total	Chi sq. value	P value
	no	yes			
1	77	3	80	1.917	0.166
	96.3%	3.8%	100.0%		
2	25	3	28		
	89.3%	10.7%	100.0%		
Total	102	6	108		
	94.4%	5.6%	100.0%		

Crosstab

CATEGORISE D OPD	Did the PHC win Kayakalp in 2019-2020	Total	Chi sq. value	P value
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SCORING OCTOBER 19	no	yes			
1	27 77.1%	8 22.9%	35 100.0%	2.711	0.100
2	44 61.1%	28 38.9%	72 100.0%		
Total	71 66.4%	36 33.6%	107 100.0%		

Table 15. Crosstabulation between OPD performance of PHCs and winning Kayakalp.

CATEGORISE D LABOUR ROOM SCORING JULY18	Did the PHC win Kayakalp in 2018-2019		Total	Chi sq. value	P value
	no	yes			
1	29 100.0%	0 0.0%	29 100.0%	1.917	0.127
2	73 92.4%	6 7.6%	79 100.0%		
Total	102 94.4%	6 5.6%	108 100.0%		

CATEGORISE D LABOUR ROOM SCORING OCTOBER 19	Did the PHC win Kayakalp in 2019-2020		Total	Chi sq. value	P value
	no	yes			
1	6 100.0%	0 0.0%	6 100.0%	2.711	0.073
2	65 64.4%	36 35.6%	101 100.0%		
Total	71	36	107		

	66.4%	33.6%	100.0%		
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Table 16. Crosstabulation between Labor room performance of PHCs and winning the Kayakalp.

STAR CATEGORIES JULY18	Did the PHC win Kayakalp in 2018-2019		Total	Chi sq. value	P value
	no	yes			
1	57 100.0%	0 0.0%	57 100.0%	7.10	0.008
2	45 88.2%	6 11.8%	51 100.0%		
Total	102 94.4%	6 5.6%	108 100.0%		

STAR CATEGORIES JUNE 19	Did the PHC win Kayakalp in 2019-2020		Total	Chi sq. value	P value
	no	yes			
1	30 58.8%	21 41.2%	51 100.0%	12.67	0.102
2	42 73.7%	15 26.3%	57 100.0%		
Total	72 66.7%	36 33.3%	108 100.0%		

Table 17. Crosstabulation between star grading of PHCs in months and winning the Kayakalp.

STAR CATEGORIES OCTOBER 2019	Did the PHC win Kayakalp in 2019-220		Total	Chi sq. value	P value
	no	yes			

1	24	25	49	12.62	0.00
	49.0%	51.0%	100.0%		
2	48	11	59		
	81.4%	18.6%	100.0%		
Total	72	36	108		
	66.7%	33.3%	100.0%		

OUTCOMES

The analysis observes amply among the various performance indicators that the magnitude of low scoring PHCs declines greatly from July'18 to October'19 with a proportionate rise in PHCs from all the 9 districts performing better to fall into high scoring categories. Greater magnitude of high performing PHCs are observable from 2018 to 2019.

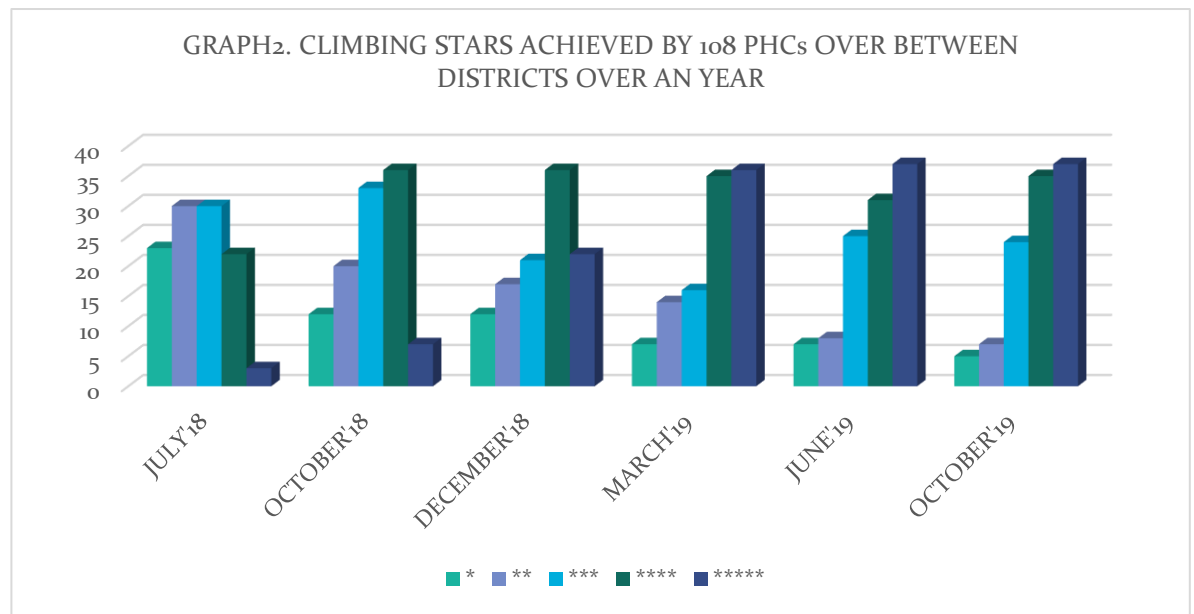
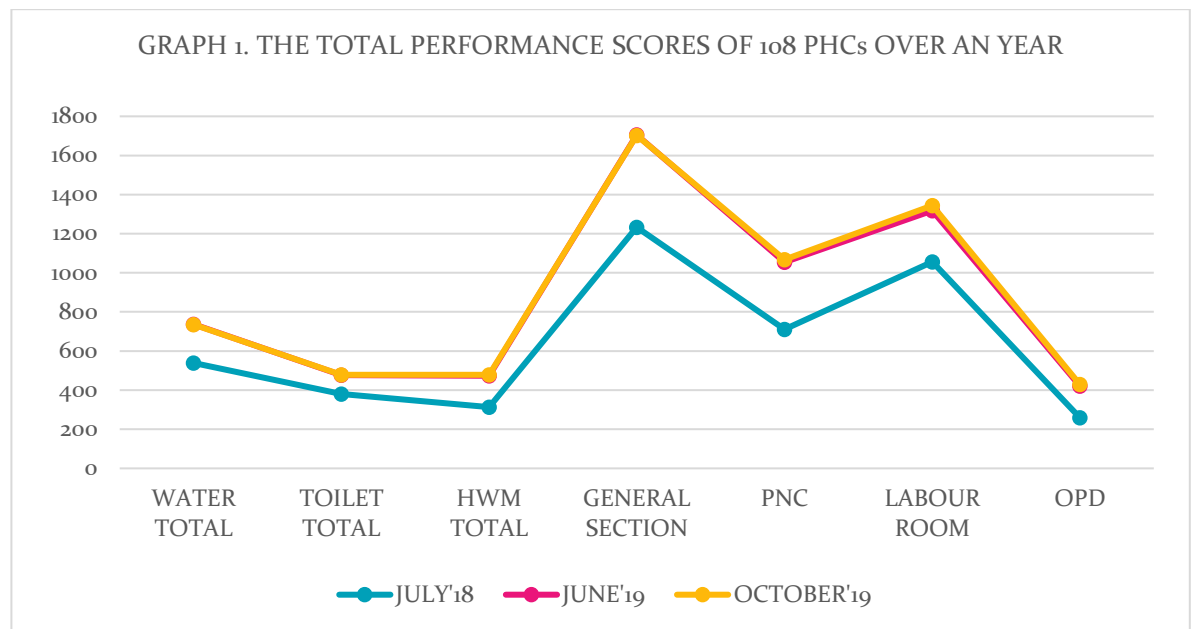
It is a valuable observation that almost all the PHCs belonging to tribal district of Alirajpur and Jhabua upgraded their performance over the measurement indicators across all the 4 health facility sections. This improvement can be appreciated best in the PNC and OPD sections by October'19 in table 2 highlighting a strong association between the performances of tribal districts against those not tribal.

While there is a significant association of performances within all the sections with the star grading, a striking difference in the General section can be noted between the 2018 and 2019. The low performing facilities drop down significantly from 38 to 6 reflecting proportionately in the high stars achieving category. A similar trend can be appreciated in the PNC section as well. While there were greater PHCs achieving lower stars in July'18 due to inadequate PNC performance, by October'19 the numbers rose to achieve higher stars.

By October'19 there were no PHCs that were performing low but had achieved 5 stars. In several instances before October'19 it is witnessed that low performing PHCs had achieved a high star grading (stars equal to and more than 3), and vice versa. This change can be marked significantly in the performance of General Section in October'19 where no low performing PHC had fallen into a 5-star category. This expresses the transparent and unbiased grading of PHC performances. Similar effects are observable in the Labour Room performance where while 3 high performing PHCs had achieved 1 star in July'18, 36 high performing PHCs had achieved 5-stars by October'19 and none of the low performing PHCs had fallen in the range of 3-5 star grading. A perceptible shift in achievement of stars contributed by upgradation and maintenance of performance is visualised with a consistently significant association across the performance sections and stars achieved on grading tool.

In July'18, the OPD performances across PHCs was found in worst shape with 74 percent PHCs performing poorly. Their transformation can be understood with the 67 percent of them markedly improving their performance by October'19.

Over the year, the impact of the intervention can most simply be realised by the fact that from 6 winning PHCs in 2018-19, the count had raised to 42 in 2019-2020. There were higher proportion of winning facilities that showed best performance across all the indicators.



It is worthy to note that a high proportion of high performers from individual sections did not win the Kayakalp as can be appreciated by the insignificant association between them. About 62 percent of high performers in General Section, 50 percent in PNC and 60 percent in Labor room did not win the Kayakalp during the session 2019-20. An analysis of

individual indicator for the performance is required to decipher the cause of it and to improve the prospects of winning the award.

However, a closer inspection also suggests that about 89 percent high performers (those graded with more than 3 stars) by the month of July'18 and about 82 percent of them by October'19 did not win the Kayakalp award either. Conversely, about 51 percent low performing PHCs (falling between 1-3 stars) in the month of October'19 did win the award.

CONCLUSION

The analysis determines the performance of PHCs is influenced by their regional positioning as determined by the insignificant association of districts with the General Section and OPD performance but a significant association with the PNC and Labor room performance. This observation calls for a deeper examination of the socio-cultural and behavioral aspects of the community. It could be likely that a simultaneous communicative and behavioral intervention might be required to garner the full potential of the WASH intervention.

The districts of Alirajpur and Jhabua together account for a 25.24 percent share of the state's total tribal population. With a Kayakalp winning PHC from each of these tribal districts that have expressed a marked improvement and maintenance in performance, a thought logically arises that despite cultural variations if a resourcefully challenged district can find the motivation to accept WASH practices then it can find replicability in better privileged settings as well.

The distribution of Kayakalp award amongst high and low performing PHCs, as observed from the lens of Star grading is arguable. The correlation between Star grading and Kayakalp

can be found in the magnitude of measurement indicators fulfilled by the health facility. HCFs exhibiting equal or greater than 70 percent accomplished indicators, as outlined by Kayakalp, are considered for the award reception. This translates into HCF falling in the range of 3-5 stars gained. This argument questions the validity of the award in respect to the 82 percent HCF achieving over 3 stars (in October'19) but not considered for it. It also urges for a more robust and finer quality of inspection of HCFs before awarding the cash prize. The sum of money may find better use in the area that express motivation to utilize it for best purposes, and not be misapplied.

DISCUSSION

It is evident from the efforts of national sanitation programs that the intent of utilization of toilets and adherence to WASH practices cannot be translated by magnitude of toilet coverage. The purport of toilets is dependent on several factors including toilet upkeep, its safety, unawareness about the health risks and perceived cultural and behavioral barriers. The efforts of national programs like SBM have however eased the path towards the acceptance of WASH practices by providing adequate resources for it. The areas with toilet coverage still practicing open defecation can guide us in understanding the unmet needs and bringing to them appropriate solutions. Such areas can benefit deeply with WASH interventions placed specially at HCFs that are the face of health.

Works of Dr. Gordon and Dr. Semmelweis established the risks of maternal mortality more than a century ago, along with their resolutions. Yet the applications find resistances in the modern era of medicine and technology. Through various national schemes Indian government has been emphasizing on expansion of institutional deliveries ceaselessly, and

with remarkable results. The rise in institutional deliveries calls for proportionate interventions for creating safer environment for such events critical to both mother and baby. The times are changing for India though. Evidenced by the behaviors of children in accepting and encouraging WASH practices, as witnessed under the TSC gives strong hope. And indicators like NGP robustly reflect the approval and engagement of community in sustaining practices that put an improvement of quality of life in their onus.

Improvements in the status of WASH has far reaching significance than just health specially for women. The psycho-social impact and outcomes can be witnessed in women empowerment, gender inequalities, psychological stress, and sexual insecurities. The acceptance of any health facility among the community women is based also on the general cleanliness and safety of the HCF. This is a contributory factor in the behavioral acceptance of WASH practices in daily routine and in empowering the community with their own decision-making capacity regarding it.

The challenge however remains still in the collection and transparency of data that limits the assessment of the full potential of any WASH intervention on health. Indicators like handwashing behaviors are difficult to assess. Moreover, while there have been known associations between health outcomes and WASH intervention, the direct relation between any single intervention on any health outcome is hard to segregate and yet to be established.

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