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Impact of Open Defecation on Women in India

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Abstract: Sanitation is usually a concept that deals with the disposal of liquid and solid waste, hygiene of an individual and foods they consume, household and environmental hygiene. The root cause of various health problems, particularly in rural areas of the country, is the inadequate sanitation. Most of the people still defecate in the open space, most of the villages lack waste disposal and drainage systems and many in the villages are unaware of the effects of poor sanitation and unhygienic conditions. As a result, many people suffer from diseases caused by poor personal and environmental hygiene practices and even die due to them. At present the extent of sanitation coverage in India is around 16 percent of all rural households. This figure is one of the lowest in the world, at par with countries like Niger and Afghanistan and possibly lower than Bangladesh. The absence of safe sanitation contributes significantly to the poor quality of life. In this paper, we have discussed about the overall concept of sanitation and open defecation and its impact on the lives of women all over India. Along with that various issues related to open defecation are also discussed in brief.

Keywords: Healthy Environment, Open defecation, Rural India, Sanitation, Women Safety.

I. INTRODUCTION

‘The day every one of us gets a toilet to use, I shall know that our country has reached the pinnacle of progresses. This quote from Pt. Jawaharlal Nehru explains a lot about the importance of sanitation, cleaning and hygiene habits for any society. Access to safe drinking water, sanitation and hygiene is the key element of the life. When it comes to sanitation, the public health problems associated with clean drinking water and proper treatment and disposal of human excreta and sewage are referenced. Preventing contact with feces, or hand washing with soap, is indeed a part of hygiene and sanitation.

Sanitation systems aim at protecting human health through a clean environment, in particular through a fecal oral route that prevents disease transmission. Diarrhea, for example, may be minimized by hygiene, a significant cause of malnutrition and the delayed development of infants. There are several other diseases that can quickly spread in environments with low rates of sanitation, including ascariasis, cholera, hepatitis, schistosomiasis and trachoma (type of intestinal worm infection or helminthiasis). Inadequate and poor quality sanitation infrastructure is the major concern for developing country.

The use of the word “sanitation” amongst countries and organizations often vary widely. Sanitation is not an easily understandable phenomenon [1]. The World Health Organization defines the term “sanitation” as follows:

“Sanitation generally refers to the provision of facilities and services for the safe disposal of human urine and feces. The word ‘sanitation’ also refers to the maintenance of hygienic conditions, through services such as garbage collection and waste water disposal.”[2]

All four of these technical and non-technical systems include sanitation: excreta management systems waste water management systems (which include waste water treatment plants), solid waste management systems as well as rainwater runoff systems, also known as storm water. However, many in the WASH sector only include excreta management in their definition of sanitation. The development of sanitation is considered by different people as most significant part of health and wellbeing. The Water Supply and Sanitation Collaborative Council defines sanitation as:

“The collection, transport, treatment and disposal or reuse of human excreta, domestic wastewater and solid waste, and associated hygiene promotion” [3].

Despite the fact that sanitation includes wastewater treatment, the two terms are often used side by side as “sanitation and wastewater management”. Another definition is in the DFID guidance manual on water supply and sanitation programmes from 1998:

“For the purposes of this manual, the word ‘sanitation’ alone is taken to mean the safe management of human excreta. It therefore includes both the ‘hardware’ (e.g. latrines and sewers) and the ‘software’ (regulation, hygiene promotion) needed to reduce faecal-oral disease transmission. It encompasses too the re-use and ultimate disposal of human excreta. The term environmental sanitation is used to cover the wider concept of controlling all the factors in the physical environment which may have deleterious impacts on human health and well-being. In developing countries, it normally includes drainage, solid waste management, and vector control, in addition to the activities covered by the definition of sanitation”[4].

Sanitation can include personal sanitation and public hygiene. Personal sanitation work can include handling menstrual waste, cleaning household toilets, and managing household garbage. Public sanitation work can involve garbage collection, transfer and treatment (municipal solid waste management) cleaning drains, streets, schools, trains, public spaces, community toilets and public toilets, sewers, operating sewage treatment plants, etc. [1]. Workers who provide these services for other people are called sanitation worker.

There are a variety of sanitation strategies and techniques that are available. Several examples are community-led total sanitation, environmental sanitation, on-site sanitation and adequate sanitation. A sanitation program (also known as the “sanitation service chain”) involves the collection, storage, distribution, treatment and disposal, or reuse of human excreta and wastewater. Sanitation practices may concentrate on the nutrients, water, energy or organic matter in human waste and sewage. This is referred to as the “sanitation value chain” or “sanitation economy”. The individuals responsible for washing, maintaining, running or emptying a sanitation system at either point of the sanitation chain are called “sanitation workers”.

Poor sanitation can substantially increase morbidities and severity of the various diseases in women. Moreover, it can have long-term negative effects on their psychological well-being and can leads to poor quality of the life. India is implementing nationwide program to improve access to basic sanitation by building individual toilet at household level. Yet, staggering 355 million women and girls are still waiting for a toilet.

Mahatma Gandhi told that importance of sanitation is much more than independence. He said that he wouldn't let anyone walk through his mind with their dirty feet [5]. Gandhi was the dream of the country where no one spits or cleans their nose on the street as it would get infected to others. The people who spit everywhere after chewing betel leaves and tobacco have no consideration for the feelings of others. He suggested that saliva, mucus from the nose, etc., should also be covered using soil [5]. Gandhi participated actively in cleanliness and broke all the walls of casteism. He said that he would be essential if he could die as a sweeper. He launched a mass contact program in villages. “A bunch of people from his party visited along with brooms and camps to the Harijan quarters of the village near the camp [5].” Health and sanitation are the first goals of every concerned authority, and contaminated water is the leading cause of most of the diseases. Water contamination occurs due to the improper disposal of waste water from domestic sector.

This paper is organized as follows: in section (2), we describe in brief the literature review and some of the work done in this direction. In section (3) results and majorly theoretical findings based on the secondary data are discussed and concluded through various point social causes. Finally, the conclusions are summarized in section (4).

II. LITERATURE REVIEW¹

An Open defecation is described as a practice of defecation without proper disposal of fecal matter in open fields, waterways and open trenches [6]. The phrase ‘open defecation’ is used as a way to measure the global progress in water and sanitation in the 2008 Joint Monitoring Program (JMP), in partnership with the World Health Organization (WHO) and the UN International Children's Emergency Fund (UNICEF). Open defecation is known as sanitation without improvement [7].

While the global action plans have been coherent for 15 years, such as the Millennium Development Goals (MDGs), the expectations for improved sanitation have not been met, which means that 2.5 billion people are still unable to have access to improved sanitation facilities (flush latrine or pit latrine) and almost 892 million of the global population are still living on open defecation. As a result of this inability to ensure basic sanitation, the SDGs (sustainable development goals) were once again identified as a key issue.

Number 6 of the Sustainable Development Goals (SDGs) is “Ensuring the provision and effective management of water and sanitation for all” while Objective 6.2 aims at achieving access to sufficient and fair sanitation and hygiene for everyone by 2030 and ending open defecation, with special attention to the needs of women and girls and those in disadvantaged situations[4]. Of those currently performing free defecation, 90% live in three regions’ rural areas; sub-Saharan Africa, Central Asia and South Asia [8].

The most widely studied health risks associated with open defecation are connected to infectious diseases linked to human excrement [9]. Infected human excreta contain many dangerous species connected to some kind of health issues. Varieties of microbes, consisting of 106 pathogens and infectious viruses, 106-108 bacterial pathogens, 103 protozoan cysts and 10-104 helminth eggs [10] can practically contain one gram of infected human excreta.

¹ Saleem, M., Burdett, T. & Heaslip, V. *Health and social impacts of open defecation on women: a systematic review. BMC Public Health* 19, 158 (2019)

Inadequate disposal also raises the risk of exposure to such pathogens that presents major health risks such as bacterial transferability, diarrhea, typhoid and cholera infection and viral infections [11]. WHO estimates that 1.8 million people suffer from extreme trachoma in low- and middle-income countries [12], which is a root cause of vision disability transmitted by flies that breed human excreta with a potential to spread via the eye discharge of the infected person [13]. Likewise, more than 200 million people worldwide are diagnosed with schistosomiasis (snail fever) [14], a chronic parasitic disease transmitted to freshwater snails by human faeces, and infection spread to humans as skin comes into contact with snail-carrying pathogens or the ingestion of polluted water and modulates their body's immune system [15].

Open defecation has a potential effect on all, but women are often at greater risk of abuse and multiple health vulnerabilities [16]. Strunz et al. [17] have found that women with low sanitation are more likely to become infested by hookworms, contributing to maternal anemia, which is in effect directly related to the adverse outcome of pregnancy [18]. Corburn and Hildebrand [19] also found that, during their reproductive period, women with limited or no exposure to the cleaning room suffered mainly from diarrheal diseases which are a major cause of malnutrition among women. Interplay between illness and under-nutrition will further perpetuate the vicious circle of worsening infection and deteriorating women's health, particularly in pregnant women [20]. However, Ziegelbauer et al. [21] suggest that enhanced sanitation measures can play a positive role in the prevention of diseases, including diarrhea and infections transmitted from soil.

Few researchers [22,23,24] make the argument that open defecation can lead to increased vulnerability to abuses such as verbal, physical and sexual, which physically and psychologically affect women. Failure to use household toilets causes a significant number of women to travel long distances to find private open spaces to protect themselves and handle their menstrual needs, thereby making themselves vulnerable to these complex types of violence [25]. Factors involving one's privacy, cultural traditions or religious beliefs have forced many women to wait until dawn or dusk so that they will not be exposed when satisfying their simple need to defecate [26]. A research report by Nallari [27] highlights the perspective of young girls who are defecating in empty areas next to their deprived village in Bangalore. The respondents expressed both the fear of disclosure while walking through the slums, and the effort to maintain secrecy. Increased anxiety, humiliation, and helplessness are widespread among lower-middle income regions girls and women where open defecation still persists [23].

One important aspect of a constitutional right is the right to personal security. The United Nations (UN) [28] called into question that sanitation has a significant effect on individual rights and stated that the effects of health associated with access to clean water, inadequate sanitation and open defecation are direct human rights violations. Furthermore, the UN argues that failure to resolve the problem at domestic level is a form of gender discrimination as well as a further violation of human rights, taking into account the consequences of women who are at greater risk of open defecation and physical security [28]. The UN argues, furthermore, that sanitation should be viewed beyond the scope of just addressing hygiene, shelter, education, employment and gender equality, but should instead be regarded in terms of human dignity and that open defecation evokes feelings of insecurity and guilt, and this breach of human dignity should be deemed a human rights issue.

III.NEED FOR PROPER SANITATION FACILITIES

A. *Impacts of open Defecation on one's Health*

The results of the study provide compelling evidence that open defecation has a substantial effect on women's safety and wellbeing. Three reports [29, 30, 31] indicate that child-bearing women are vulnerable to unprotected defecation that can affect both mother and fetus. Padhi et al. [32] have established a statistically important relationship in their prospective pregnant woman report, which tracked 670 pregnant women in their first quarter in rural India ($p > 0.001$). Open defecation have adverse effects of premature birth and low birth. Likewise, in West Bengal, Majumdar et al.[33] investigated that open defecation is a confusing factor in the prevalence of hookworm infestation among pregnant women; in that pregnant women who defect in open fields are at higher risk of hookworm infestation (24.3%) than those using toilets (6.4%). The final population of the sample may not be a representative reflection of the target group as no sufficient randomized sampling has been achieved which represents a possible risk of bias in selection.

A study performed by Greenland et al. [35] reveals that children engaged in open defecation in rural settlement India are more vulnerable to soil-borne helminths (48.9%), intestinal infection caused by exposure to contagious human faeces, than children who used toilets (13%). Although the sample range was limited to girls between the ages of 4 and 17, and no specific age classification is given, the research also validates that older girls (over 12 years) were more likely to be diagnosed with soil-transmitted helminths than younger girls.

At last, Kotian et al.[36] found that in the Bihar people who used open defecation reported more positive results for parasitic infection, and furthermore found that the infection to be more prevalent in women (17.07%) than men (8.33%). They suggest that broader variations in prevalence of infections in the study region may also be the result of poor drinking water quality, greater involvement by women in livestock management and agricultural management, unsuitable waste disposal practices or other environmental factors. The results, however, cannot be applied to a wider population as the study recruitment was confined to the patients admitted to the hospital.

B. Growing Chance of Sexual Harassment

The study on sexual harassment encounters and the fear of sexual abuse among women, after women leave their homes to defecate in open areas or near the surroundings was based on two studies [37, 38]. The main aim of the study was to determine the risk of sexual abuse among non-partners in relation to open defecation. Sahoo et al. [39] also reported in study from Odisha, that sexual violence among young unmarried girls is seriously affected by all age groups. Similarly, the Kenya Demographic and Health Survey (DHS) survey by Winters and Barchi[38], examining cross-sectional data from 2008-09, found that the risks of non-partner sexual harassment among women who defecate in open have risen to 40% compared with women who have access to the toilet (in their homes or shared toilets). The findings from a model of logistic regression [36] support the significant correlation between holiday sanitation and sexual abuse ($p < 0.01$) by non-partners in India. They conclude that non-partner sexual abuse events were two times higher for open defecation females than for toilet-friendly women. The secondary data collected from national health surveys in both quantitative studies [37, 38] and had a large number of participants ($n = 75,619$ and $n = 6191$), although the authors may not have limited their reach to knowledge available that is accessible for just a year of study.

C. Endangering the Privacy and Confidentiality of Women

These studies [39, 40] found that women defecating in open areas face many real life-long threats to their privacy and dignity. The conclusion from the focus group discussion [40] was that 44% of participants ($n=28$) expressed the pain of seeking a suitable place in open fields for defecation and expressed indignation at preventing defecation or urination where people or vehicles are approaching a defecation site. In addition, the results of detailed interviews conducted in Odisha [39] show the general fear of being seen by men in the absence of a toilet in their homes overwhelmingly shared by almost all participants, 51 out of the 56 women and girls.

D. Psychosocial Stressors Linked to Open Defecation

There are various psychosocial stressors related to open defecation in women. The stressors that were most addressed were: hunt for suitable places to defecate, travelling very far from home, water to be cleansed, increased risk of insect or snake bites, fear of dark ghosts and untidiness. This can also be seen that women tend to travel with family or group followed when they need to defecate in open because of the fear of physical assault or sexual harassment that women who practice open defecation have widely reported. Women from the country's rural areas shared the largest number of observations of their social stressors; lack of near-house amenities, social restrictions, and inadequate privacy when defecating in the open. Hirve et al. [40] recorded that psychosocial stress in Western rural India extends to concerns about personal safety as revealed by more than half of the participants (64%) and these stressors were the leading causes behind women who felt tensed, worried, depressed and irritated.

The effect is comparatively serious for reproductive-age girls and women as they face an additional challenge of handling their menstruation while addressing the everyday need for defecation.

IV. FINDINGS AND CONCLUSION

Sahoo et al. [39] shares an opinion that the problem is way beyond young age of women, but it is relevant across women's life stages, and it is imperative to acknowledge that women's participation in development and construction of toilets as this can be the best way to deal with the psychosocial stressors among women.

Mr. Narendra Modi (Prime Minister of India) launched the Swachh Bharat Mission in October 2014 with the stated goal of eliminating open defecation in India by October 2019, to symbolically coincide with Mohandas Gandhi's 150th birthday. To do this, the government launched a massive toilet-building programme, offering Rs 12,000 as subsidy to households for building a toilet. By early January 2019, the government claims, five lakh villages and 25 states and Union Territories had become Open Defecation Free. They include Uttar Pradesh, India's most populous state which has a reputation for being one of the most polluted and worst governed.

Sanitation is the root cause of maximum diseases. Increasing population and search for employment and better education leads to generate urban slums. These slums are illegal, so they are not enjoying the same facilities provided by the government as that of other people. Rural and urban slum people are the most affected by poor sanitation. The countries with lower per capita income also perform better in sanitation, which is really a matter of concern. When the word sanitation appears, people linked it up with open defecation only. The reason is that after the launch of the sanitation campaign, the main focus was on removing open defecation from the country. Media has also shown various advertisements which resist in the mind of people. The celebrities also attract people towards the campaign. The government has launched various advertisements related to open defecation. The tagline, 'Jahan Soch, Wahan Shauchalya' is very well-known in this context. The other factors of sanitation like safe drinking water, promoting technologies for sustainable sanitation, manual scavenging, and solid waste management are not discussed equally that of open defecation. There is very less number of people who are aware of twin pit and its benefits. Manual scavenging is still practicing. Swachhagrahis played a vital role in the success of the sanitation campaign. Their role begins to convince people to build toilets and use them. Building toilet is not sufficient, but the proper usage is a matter of concern.

People think a toilet needed for women. Male used to pee in the open without shame they find bravery in it. So to tell the people that the toilet is important for all not only for women, it is a big task. Fund allocation, corruption, and poorly constructed toilet hinder to achieve the target. There is a misconception that the subsidized pit will fill rapidly, so the male of the families does not use the toilet. Women and the sick person only use these. The culture is also one of the factors. In some culture, the toilet considered as very impure, so it has to be outside the house. This misconception has to be removed. Employment should be provided in their areas so that people will not migrate from rural to urban; which is the main cause of the urban slum. The government should generate more employment through waste recycling activities. There should be a proper check on each stage from the sanction of subsidized amount for the construction of toilet building till its practice in use. Safe drinking water should also be provided. Awareness about safe drinking water should be provided so that people could raise their voice against their rights. Awareness would be possible only through various media, and participatory approach has to be used because of its high effectiveness.

REFERENCES

- [1] S. M. Metev and V. P. Veiko, Laser Assisted Microtechnology, 2nd ed., R. M. Osgood, Jr., Ed. Berlin, Germany: Springer-Verlag, 1998.
- [2] Pria.Org. 2020. [https://pria.org/knowledge_resource/1560777260_Occasional%20Paper%204%20\(2019\)%20\(Lived%20Realities%20of%20Women%20Sanitation%20Workers%20i....pdf](https://pria.org/knowledge_resource/1560777260_Occasional%20Paper%204%20(2019)%20(Lived%20Realities%20of%20Women%20Sanitation%20Workers%20i....pdf)
- [3] "Water Sanitation and Health". 2020. World Health Organization. https://www.who.int/water_sanitation_health/en/.
- [4] Eprints.Whiterose.Ac.Uk. 2020. http://eprints.whiterose.ac.uk/10179/1/Public_Funding_for_Sanitation_the_many_faces_of_sanitation_subsidies.pdf.
- [5] Wedc-Knowledge.Lboro.Ac.Uk. 2020. https://wedc-knowledge.lboro.ac.uk/resources/books/DFID_Guidance_Manual_on_Water_Supply_and_Sanitation_Programmes_-_Contents.pdf
- [6] "Sanitation: Definition of sanitation in English by Oxford Dictionaries". Oxford Dictionaries'. English. <https://www.oed.com/>
- [7] Jones, Hazel, Julie Fisher, and Robert Reed. "Water And Sanitation For All In Low-Income Countries". Proceedings of the Institution Of Civil Engineers - Municipal Engineer. 2012. 165 (3): 167-174.
- [8] WHO & UNICEF. Progress on drinking water and sanitation. 2017 update: 2017. WHO press;<https://www.who.int/mediacentre/news/releases/2017/launch-version-report-jmp-water-sanitation-hygiene.pdf>.
- [9] "United Nations Sustainable Development-17 Goals to Transform Our World." United Nations. <https://www.un.org/sustainabledevelopment/>.
- [10] Cairncross, Sandy, Caroline Hunt, Sophie Boisson, Kristof Bostoen, Val Curtis, Isaac CH Fung, and Wolf-Peter Schmidt. "Water, Sanitation And Hygiene For The Prevention Of Diarrhoea". International Journal of Epidemiology. 2010. 39 (suppl_1): i193-i205.
- [11] Richard G. Feachem, David J. Bradley, Hemda Garelick And D. Duncan Mara. "Sanitation and Disease (Health Aspects Of Excreta And Wastewater Management) World Bank Studies". Water Supply And Sanitation 3. 1985. Water Research 19 (1): 131-131.
- [12] Pruss-Ustun A, Bos R, Gore F, Bartram J. Safer water, better health: costs, benefits and sustainability of interventions to protect and promote health: World Health Organization; 2008. http://www.who.int/quantifying_ehimpacts/publications/saferwater/en/.
- [13] World Health Organization. WHO fact sheets for trachoma. Switzerland. 2017. <http://www.who.int/mediacentre/factsheets/fs382/en/>.
- [14] Emerson, P. M., R. L. Bailey, G. E. L. Walraven, and S. W. Lindsay. 2001. "Human And Other Faeces As Breeding Media Of The Trachoma Vector Musca Sorbens". Medical And Veterinary Entomology 15 (3): 314-320.
- [15] World Health Organization. WHO fact sheets for schistosomiasis. Switzerland. 2017. <http://www.who.int/mediacentre/factsheets/fs115/en/>.
- [16] Colley, Daniel G, Amaya L Bustinduy, W Evan Secor, and Charles H King. "Human Schistosomiasis". The Lancet. 2014. 383 (9936): 2253-2264.
- [17] Carolini, Gabriella Y. "Framing Water, Sanitation, and Hygiene Needs among Female-Headed Households In Periurban Maputo, Mozambique". American Journal of Public Health. 2012. 102 (2): 256-261.
- [18] Strunz, Eric C., David G. Addiss, Meredith E. Stocks, Stephanie Ogden, Jürg Utzinger, and Matthew C. Freeman. "Water, Sanitation, Hygiene, and Soil-Transmitted Helminth Infection: A Systematic Review and Meta-Analysis". 2014. Plos Medicine 11 (3): e1001620.
- [19] Bora, Reeta, Corey Sable, Julian Wolfson, Kanta Boro, and Raghavendra Rao. "Prevalence Of Anemia In Pregnant Women And Its Effect On Neonatal Outcomes In Northeast India". The Journal Of Maternal-Fetal & Neonatal Medicine. 2013. 27 (9): 887-891.

- [20] Corburn, Jason, and Chantal Hildebrand. "Slum Sanitation and the Social Determinants of Women's Health in Nairobi, Kenya". *Journal of Environmental and Public Health*. 2015. 2015: 1-6.
- [21] STEPHENSON, L.S., M.C. LATHAM, and E.A. OTTESEN. "Malnutrition and Parasitic Helminth Infections". 2000. *Parasitology* 121 (S1): S23-S38.
- [22] Ziegelbauer, Kathrin, Benjamin Speich, Daniel Mäusezahl, Robert Bos, Jennifer Keiser, and Jürg Utzinger. "Effect of Sanitation on Soil-Transmitted Helminth Infection: Systematic Review and Meta-Analysis". 2012. *Plos Medicine* 9 (1): e1001162.
- [23] Pardeshi, Geeta. "Women in Total Sanitation Campaign: A Case Study From Yavatmal District, Maharashtra, India". 2009. *Journal of Human Ecology* 25 (2): 79-85.
- [24] Mader, Philip. "Attempting the Production Of Public Goods Through Microfinance". *Journal of Infrastructure Development*. 2011. 3 (2): 153-170.
- [25] Fiasorgbor, A. "Water and Sanitation Situation in Nima and Teshie, Greater Accra Region of Ghana." *Journal of Toxicology and Environmental Health Sciences*. 2013. 5, no. 2, 23-28.
- [26] Pearson, Joanna, and Kate Mcphedran. A Literature Review of the Non-Health Impacts of Sanitation". *Waterlines*. 2008. 27 (1): 48-61.
- [27] Nallari, Anupama. "All We Want Are Toilets inside Our Homes!" *Environment and Urbanization*. 2015. 27, no. 1: 73-88.
- [28] United Nations. Promotion and protection of all Human rights, civil, political, economic, social and cultural rights, including the right to development; report of the independent expert on the issue of human rights obligations related to access to safe drinking water and sanitation, Catarina de Albuquerque, resolution a/HRC/12/24; 2009. http://ap.ohchr.org/documents/alldocs.aspx?doc_id=15861.
- [29] Higgins JPT, Green S. *Cochrane Handbook for Systematic Reviews of Interventions* Version 5.1.0. 2011 Update. <https://training.cochrane.org/handbook>.
- [30] J J Deeks. "Cochrane Handbook for Systematic Reviews of Interventions." 2008.
- [31] Dyrvig, Anne-Kirstine, Kristian Kidholm, Oke Gerke, and Hindrik Vondeling. "Checklists for External Validity: a Systematic Review." *Journal of Evaluation in Clinical Practice*. 2014. 20, no. 6: 857-64.
- [32] "Critical Appraisal Skills Programme (CASP) (2017) Appraising the Evidence Checklist. CASP, Oxford.-References-Scientific Research Publishing". 2017. Scirp.Org. <https://www.scirp.org/reference/ReferencesPapers.aspx?ReferenceID=2148288>.
- [33] Letts L, Wilkins S, Law M, Stewart J, Westmorland M. 2007. Critical review form-quantitative studies. Hamilton: McMaster University.
- [34] Padhi BK, Baker KK, Dutta A, Cumming O, Freeman MC, Satpathy R, et al. Risk of adverse pregnancy outcomes among women practicing poor sanitation in rural India: a population-based prospective cohort study. *PLoS Negl Trop Dis*. 2015.
- [35] Majumdar TK, Bisoi S, Haldar D. "A study on hookworm infestation among pregnant women in rural area of West Bengal". *Int J Nutr Diet*. 2010. 47:51-6.
- [36] Janmohamed, Amaryn, Timothy J. Green, Crystal D. Karakochuk, and Judy McLean. "Improved Sanitation Facilities Are Associated With Higher Body Mass Index And Higher Hemoglobin Concentration Among Rural Cambodian Women In The First Trimester Of Pregnancy". *The American Journal Of Tropical Medicine And Hygiene*. 2016. 95 (5): 1211-1215.
- [37] Greenland, Katie, Ruth Dixon, Shabbir Ali Khan, Kithsiri Gunawardena, Jimmy H. Kihara, Jennifer L. Smith, and Lesley Drake et al. "The Epidemiology of Soil-Transmitted Helminths In Bihar State, India". *PLOS Neglected Tropical Diseases*. 2015. 9 (5): e0003790.
- [38] Kotian, Swapna, Munesh Sharma, Deepak Juyal, and Neelam Sharma. "Intestinal Parasitic Infection-Intensity, Prevalence And Associated Risk Factors, A Study In The General Population From The Uttarakhand Hills". *International Journal Of Medicine And Public Health*. 2014. 4 (4): 422.
- [39] Jadhav, Apoorva, Abigail Weitzman, and Emily Smith-Greenaway. "Household Sanitation Facilities and Women's Risk of Non-Partner Sexual Violence In India". *BMC Public Health*. 2016. 16 (1).
- [40] Winter, Samantha C., and Francis Barchi. "Access To Sanitation And Violence Against Women: Evidence From Demographic Health Survey (DHS) Data In Kenya". *International Journal of Environmental Health Research*. 2015. 26 (3): 291-305.
- [41] Sahoo, Krushna Chandra, Kristyna R.S. Hulland, Bethany A. Caruso, Rojalin Swain, Matthew C. Freeman, Pinaki Panigrahi, and Robert Dreifelbis. "Sanitation-Related Psychosocial Stress: A Grounded Theory Study of Women across The Life-Course In Odisha, India" *Social Science & Medicine*. 2015. 139:80-89.



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