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Original Research Article

India's performance in achieving the targets of sustainable development goal-3 and the national health policy 2017 based on NFHS data

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ABSTRACT

Background: India is committed to pursue the sustainable development goals (SDGs) of the UN agenda 2030. Our objective is to evaluate India's required progress rate for achieving the health-related targets under SDG 3 and the national health policy of India 2017.
Methods: The data were collected from the reports of NFHS-4 and NFHS-5. Targets were taken from the United Nations SDG 2030 and the national health policy of India, 2017. When target is 100 percent, the annual rate of progress = $[(Xt_1 – Xt_0)/ 100- Xt_0] * [1/ (t_1 – t_0)]$. Here t_0 is the survey period of NFHS-4 and t_1 is the survey period of NFHS-5. Xt_1 and Xt_0 represent the indicator's values for the corresponding years. The rate of progress necessary to meet the target by the target year (α) = $(X_{tg} – X_{t1}) / X_{t1}$ where X_{tg} is the achievable value of an indicator in the target year and X_{t1} is the value of the base year.
Results: The required rate of progress to achieve the targets of SDG-3 was considerably higher than the current rate in case of neo-natal mortality rate, maternal mortality ratio, standard antenatal care visits, HIV/AIDS awareness, and households using clean energy for cooking and having health insurance. The targets of infant mortality rate and MMR of national health policy of India 2017 have not been achieved.
Conclusions: Government should immediately intervene where the required rate of progress to achieve the health-related targets of SDG-3 and national health policy of India, 2017 is considerably lagging.

Keywords: India, National Health Policy 2017, NFHS, Sustainable development goal 3

INTRODUCTION

The 17 interlinked sustainable development goals (SDGs), adopted by 193 member states of the United Nations (UN) in 2015, aimed to establish a more equitable, habitable, and peaceful world by 2030.[1] India is committed to pursue the goals and the targets of the UN Agenda 2030. In 2018 the NITI Aayog signed the Government of India-United Nations Sustainable Development Framework (UNSDF) 2018-22 for preparation, execution, and assessment of UN assistance in major developmental sectors to achieve the SDGs.[2,3]

Health-related sustainable development goal (SDG 3) calls for ensuring healthy lives and promoting well-being for all.[1] Conforming to SDG 3, the national health policy (NHP) of India 2017 declared its objective as "to attain the highest possible level of health and well-being for all at all ages, through a preventive and promotive health care orientation in all developmental policies".[4] However, SDG 3 should not be viewed as an isolated development issue as health is influenced by various factors like, income, food security, education, transportation and communication, energy, environment, and national and international policies. Therefore, to improve health status,

we must understand the complex interconnections among the sustainable development goals and make a conscious effort to accomplish not only the targets of SDG 3, but also other SDG targets.

To fulfil the health-related sustainable development goals, some targets have been delineated by United Nations and NHP of India 2017. Is India's rate of progress sufficient to attain the objectives of SDG 3? We need to analyse it in detail because monitoring the progress provides necessary impetus to revise the ongoing health programmes and policies. In this context, our objective is to evaluate the current rate of progress and the required rate to achieve the health-related targets of SDG 3 and the national health policy of India 2017.

METHODS

We used the data from the reports of national family health survey (NFHS)-4 conducted in 2015-16 and NFHS-5 conducted in 2019-21.[5,6] Targets were taken from the National Health Policy of India, 2017 and the Sustainable Development Goals, 2030.[1,4]

To compute the rate of progress, we have used the following formula:

Annual rate of progress = $[(X_{t1} - X_{t0})/ 100- X_{t0}] * [1/ (t_1 - t_0)]$

where, t_0 is the survey period of NFHS-4 and t_1 is the survey period of NFHS-5 and the target value is 100. The survey period of NFHS-4 was 2015-16 and NFHS-5 was 2019-21. For convenience, we have taken the time difference as 5 years. X_{t0} and X_{t1} represent the indicator's values for the corresponding surveys. In case, where the most desirable value is 0, the annual rate of progress is computed as:

Annual rate of progress = $[(X_{t0} - X_{t1})/ X_{t0} - 0] * [1/ (t_1 - t_{0-})]$

The rate of progress necessary to meet the target by the target year is calculated as:

$\alpha = (X_{t1} - X_{tg}) / X_{t1}$

Where X_{tg} is the achievable value of an indicator in the target year, X_{t1} is the value of the base year, and the most desirable value is 0. If the desirable goal is 100 per cent, then the rate of progress necessary to meet the target is:

$\alpha = (X_{tg} - X_{t1}) / X_{t1}$

The annual rate of progress required to achieve the goal is expressed as:

Required annual rate of progress = $\alpha / (t_g - t_1)$

Where, t_g is the target year and t_1 is the base year. In case of SDG, the target year is 2030. The NHP 2017 fixed different target years for different indicators. We have taken the survey time of NFHS-5 as the base year (t_1). As NFHS-5 was conducted in 2019-21, we have taken 2020 as the base year for our calculation.

RESULTS

We have estimated the current SDG 3 related performance and the required rate to achieve the SDG 3 targets based on the information from the NFHS-4 and the NFHS-5. Table 1 shows the current and the required rate of progress per year in India for selected SDG health parameters. To get a broader view of the changes in health indicators, we have included the observations of NFHS-1 (conducted in 1992-93) in our Table 1.

From Table 1, we observe moderate to remarkable improvement in different health parameters between NFHS-1 and NFHS-5. However, the current progress rates (based on NFHS-4 and NFHS-5) of some health-related parameters are not sufficient to achieve the goals of SDG 3. In case of neo-natal mortality, the required annual rate of progress to achieve the targets of SDG-3 is 1.5 times higher than the current annual progress rate. Regarding maternal mortality ratio, the required rate is 1.7 times higher than the current rate. In case of the standard antenatal care visits, the annual progress rate should be 2.5 times higher than the actual rate observed between NFHS-4 and NFHS-5. It seems that India will comfortably reach the targets in case of child immunization and birth in a health facility if the current progress rates continue.

According to NFHS-5, the percentage of women and men who reported comprehensive knowledge of HIV/AIDS in India was 21.6 and 32.5, respectively, which are substantially low. Percentage of man and women who use any kind of tobacco and consume alcohol must be reduced to one third from the percentage in 2015. Interestingly, the current rate of females quitting tobacco is significantly lower than men and it is much below than the required rate of improvement. There is a huge gap in current and the required rate of progress in the use of clean energy for cooking. According to NFHS-5, the proportion of households in India where any member had health insurance is only 41 per cent. In this case, NFHS data involves both private and government health insurance. To achieve the target of SDG 3, the required annual rate of progress should be 4.1 times than the annual progress rate observed between NFHS-4 and NFHS-5.

Table 2 shows the progress of India regarding health targets of National Health Policy 2017. It is found from Table 2 that India has achieved the target set for TFR reduction but missed the targets of infant mortality rate and maternal mortality ratio. Also, with the annual progress rate between NFHS-4 and NFHS-5, it is almost

impossible to attain the targets set for reduction in under-5 mortality rate, neonatal mortality rate, and stunted children below 5 years of age. In case of percentage of households using improved sanitation facility, and having health insurance, the required progress rates should be 2.5 times and 8.2 times higher, respectively, than the current progress rate to achieve the targets of NHP 2017.

Table 1: Progress of India towards achieving the health-related targets of SDG-3.

Indicators	NFHS-1	NFHS-4	NFHS-5	Target	Actual rate of progress (NFHS-4 to NFHS-5) (%)	Required rate of progress to achieve SDG targets (%)
Maternal health						
Mothers who had at least 4 antenatal care visits for their last birth (%)	44	51	58.1	100	2.9	7.2
Maternal mortality ratio (MMR)	437	130	113	70	2.6	3.8
Birth attended by skilled health personnel (%)	NA	81.4	89.4	100	8.6	1.2
TFR	3.39	2.2	2.0	2.1	Achieved	
Institutional births (%)	25.5	79	88.6	100	9.1	1.3
Child health						
Children age 12-23 months fully vaccinated (%)	35.4	62	76.4	100	7.6	3.1
IMR	78.5	41	35.2	Minimum	2.8	
Under-five mortality rate	109.3	50	41.9	25	3.2	4.0
Neonatal mortality rate	NA	29.5	24.9	12	3.1	5.2
Health awareness						
Women who have comprehensive knowledge of HIV/AIDS (%)		20.9	21.6	100	0.2	36.3
Men who have comprehensive knowledge of HIV/AIDS (%)		30.7	32.5	100	0.5	20.8
Substance abuse						
Women who use any kind of tobacco (%)	NA	10.8	8.9	Reduce by 1/3rd (3.6)	3.5	6.0
Men who use any kind of tobacco (%)	NA	57	38	Reduce by 1/3rd (19)	6.7	5.0
Women who consume alcohol (%)	NA	2.2	1.3	Reduce by 1/3rd (0.73)	8.2	4.4
Men who consume alcohol (%)	NA	31.9	18.8	Reduce by 1/3rd (10.6)	8.2	4.4
Health facility						
Households with improved source of drinking water (%)	66.2	94.4	95.9	100	5.4	0.4
Households using clean fuel for cooking (%)	NA	43.8	58.6	100	5.3	7.1
Households using an improved sanitation facility (%)	NA	48.5	70.2	100	8.4	4.2
Households with health insurance (%)	NA	28.7	41	100	3.5	14.4

India is a vast country with huge socio-cultural diversity. The socio-economic development and demographic characteristics vary from region to region. As a result, substantial differences are observed in health indicators among the states even for those parameters in which India is performing well (Table 3).

Table 3 shows the variation in selected health indicators among large states of India. The states with a population 10 million or above as per 2011 census of India are referred to as large states. Although Telangana was formed in 2014 by bifurcating Andhra Pradesh, its population was over 35 million in 2014; so, we have included it in our study. On the other hand, the state of Jammu and Kashmir was reorganised as two union territories- Jammu and Kashmir and Ladakh in 2019. Therefore, we have excluded it from our analysis. We observed an extreme interstate variation in maternal mortality ratio (MMR) in India.[8] During 2017-19, Assam registered the highest MMR of 205 and in Kerala it was

as low as 30. Kerala also recorded the lowest infant mortality rate (IMR), only 4.4, whereas Bihar has the highest IMR, 50.4 per thousand live births. According to NFHS-5, in most of the states, the TFR has reached below the replacement level, but the TFR in Bihar is still quite high (2.98).

Table 2: Progress of India towards achieving the health-related targets of NHP, 2017.

Indicators	NFHS-1	NFHS-4	NFHS-5	Target	Actual rate of progress (NFHS-4 to NFHS-5) (%)	Required rate of progress to achieve NHP targets (%)
Maternal health						
Maternal mortality ratio (MMR)	437	130	113	100[+]	2.6	Not achieved
Birth attended by skilled health personnel (%)	NA	81.4	89.4	90[$]	8.6	0.1
TFR	3.39	2.2	2.0	2.1		Achieved
Child health						
Children aged 12-23 months who received one dose of MCV (%)	42	81.1	87.9	90[$]	7.2	0.5
Children aged 12-23 months fully vaccinate (%)	35.4	62	76.4	90[$]	7.6	3.6
IMR	78.5	41	35.2	28[*]	2.8	Not achieved
Under-five mortality rate	109.3	50	41.9	23[$]	3.2	9.0
Neonatal mortality rate	NA	29.5	24.9	16[$]	3.1	7.1
Children under-5 stunted (%)	52	38.4	35.5	40% reduction from NFHS-4 (23.04)[$]	1.5	7.0
Health facility						
Households with improved source of drinking water (%)	66.2	94.4	95.9	100[+]	5.4	Not achieved
Households using an improved sanitation facility (%)	NA	48.5	70.2	100[#]	8.4	21.2
Households with health insurance (%)	NA	28.7	41	100[$]	3.5	28.8

Source: Computed by the researchers; Note: * Targets that were supposed to be achieved by 2019; + Targets that were supposed to be achieved by 2020; # Targets to be achieved by 2022; $ Targets to be achieved by 2025

Table 3: Variation in selected health indicators in large states* of India, NFHS-5 (2019-21).

States of India	Maternal mortality ratio+	IMR	TFR	Children aged 12-23 months fully vaccinated (%)	Households with improved source of drinking water (%)	Households using an improved sanitation facility (%)
Punjab	114	28.0	1.63	76.2	98.8	86.6
Haryana	96	33.3	1.91	76.9	98.6	85.0
Rajasthan	141	30.2	2.01	80.5	96.4	71.1
Uttarakhand	101	39.1	1.85	81.1	95.5	78.7
Uttar Pradesh	167	50.4	2.35	69.9	99.2	68.7
Madhya Pradesh	163	41.3	1.99	77.4	88.9	65.1
Chhattisgarh	160	44.2	1.82	79.7	95.6	76.8
Bihar	130	46.8	2.98	71.0	99.1	49.4
Jharkhand	61	37.9	2.26	74.1	86.8	56.7
Orissa	136	36.3	1.82	90.7	90.8	60.5
West Bengal	109	22.0	1.64	88.2	97.5	68.0
Assam	205	31.9	1.87	66.7	86.4	68.5
Gujarat	70	31.2	1.86	76.4	97.5	74.0
Maharashtra	38	23.2	1.71	73.6	93.8	72.0
Andhra Pradesh	58	30.2	1.68	73.2	96.7	77.3

Continued.

States of India	Maternal mortality ratio+	IMR	TFR	Children aged 12-23 months fully vaccinated (%)	Households with improved source of drinking water (%)	Households using an improved sanitation facility (%)
Telangana	56	26.4	1.75	79.1	98.7	76.2
Karnataka	83	25.4	1.67	84.3	95.6	74.8
Kerala	30	4.4	1.79	78.4	94.9	98.7
Tamil Nadu	58	18.6	1.76	89.4	98.6	72.6
India	103	35.2	1.99	76.6	95.9	70.2

Note: *Large states refers to the states with population 10 million or above as per 2011 Census; +SRS special bulletin on maternal mortality in India, 2017-19.

The inter-state range in percentage of children fully vaccinated aged 12-23 months is 20.8 percentage point (Orissa 90.7 per cent and Uttar Pradesh 69.9 per cent). Except Jharkhand and Madhya Pradesh, more than 90 per cent of the households in all the large states are provided with improved source of drinking water. In NFHS-5, improved source of drinking water combines piped into dwelling, piped to neighbour, public tap, tube well or borehole, protected dug well, protected spring, rainwater, tanker truck, bottled water, and community RO plant. The inter-state range in percentage of households using an improved sanitation facility is striking. Improved sanitation facilities include two criteria. It must combine flush or pour flush to piped sewer system/ septic tank/pit latrine, ventilated improved pit latrine, pit latrine with slab, and twin pit composting toilet; and secondly, it should not be shared by two or more households. In Bihar, half of the households (49.4 per cent) are deprived of improved sanitation facilities. In contrast, 98.7 per cent households in Kerala enjoy improved sanitation facilities.

DISCUSSION

India is a signatory of the declaration on the 2030 agenda for sustainable development. Health is a major agenda and the health-related targets must be achieved by 2030. Why should we emphasize on ensuring healthy lives for all? The main reason is that unlike income, health has both intrinsic and instrumental values.[9] It is an inherent part of one's well-being and it also enhances a person's functional capability.

We observed that since NFHS-1, the maternal mortality ratio, the infant and child mortality rate has declined steadily. During NFHS-1 (1992-93), the MMR in India was 437 which reduced to 113 during NFHS-5 (2019-21). Between NFHS-1 and NFHS-5, the IMR declined from 78.5 to 35.2. The improvement in maternal and child health owes to the public health initiatives of the central and state governments of the country. In this context some policies and programmes adopted by the government of India is worth mentioning. In 1992 India launched the child survival and safe motherhood (CSSM) programme. Maternal mortality prevention by providing emergency obstetric care and reduction of infant and child deaths through universal immunization were key components to CSSM.

In 1994, the United Nations' international conference on population and development was held in Cairo. India was a co-signer of its 'programme of action' which emphasized on poverty reduction, women empowerment, and reproductive health rights among others.[10] Consequently, India merged the family planning programme with CSSM and introduced the reproductive and child health (RCH) programme in 1997 (phase I). RCH programmes focussed on safe motherhood and child health (by ensuring institutional delivery, antenatal care and child immunization), reduction in fertility rates, promotion of adolescent health and the control of reproductive tract infections.[11] With a few modifications, in 2005, RCH phase II and in 2013, RMNCH+A approach was launched.

To minimize the rural-urban health gap, in 2005 the government of India announced national rural health mission (NRHM). "This mission included increased investment in public health, improvements in health systems, focus on communities, decentralization and demand-side interventions to improve the effectiveness of the programmes".[12] In the same year Janani Suraksha Yojana was launched as an integral part of NRHM to increase institutional delivery by providing a small cash benefit. In 2013, the cabinet of India also approved the national urban health mission (NUHM).

The integrated child development services (ICDS), introduced by the government of India in 1975, played a key role in boosting child and maternal nutrition, particularly among the underprivileged and in backward areas. Under this scheme, the Anganwadi workers were selected from the local communities. They are trained and then employed at a nominal wage. In the community, they take care of child immunization, ante-natal and post-natal care, and informal education of the children under the age six.[13] These programmes paved the way for India's success story in institutional delivery and child immunization. However, the progress in lowering IMR is slow. Caldwell in his monumental work "routes to low mortality in poor countries" highlighted that women's place in the society, mother's education, political determination, and government initiatives in public health sector played the pivotal role in reducing maternal and child mortality.[14] According to NFHS-4 (2015-16), IMR was 41.5 (per 1000 live births) among mothers with no schooling and 18.6 among those who completed 12 or more years of education.[5] Mother's education is

positively corelated to the access and utilization of maternal and child healthcare.[15] Due to historical and socio-cultural factors, women's autonomy and level of education was higher in the southern states than in the northern states.[16] Consequently, IMR and MMR are comparatively lower in the southern states than the northern states of India. One recent study found that mother's education and age at birth are significantly associated with neonatal mortality.[17] The longer duration of female education delays the age at marriage and childbirth and enhances women's decision-making power regarding self-care and child health. Therefore, empowering women through education is a prerequisite for improving maternal and child health in India.

Reduction in the burden of non-communicable diseases (NCDs) is an important aspect of SDG-3. NFHS provides a meagre information on NCDs but various research have focused on the growing burden of chronic diseases in India, particularly in the urban areas. NCDs accounted for 44 percent of national disability-adjusted life years (DALYs) in 2005 and 46.6 per cent of DALYs in 2017.[18,19] NCDs contribute around 60 per cent of all deaths in India.[20] The diabetes prevalence rate in India increased from 7.1 per cent to 8.9 per cent between 2009 and 2019.[21] The contribution of cardiovascular diseases (CVDs) to total death in India increased from 15.2 per cent to 28.1 per cent between 1990 and 2016.[22] To control the rise of NCDs, the Government of India launched the national programme for prevention and control of cancer, diabetes, cardiovascular diseases and stroke (NPCDCS) in 2010.

Based on the data of the national AIDS control organization (NACO), Sahu et al estimated that between 2010 and 2020, the decline in the incidence rate of HIV infections in India was 27 per cent, far lower than the national target of 75 per cent by 2020.[23] Although India has efficiently tackled the problem of HIV/AIDS in the last two decades and the incidence rate of HIV infection has declined, substantial efforts are needed to increase the comprehensive knowledge regarding HIV/AIDS among men and women in India. The government should encourage the expansion of adolescence education programme in schools and red ribbon clubs in colleges and emphasize on community outreach programmes to educate the adults about HIV/AIDS. It is particularly important in the context of widespread stigma against the AIDS patients.

We observed that the percentage of males and females who consume alcohol and any form of tobacco reduced in India between 2015-16 and 2019-21. Besides strict government policies against substance use, widespread awareness campaign is required on the disastrous effects of substance use on health, family, and society.

The rate of increase in the proportion of households using clean fuel for cooking in India is not sufficient to achieve the SDG target. In India, the Pradhan Mantri Ujjwala yojana (PMUY) was initiated in 2016 to endorse clean energy use, help poor families, check deforestation and reduce air pollution. The initial success of the project has dwindled which is apparent from the rising trend of inactive LPG connections.[24] The Russian invasion of Ukraine and the Indian government's policy to remove subsidy on petroleum and natural gas have worsen the situation.

Out-of-pocket (OOP) health expenditure in India is catastrophic. According to the National Health Accounts 2017-18, the out-of-pocket health expenditure in India was 48.8 percent of the total health expenditure and 1.6 percent of GDP.[25] The inclination towards private healthcare services (due to huge pressure and miserable condition at public health care institutions) and lack of health insurance have increased the proportion of OOP health expenditure. To tackle the problem, the government of India and various state governments adopted different health schemes to provide affordable healthcare services to the poor. Under the Rashtriya Swasthya Bima Yojana, launched in 2008, millions of unorganised sector workers of below poverty line were benefitted.[26] To achieve the target of universal health coverage under SDG-3, the Government of India introduced Ayushman Bharat in 2018. Despite all these attempts, the percentage of households having health insurance is abysmally small in India. Low awareness level about the importance of health insurance is an important reason for small health insurance coverage in India.[27]

A few limitations are observed in this study. We have used the NFHS data for our study. The information about some of the SDG health indicators are not available from the NFHS. For example, NFHS does not provide data on mortality due to NCDs, suicide mortality rate etc. So, we did not compute the progress rate of these health parameters. We have compared the actual annual rate of progress and the required annual rate of progress under the assumption of linear progression. In reality it may not be the linear progress.

The NITI Aayog of India regularly publish the SDG related progress report for India. However, our main contribution is that, besides actual rate of progress, we also have calculated the required rate of progress based on the data of NFHS-4 and NFHS-5. It directly throws light on the health parameters where immediate policy intervention is required.

CONCLUSION

As India is the second most populous country in the world, high population growth rate remained a major concern of the Indian policy makers since independence. The report of NFHS-5 revealed that India has already succeeded in lowering the TFR below the replacement level. However, some indicators show that India's performance is not satisfactory in achieving the targets of

SDG-3 and national health policy 2017. In case of reduction of neonatal and under-5 mortality rates and maternal mortality ratio, speedy progress is required. Unfortunately, the percentage of wasted children under-5 slightly increased between 2015-16 and 2019-216. Therefore, mid-day meal and ICDS service should be strengthen as poor families are benefitted from these services.[28] Besides, regular audit in the schools and ICDS centres is necessary so that government's fund for child development cannot be misused. To provide nutritious food to the children, the government also need to increase its budgetary allocation.

There are many challenges lying ahead of India in achieving the goals of national health policy 2017 and SDG-3. As India is experiencing population ageing, the incidence of non-communicable diseases is expected to increase further. Urgent public health policy to combat this situation is necessary. The Swachh Bharat Mission (SBM) launched in 2014 in India is applauded for spreading cleanliness awareness and preventing diarrhoeal deaths. More preventive measures like SBM are required to curb infectious diseases. There is enough evidence that smoking and consumption of alcohol are highly corelated.[29] Therefore, a comprehensive policy formulation is required to reduce the prevalence rate of smoking and alcohol consumption. Every year around two million premature deaths occur in India due to air pollution including indoor pollution.[30] Despite various government initiatives, the percentage of households using clean fuel for cooking is low in India. Therefore, the central government must provide subsidy for the success of the Pradhan Mantri Ujjwala Yojana programme.

As India experience massive regional disparity in health outcomes, the governments of the poorly performing states should put more emphasis on improving the population health by focussed public health initiatives. Besides, they need to concentrate on the social, economic, and environmental determinants of health as they have direct and indirect impact on the population health. For example, to improve maternal and child health, reduction of poverty, creating an accessible and affordable health care system, increasing the opportunity of education and employment for women are essential. In India, the health care infrastructure is inadequate. Despite the introduction of universal health insurance scheme, the catastrophic health expenditure in India is astoundingly high which makes many families to sink below poverty line. It is important to mention that the share of GDP spent on public health by the government of India is among one of the lowest in the world. When our pledge is to improve the overall population health of India, the government should raise its health expenditure to at least 2.5 per cent of the GDP to meet the health-related targets of sustainable development goals 2030.

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