

# INDIAN JOURNAL OF POPULATION AND DEVELOPMENT

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# **Child Vulnerability across Life Cycle in District Chhindwara of Madhya Pradesh, India**

Aalok Ranjan Chaurasia

## **Abstract**

This paper analyses child vulnerability in the rural areas of district Chhindwara, Madhya Pradesh, India following a vulnerability criterion related to the well-being of children. The analysis reveals that close to half of children in the rural areas of the district are vulnerable in the sense that they have higher probability of an adverse outcome or a welfare loss in different domains of well-being that are relevant to the age of the child. The analysis also reveals that vulnerability among children of the district is influenced by child level as well as household level and village level factors. The paper class for improving the organisational effectiveness of child well-being efforts to mitigate the vulnerability faced by the children of the district.

## **Background**

Children are not full social and economic agents. They need care and support for their survival, physical growth, cognitive development, and protection from a range of social, economic, and environmental hazards. If the care and support is missing or if it is inadequate, the normal growth and development of the child is compromised, and the child becomes vulnerable in the sense that it has relatively higher probability or chance of an adverse outcome or welfare loss which has implications for the well-being of the child. To mitigate the vulnerability faced by children, specific interventions focussing on different domains of child well-being – survival, physical growth, cognitive development, and protection from a range of social, cultural, economic, and environmental hazards - constitute an integral component of every social and economic development agenda. These interventions are directed towards specific dimensions grouped into four domains of child well-being and universal coverage of these interventions is argued to be necessary to mitigate child vulnerability. A simple, yet straightforward, approach to measure vulnerability faced by children may, therefore, be evolved in terms of the coverage of different interventions that are specifically directed towards different domains of child well-being - interventions that secure survival, promote physical growth and cognitive development, and ensure protection of children from social, cultural, economic, and environmental hazards. If the coverage of these

interventions is not universal, then, a proportion of children is left vulnerable in at least one dimension of child well-being and the lower the coverage the higher the proportion of vulnerable children.

The concept of child vulnerability has frequently been discussed in child development and child rights literature (Schweiger, 2019; Jopling and Vincent, 2016; Brown, 2011), but there is no universally accepted framework for analysing child vulnerability (OECD, 2019). A vulnerable child has been defined as the one whose basic rights including right to survive, right to growth and development, and right to protection remain unfulfilled (Skinner et al, 2006). This definition, however, is difficult to be quantified, although it is possible to quantify some situations or conditions that make a child vulnerable in specific dimensions of child well-being. For example, children born with a low birth weight have relatively higher risk of death during childhood compared to children born with normal birth weight so that children born with a low birth weight may be classified as vulnerable children as far as the survival dimension of child well-being is concerned.

Measurement of child vulnerability and identification of factors associated with it is important from at least three perspectives. The first is related to the monitoring of the coverage different interventions that are directed to specifically mitigate child vulnerability. The second rationale of measuring, and analysing determinants of child vulnerability is related to informing resources requirements necessary for providing adequate care and protection to every child so that survival, growth, development, and protection of the child can be ensured. Lastly, measuring, and analysing child vulnerability is needed to generate the evidence necessary for properly targeting different child well-being interventions so as to increase their effectiveness and maximise their impact. Child vulnerability analysis is also necessary to create a constituency for the well-being of children. Children are the future of the mankind and roots of the well-being of the future generation lie in the well-being of children.

Child vulnerability, however, is highly contextual as the extent and the nature of care and support to children is determined by a host of social, cultural, economic, and environmental factors that operate at the level of the child as well as at the level of the family and the community. Child vulnerability is also influenced, up to a significant extent, by the organisational effectiveness of the agencies involved in the delivery of child well-being services. The situation is compounded further because the well-being needs of children of different ages are essentially different so that meeting the well-being needs of children is essentially a multidimensional perspective. As such, some children are more vulnerable than others given the same social, cultural, economic, and environmental context.

In this paper, we measure the vulnerability faced by children and analyse factors associated with it in children living in the rural areas of district Chhindwara of Madhya Pradesh, India. Madhya Pradesh is one of the poorly developed states of the country. It has the dubious distinction of having the highest risk of death during infancy

(Government of India, 2022a) and in the first five years of life (Government of India, 2022b). The state also has the lowest probability of survival during the childhood period in the country which suggests that child vulnerability in the state is quite pervasive and has persisted over time. District Chhindwara had an area of 11815 square Kms and a population of around 2.1 million at the 2011 population census which was distributed across 1906 villages and 24 towns. Around 24 per cent of the district population lives in the urban areas as defined at the 2011 population census. Scheduled Tribes constitute almost 37 per cent population of the district whereas Scheduled Castes constitute about 11 per cent. The effective literacy rate or the proportion of the population aged seven years and above who can read and write with understanding was around 71 per cent at the 2011 population census while the work participation rate was almost 46 per cent. However, more than 44 per cent of the work force was engaged as agricultural labourer. The under-five mortality rate in the district is estimated to be 57 under-five deaths for every 1000 live births in the year 2017 (Chaurasia, 2021). According to the latest round of the National Family Health Survey, the proportion of women who had at least four antenatal care visits during their last pregnancy was only 67 per cent but more than 92 per cent of deliveries in the district were reported to be institutional deliveries. Around 44 per cent children below 3 years of age were reported to have been breastfed within one hour of the birth whereas around 65 per cent children aged 12-23 months were found to be fully immunised. On the other hand, around 24 per cent children aged 0-5 years were found to be stunted whereas almost 33 per cent were found to be underweight (Government of India, 2021).

The paper is organised as follow. The next section of the paper describes the conceptual framework that has been adopted for constructing a vulnerability index for measuring and analysing child vulnerability. Section three describes the data used to measure child vulnerability and analyse its determinants. Estimates of the child vulnerability index and its covariates are presented in section four. Section five analyses determinants of child vulnerability using the multilevel logistic regression analysis approach which recognises that child vulnerability is influenced by individual, household, and community level factors. The last section of the paper summarises the main findings of the analysis and puts forward a set of recommendations to reduce child vulnerability.

## Conceptual Framework

We conceptualise child vulnerability in terms of the age of the child and in terms of dimensions of child well-being. Consideration of the age of the child is important as the well-being needs of children of different age are different and all child well-being needs are not relevant to all children. On the other hand, different dimensions of child well-being can be grouped into different domains of child well-being. The conceptual framework maps the well-being needs of children of different ages to different domains of child well-being. From the perspective of well-being,

children can be divided into five age-groups: 1) 0-1 year; 2) 1-3 years; 3) 3-6 years; 4) 6-14 years; and 5) 14-19 years. Similarly, different child well-being interventions can be grouped into four domains of well-being – survival, physical growth, cognitive development, and protection and each domain is relevant to children of different age groups. For example, the most relevant well-being domain for children aged 0-1 year is survival domain whereas the most relevant domain for children aged 1-3 years is physical growth domain. Table 1 presents the relevance of different domains to children of different age groups - the darker the colour of the cell the more relevant the domain for the age group. We consider only the most relevant domain for the construction of the vulnerability index for children of different ages.

Table 1: The relevance of different child well-being domains in analysing vulnerability in children of different ages.

Age	Domains of child well-being			
	Survival	Physical growth	Cognitive development	Protection
0-1 year				
1-3 years				
3-6 years				
6-14 years				
14-19 years				

Remarks: The darker the colour of a cell, the more relevant is the domain of child well-being for the analysis of child vulnerability.

Source: Author

Table 2: Age- and domain-specific child well-being dimensions identified for the construction of vulnerability index.

Age of the child	Domains of child well-being			
	Survival	Growth	Development	Protection
0-1 year	Full antenatal care during pregnancy Birth registration	Breastfeeding Nutrition		
1-3 years	Full immunisation	Nutrition Vitamin A		
3-6 years		Nutrition	Early childhood education	
6-14 years		Nutrition	Schooling	No paid work
14-19 years		Nutrition	Schooling	No paid work

Source: Author

The next step in the construction of the child vulnerability index is to identify key dimensions in different domains of child well-being that is relevant for children of different age groups in accordance with the conceptual framework presented in table 1. We have identified 15 dimensions grouped into four domains of child well-being (Table 2). For example, care and attention during pregnancy is a key child well-being dimension which is directed to reducing the adverse survival outcome in children aged 0-1 year. Similarly, schooling is an important child well-being dimension that is directed towards reducing the welfare loss in terms of the cognitive development of children aged 6-14 years whereas prevention of child labour is an important child well-being dimension that is directed towards protecting children aged 6-19 years from a range of social, economic, and environmental hazards.

Based on table 2, the child vulnerability criterion for constructing the child vulnerability index is summarised in table 3. The criteria follow the counting approach to classify a child as vulnerable or not vulnerable. For example, a child aged 0-1 year is classified as vulnerable if the mother of the child had not received full antenatal care during pregnancy, or if the birth of the child is not registered, or if breastfeeding was not initiated within one hour of the birth of the child or if the child is low weight-for-age. Similarly, a child aged 1-3 years is classified as vulnerable if the child is not fully immunised or if the child is stunted or low height-for-age or if the child has not received five doses of Vitamin A prophylaxis and a child aged 3-6 years is classified as vulnerable if the child has low body mass index-for-age or if the child is not attending an early childhood education centre. In the same manner, children aged 6-14 years and 14-19 years may be classified as vulnerable following table 3.

Table 3: The vulnerability criteria for children.

Age	A child is classified as vulnerable if
0-1 year	<ol style="list-style-type: none"> <li>1. Mother of the child did not have at least four antenatal care visits during pregnancy, or</li> <li>2. Child is not breast fed within one hour of birth, or</li> <li>3. Birth of the child is not registered, or</li> <li>4. Child is low weight-for age.</li> </ol>
1-3 years	<ol style="list-style-type: none"> <li>1. Child is not fully immunised, or</li> <li>2. Child is low height-for-age, or</li> <li>3. Child has not received 5 doses of Vitamin A prophylaxis.</li> </ol>
3-6 years	<ol style="list-style-type: none"> <li>1. Child is not attending the early childhood education centre, or</li> <li>2. Body mass index of the child is low for age.</li> </ol>
6-14 years	<ol style="list-style-type: none"> <li>1. Child is not attending school, or</li> <li>2. Body mass index of child is low for age, or</li> <li>3. Child is working outside home for money.</li> </ol>
14-19 years	<ol style="list-style-type: none"> <li>1. Child is not attending school, or</li> <li>2. Body mass index of the child is low for age, or</li> <li>3. Child is working outside home for money.</li> </ol>

Source: Author

The vulnerability index for children of a given age group may now be calculated simply as the proportion of the vulnerable children to the total children in that age group. Finally, the child vulnerability index covering all children (0-19) years may be calculated as the ratio of the sum of the vulnerable children in different age groups to the sum of all children in different age groups. It is obvious that the child vulnerability index so calculated ranges between 0 and 1 so that the child vulnerability index also reflects the probability of a child being vulnerable in the context of the respective dimension of different domains of child well-being. When the child vulnerability index is 0, there is no child who is vulnerable or has relatively high probability or chance of an adverse outcome or welfare loss in any of the 15 dimensions of the four domains of child well-being considered in the present analysis. On the other hand, the higher the child vulnerability index the higher the probability of adverse outcome or welfare loss. When the index is equal to 1, child vulnerability is universal.

## Data

The data for the study come from a household survey that was carried out in 2019 in the rural areas of district Chhindwara of Madhya Pradesh, India. The survey covered 1000 households from 100 villages which were selected through a two-stage sample selection procedure. In each selected household, information related to different dimensions of child well-being was collected from all children (persons aged 0-19 years) through direct interview with the head of the household. When the head of the household was not available, information was collected from a responsible adult member of the household. The survey identified 1500 children aged 0-19 years in 1000 households.

The analysis of the collected data was carried out in three stages. At the first stage, every child was classified as vulnerable or not vulnerable according to the vulnerability criterion described in table 2. Based on this classification the child vulnerability index was calculated for children of different age groups and for all children. In the next step, bivariate analysis was carried out to analyse village, household, and child level covariates of child vulnerability and to get first-hand idea about how village-specific, household-specific, and child-specific factors influence child vulnerability. Subsequently, multi-level, logistic regression analysis was carried out to determine village, household, and child level determinants of child vulnerability. Finally, children were classified according to their vulnerability status and their distinguishing individual, household, and village level characteristics. Recursive partitioning technique was adopted for the classification modelling exercise.

The villages covered under the study varied widely in terms of their social, economic, and demographic characteristics. The population of the villages surveyed ranged from 36 to 6926 with a median population size of 661 while the average household size ranged from 3.44 to 6.26 with a median of 4.81 according to the 2011 population census. Similarly, the proportion of population below 7 years of age ranged



from 8.2 to 24.8 per cent while the population sex ratio ranged from 782 to 1192 females for every 1000 males and was favourable to females in Scheduled Tribes but highly unfavourable to females in the literate and working population. The entire population of some of the villages was Scheduled Tribes whereas in some villages, there was virtually no Scheduled Tribes population. The same was the case with Scheduled Castes. Around 44 per cent villages surveyed were within a distance of 20 Kms from their respective sub-district headquarters whereas around 5 per cent villages were at a distance of more than 60 Kms (Table 4). More than four-fifth of the villages were connected through surfaced road. Health facility of any type was available in only 15 per cent villages.

In majority of the villages, villagers had very little knowledge about the existence of Village Health, Nutrition and Sanitation Committee. Even in those villages where villagers knew about the Committee, there was little knowledge about the meeting of the Committee. The Village Health and Nutrition Day was also reported to be organised in only 60 per cent of the villages. However, ASHA (Accredited Social Health Activist) was available in 95 per cent of the villages but in some villages, she did not live in the village. In 3 villages, there was no Aanganwadi Centre and in 7 villages, the Aanganwadi Worker did not stay in the village. In 5 villages, there was no school. In 91 villages, a government school was available, but in most of the government schools, the staff did not stay in the village. The availability of facilities like safe drinking water was also found lacking in most of the villages. In most of the villages, the drainage system was in poor shape and in at least 70 villages, water clogging was common.

The characteristics of the households surveyed were also quite diverse. The religion of most of the households was Hindu but majority of the Hindu households belonged to either Scheduled Tribes or Scheduled Castes. More than 53 per cent of the households surveyed were below the poverty line. Almost 95 per cent of the households had their own house, but the proportion of households having a pucca house was small. Moreover, more than 38 per cent households were single room households. The most common source of drinking water in the households surveyed was either the public tube well or the public hand pump. Only about four-fifth of the households were having latrine in the household premises but there was no proper drainage system in most of the households. Separate kitchen was not available in more than 44 per cent of the households surveyed. Wood and cow dung cakes was the most common cooking fuel, although around 15 per cent of the households surveyed were having an LPG connection. Electricity was not available in about 10 per cent households. The most common household asset was the mobile phone. Television was available in around 50 per cent of the households whereas two-wheeler auto vehicle was available in one third of the households surveyed. Other household assets were available in only a small proportion of the households surveyed.

During the survey, information about the availability of 13 household assets was also collected from every household surveyed. Based on the availability of these household assets, a standard of living index was constructed for every household

through the application of the factor analysis technique. This exercise suggested that the household standard of living index was the poorest (less than 20 per cent) in almost 60 per cent of the households surveyed. Based on the availability of household assets, the standard of living was found to be either poor or very poor in most of the households surveyed. There was only a small proportion of the households surveyed where the standard of living as measured through the household standard of living index was at least average.

The survey identified 1500 children aged 0-19 years in 1000 households from 100 villages covered under the study. The sex ratio of the children enumerated during the study was 958 girls aged 0-19 years for every 1000 boys aged 0-19 years. Around 6 per cent of the children were aged 0-1 year; around 12 per cent in aged 1-3 years; around 17 per cent aged 3-6 years; around 37 per cent aged 6-14 years; and around 28 per cent aged 14-19 years according to the information given by either the head of the family or any other family member. Around 38 per cent children were the first child of their parents whereas around 35 per cent children were second order births and 28 per cent children were third and higher order births.

## Child Vulnerability

The classification of children according to the vulnerability criteria given in table 3 suggests that child vulnerability was quite pervasive in the rural areas of the district. It is estimated that around 46 per cent children aged 0-19 years in the rural areas of the district were vulnerable in at least one of the 15 dimensions of child well-being. Child vulnerability is found to be the highest, almost universal, in the age group 1-3 years. In this age group more than 90 per cent children were classified as vulnerable - having relatively higher risk probability of an adverse outcome or welfare loss because they were either not fully immunised or were stunted (low height-for-age) or they had not received five doses of Vitamin A prophylaxis. Similarly, in the age group 0-1 year, more than 73 per cent children were found to be vulnerable in the sense that either the mother of these children did not have at least four antenatal visits during pregnancy, or these children were not breastfed within one hour of birth or they were low weight-for-age, or their birth was not registered as required by the law. In the age group 14-19 years, on the other hand, around 52 per cent children were classified as vulnerable as they were either not attending the school or their body mass index was low age, or they were engaged in some paid work outside the home (Table 4).

It is logical to argue that a child may be classified as vulnerable in more than one dimension of different domains of child well-being. It may also be argued that the higher the number of dimensions in which the child is classified as vulnerable the deeper and more complex the vulnerability faced by the child. This analysis, however, reveals that child vulnerability in the district was generally not deep and complex. Around 41 per cent children aged 0-1 years were found to be vulnerable in only one dimension of the survival domain whereas there was no child in this age group who was

vulnerable in all the four dimensions child well-being relevant to this age group (Table 5). On the other hand, child vulnerability appears to be quite complex and deep in children aged 1-3 years as almost 20 per cent of children of this age group are classified as vulnerable in all the three dimensions of child well-being relevant to the age group whereas less than one third of children of this age group are classified as vulnerable in only one dimension. There were less than 10 per cent children in this age group who are not classified as vulnerable in any of the three dimensions of child well-being relevant to the age group. The physical growth domain of child well-being is the most relevant domain of child well-being for children of this age group. In children aged 14-19 years also, a small proportion of children is classified as vulnerable in all the three dimensions of child well-being relevant to the age group. Table 5 suggests that the depth or the complexity of child vulnerability is not the same for children of different age groups. This means that an age-specific approach should be adopted to reduce child vulnerability.

Table 4: Child vulnerability by the age of the child in District Chhindwara, Madhya Pradesh

Vulnerability criteria	Age of the child in years				
	0-1	1-3	3-6	6-14	14-19
Mother did not receive full antenatal care (%)	23.7				
Birth not registered (%)	14.0				
No breastfeeding within 1 hour of birth (%)	37.6				
Low weight-for-age (%)	36.6				
Not fully immunised (%)		36.7			
Low height-for-age (%)		56.1			
Not received 5 doses of Vitamin A (%)		76.1			
No registered in early childhood education (%)			2.4		
Low body mass index-for-age (%)			23.1	26.2	23.8
Not attending school (%)				7.8	33.5
Working for money outside home (%)				1.6	17.1
Child vulnerability index	0.731	0.911	0.231	0.333	0.521

Source: Author

Table 5: Depth of child vulnerability

Age	Proportion (Per cent) of children by the number of dimensions in which they are vulnerable						N
	0	1	2	3	4	All	
0-1 year	26.9	40.9	25.8	6.5	0	0	93
1-3 years	8.9	32.8	38.9	19.4		19.4	180
3-6 years	76.9	22.3	0.8			0.8	251
6-14 years	68.9	29.3	1.8	0		0	550
14-19 years	47.7	34.2	15.1	3.4		3.4	426
0-19 years	54.9	24.4	18.2	3.7	0	3.7	1500

Source: Author

## Covariates of Child Vulnerability

The village level, household level and child level covariates of child vulnerability are presented in table 6. The probability of a child being vulnerable is more than two times higher in villages which were connected by unsurfaced road compared to villages connected by surfaced road. Similarly, probability of a child being vulnerable is almost 13 per cent higher in villages at a distance of more than 50 Kms from the sub-district headquarters compared to villages at a distance of less than 20 Kms. Child vulnerability is found to be more than 16 per cent higher in villages where children constituted at least 15 per cent of the village population compared to villages where child population was less than 10 per cent. On the other hand, child vulnerability is found to be around 22 per cent lower in villages having effective literacy rate at least 60 per cent compared to villages having effective literacy rate less than 40 per cent. However, effective female literacy rate does not have any impact on child vulnerability. The proportion of main workers in the labour force in the village, however, has an impact on child vulnerability. The probability of a child being vulnerable is more than 50 per cent higher in those village where main workers constituted at least 60 per cent of the village labour force.

The education of the head of the household is found to be directly related to vulnerability risk of children in the household. The probability of a child being vulnerable is found to be almost 30 per cent less in households where the household head was educated at least up to high school level compared to households where the household head was illiterate. Similarly, child vulnerability risk is found to be substantially higher in households of other religions compared to households of Hindu religion. Moreover, child vulnerability risk is found to be directly related to the household standard of living. The probability of a child being vulnerable is estimated to be almost 20 per cent lower in non-poor households compared to very poor households as identified through the household standard of living index. Similarly, in households without latrine, the probability of a child being vulnerable is found to be more than 25 per cent higher compared to households having latrine while this probability is 40 per cent higher in households having mixed kitchen compared to households having separate kitchen. The child vulnerability risk is found to be almost 20 per cent lower in household using LPG for cooking compared to households using wood and cow dung. On the other hand, the probability of a child being vulnerable is found to be more than 34 per cent higher in household using coal for cooking compared to households using wood and cow dung for cooking.

The probability of a child being vulnerable, or the child vulnerability risk is found to be associated with the sex of the child and its birth order. The vulnerability risk in the surveyed households is found to be marginally lower in girls as compared to boys. On the other hand, the child vulnerability is found to increase with the increase in the birth order of the child. The probability of a child being vulnerable is found to be more than 15 per cent higher in 3<sup>rd</sup> and higher birth order children compared to 1<sup>st</sup> birth order children. Similarly, the probability of a child being vulnerable is found to be almost 7 per cent higher in 2<sup>nd</sup> birth order children compared to 1<sup>st</sup> birth order children.

Table 6: Village, household, and child level covariates of child vulnerability in district Chhindwara, Madhya Pradesh.

Covariates	Child vulnerability		Risk ratio	Odds ratio	N
	Index	Odds			
Village level covariates					
Village connectivity					
Surfaced road	0.456	0.838	1.000	1.000	1204
Unsurfaced road all weather	0.485	0.942	1.064	1.123	265
Unsurfaced road dry weather	0.645	1.817	1.414	2.168	31
Distance from sub-district headquarters					
Less than 20 km	0.434	0.767	1.000	1.000	603
20-50 km	0.460	0.852	1.060	1.111	705
50 km and more	0.464	0.866	1.069	1.129	192
Child population					
Less than 10 per cent	0.422	0.730	1.000	1.000	90
10-15 per cent	0.473	0.898	1.121	1.229	711
15 per cent and more	0.459	0.848	1.088	1.162	699
Effective literacy rate					
Less than 40 per cent	0.530	1.128	1.000	1.000	134
40-60 per cent	0.441	0.789	0.832	0.700	513
60 per cent and more	0.467	0.876	0.881	0.777	853
Effective female literacy rate					
Less than 40 per cent	0.455	0.835	1.000	1.000	308
40-60 per cent	0.465	0.869	1.022	1.041	763
60 per cent and more	0.466	0.873	1.024	1.045	429
Main workers as proportion to all workers					
Less than 40 per cent	0.393	0.647	1.000	1.000	369
40-60 per cent	0.468	0.880	1.191	1.359	329
60 per cent and more	0.494	0.976	1.257	1.508	802
Household level covariates					
Education of household head					
Illiterate	0.496	0.984	1.000	1.000	704
Below high school	0.423	0.733	0.853	0.745	586
High school and above	0.410	0.695	0.827	0.706	210
Religion					
Hindu	0.461	0.855	1.000	1.000	1476
Others	0.709	2.436	1.538	2.849	24
Social Class					
Scheduled Castes	0.422	0.730	1.000	1.000	136
Scheduled Tribes	0.465	0.869	1.102	1.190	930
Others	0.464	0.866	1.100	1.186	434

Covariates	Child vulnerability		Risk ratio	Odds ratio	N
	Index	Odds			
Number of living rooms					
1	0.453	0.828	1.000	1.000	570
2	0.471	0.890	1.040	1.075	862
3 and more	0.450	0.818	0.993	0.988	68
Latrine in the house					
Yes	0.450	0.818	1.000	1.000	1185
No	0.506	1.024	1.124	1.252	315
Kitchen in the house					
Separate	0.415	0.709	1.000	1.000	641
Mixed	0.499	0.996	1.202	1.404	859
Cooking fuel used					
Wood and cow dung cake	0.468	0.880	1.000	1.000	1289
Coal	0.542	1.183	1.158	1.345	24
LPG	0.422	0.730	0.902	0.830	187
Household assets					
None	0.504	1.016	1.000	1.000	125
At least one	0.460	0.852	0.913	0.838	1375
Household standard of living index					
Very poor	0.462	0.859	1.000	1.000	889
Poor	0.466	0.873	1.009	1.016	524
Non-poor	0.412	0.701	0.892	0.816	97
Child level factors					
Sex					
Boy	0.466	0.873	1.000	1.000	766
Girl	0.460	0.852	0.987	0.976	734
Birth order					
1	0.445	0.802	1.000	1.000	567
2	0.461	0.855	1.036	1.067	519
3 and higher	0.480	0.923	1.079	1.151	414

Source: Author

## Classification of Children

Table 6 suggests that child vulnerability is influenced by child level as well as household and village level factors which operate simultaneously so that there is substantial degree of endogeneity among child, household, and village level factors affecting child vulnerability. Since child-level factors of child vulnerability are nested in households and households are nested in the village, we have adopted the classification modelling approach, or the segmentation approach for classifying children in terms of their vulnerability status. The classification modelling approach involves classifying

children into one of the several mutually exclusive categories – each category having distinct child-level, household-level and village-level factors that influence the vulnerability status of children using data mining techniques (Han et al, 2012; Tan et al, 2006). The classification modelling approach is different from the regression-based approach that is commonly used for analysing marginal effects of the defining characteristics of children on child vulnerability (Chaurasia, 2012). Unlike the regression-based approach, there is no restriction or limitation on the structure of the independent variables or the defining characteristics of children which are used as explanatory variables in the classification modelling exercise. In the most general terms, the classification or the segmentation emanating from the classification modelling exercise is based on a set of *if-then* logical conditions that permit splitting or classifying or segmenting children into mutually exclusive groups of children. The approach is non-parametric, recursive partitioning approach which allows for specifying a large number of potential influencing variables, which may even be more than the number of observations in the data set. It can be applied to both quantitative and attribute data and the combination of the two.

There are different classification modelling techniques available. These include logistic regression, naïve Bayes, stochastic gradient descent, K-nearest neighbours, decision tree, and support vector machine. We have adopted the decision tree approach of classification modelling in the present analysis. Decision tree approach is simple to understand and visualise, requires little data preparation, and can handle both numerical and categorical data. There are different methods available to construct a decision tree (Song and Lu, 2015). These include CART (Classification and Regression Tree) (Brieman et al, 1984), C4.5 (Quinlan, 1993), CHAID (Chi-squared Automatic Interaction Detection) (Kas, 1980), and QUEST (Quick, Efficient, Unbiased Statistical Tree) (Loh and Shih, 1997). used the classification and regression tree method in the present analysis. The method sort children into mutually groups based on the explanatory variables in such a way that the group homogeneity with respect to the dependent variable – the vulnerability status of the child – is the maximum (Chaurasia, 2018). The process is repeated until either the perfect similarity is achieved, or the pre-decided stopping criteria is met (Ambalavanan et al, 2006; Lemon et al, 2003). The method can be applied to both categorical and continuous dependent variables. If the dependent variable is categorical one, the method provides distribution of the dependent variable in each group or category identified. If the dependent variable is continuous one, then the method estimates of arithmetic mean and standard deviation of the dependent variable in each group. Since the dependent variable in the present case is a categorical one, the classification and regression tree method provided the estimate of child vulnerability index for each group. The variation in the child vulnerability index or the proportion of vulnerable children across the mutually exclusive groups so identified makes it possible to explore how child vulnerability varies given the child-level, household-level, and village-level factors that are different for different groups. Actual calculations were carried out using the Classify routine of the software Statistical Package for Social Sciences (SPSS).

Table 7: Results of the classification modelling exercise showing how village level factors, household level factors and child level factors influence child vulnerability in the context of different dimensions of child well-being.

Age	Village level characteristics <i>Approach road</i>	Household level characteristics <i>Education of family head</i> <i>Social class</i> <i>Latrine in the house</i> <i>Separate kitchen</i> <i>Fuel used for cooking</i>	Child level characteristics <i>Sex</i> <i>Birth order</i>	Child vulnerability index	N
0-1 year	All	All	All	0.731	93
	Surfaced			0.694	72
1-3 years	Unsurfaced			0.857	21
	All	All	All	0.911	180
	Surfaced		Girl	0.945	73
3-6 years			Boy	0.848	66
	Unsurfaced			0.951	41
	All	All	All	0.231	251
	Surfaced	Family head education below middle		0.275	143
		Family head education above middle		0.146	48
	Unsurfaced	Scheduled Castes/Scheduled Tribes		0.125	48
6-14 years		Other Castes		0.417	12
	All	All	All	0.333	550
	Surfaced	Family head education below middle		0.348	330
		Family head education above middle		0.243	103
	Unsurfaced	Scheduled Castes/Scheduled Tribes		0.318	85
	Other Castes		0.500	32	



Age	Village level characteristics <i>Approach road</i>	Household level characteristics <i>Education of family head</i> <i>Social class</i> <i>Latrine in the house</i> <i>Separate kitchen</i> <i>Fuel used for cooking</i>	Child level characteristics <i>Sex</i> <i>Birth order</i>	Child vulnerability index	N
14-19 years	All	All	All	0.521	426
	Surfaced	Latrine in the house		0.468	279
		No latrine in the house		0.706	68
	Unsurfaced	Separate kitchen		0.379	29
		No separate kitchen		0.680	50
All	All	All	All	0.463	1500

Source: Author

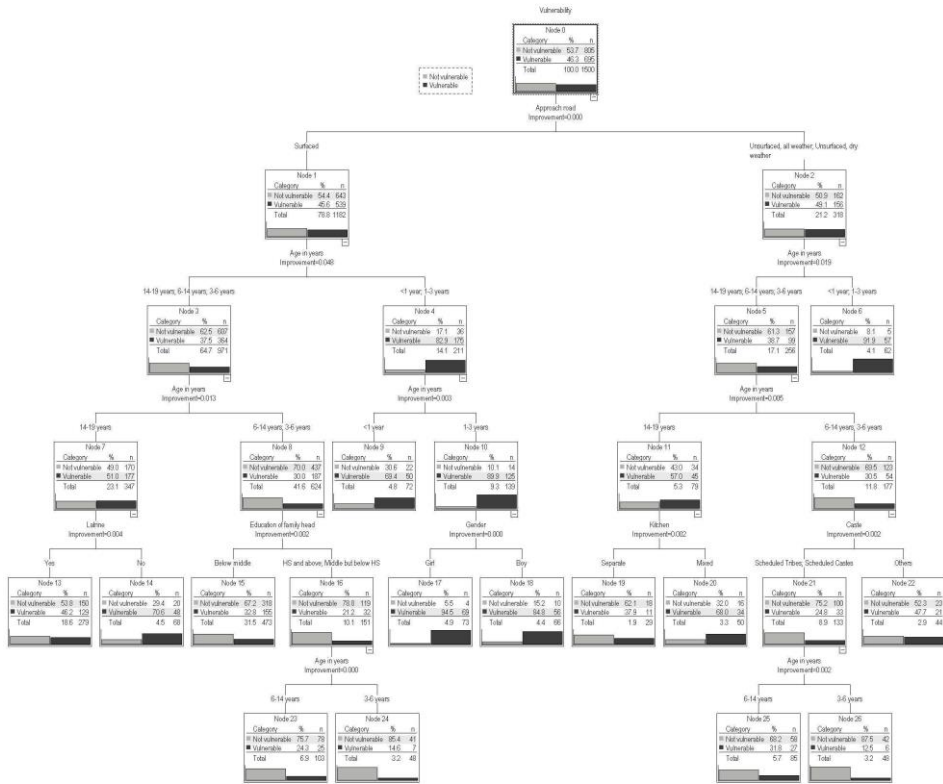


Figure 1: Classification of children by their distinguishing child level, household level and village levels characteristics and child vulnerability in different groups

Results of the classification modelling exercise are presented in table 7 and the classification tree is depicted in figure 1. The exercise suggests that the 1500 children can be divided into 14 mutually exclusive and exhaustive groups and each group has distinct child-specific, household-specific, and village-specific characteristics. Moreover, the child vulnerability index or the proportion of vulnerable children to total children is different in different mutually exclusive groups. In children below 1 year of age, it is the connectivity of the village which is the key determinant of child vulnerability. Child vulnerability is substantially lower in children aged 0-1 year living in those villages which are connected through the surfaced road as compared to children living in villages which are not connected through the surfaced road irrespective of whether the unsurfaced road is an all-weather road or only a dry weather road. The effect of the type of road connectivity of the village on the vulnerability of children aged 1-3 years is also very strong. On the other hand, in villages connected through a surfaced road, the vulnerability in girls aged 1-3 years is found to be substantially higher than the

vulnerability in boys of the same age group and living in villages connected through a surfaced road. In villages not connected through the surfaced road, there appears no impact of different distinguishing characteristics of children on vulnerability in the context of child well-being.

In children aged 3-6 years, education of the head of the family matters is an important household level factor in deciding child vulnerability in villages which are connected by a surfaced road while social class matters in child vulnerability in villages which are not connected through a surfaced road. In children living in villages connected through a surfaced road, child vulnerability is lower in those households in which the head of the household is having at least middle level of education compared to child vulnerability in households where the head of the household is either illiterate or having less than middle level education. On the other hand, in villages not connected through a surfaced road, child vulnerability is found to be very high in Other Castes households compared Scheduled Castes and Scheduled Tribes households.

In children 6-14 years also, the level of education of the head of the household and the social class of the household are the main influencing factors of child vulnerability and the pattern is very similar to that in children aged 3-6 years, although child vulnerability is relatively higher in children aged 6-14 years as compared to children aged 3-6 years. Interestingly, in children of this age group also, child vulnerability is found to be comparatively lower in Scheduled Castes and Scheduled Tribes households in villages which are not connected through a surfaced road as compared to child vulnerability in Other Castes households.

Finally, in children aged 14-19 years, availability of latrine in the household appears to be the most important factor in deciding child vulnerability in villages connected through a surfaced road whereas a separate kitchen in the household matters the most in deciding child vulnerability in villages not connected through a surfaced road. In villages connected through a surfaced road, child vulnerability is substantially high in households without latrine compared to households having a latrine. Similarly, in villages not connected through a surfaced road, child vulnerability is substantially higher in households not having a separate kitchen compared to households having separate kitchen.

Among the 14 mutually exclusive groups identified through the classification modelling exercise, vulnerability is found to be the highest in girls aged 1-3 years living in villages connected with a surfaced road. In this group of children almost 95 per cent children are found to be vulnerable in the context of the physical growth domain of child well-being. Gender discrimination appears to play a crucial role in deciding child vulnerability in children below 1 year of age living in village connected by a surfaced road. Household level factors appear to play little role in deciding the vulnerability status of children of this group. Child vulnerability is also found to be very high in children below 3 years of age living in villages not connected by a surfaced road and in children aged 14-19 years living in households not having latrine in villages connected

by a surfaced road or in households not having separate kitchen in villages not connected by surfaced road.

On the other hand, vulnerability is found to be the lowest in Scheduled Castes and Scheduled Tribes children aged 3-6 years living in villages not connected by a surfaced road. Vulnerability is also very low in children aged 3-6 years of those households of villages connected by a surfaced road where the head of the household is having at least middle level education. Less than 15 per cent children of this group have been found to be vulnerable in the context of the cognitive development domain of child well-being.

## Discussion and Conclusions

Madhya Pradesh has the dubious distinction of having the highest risk of death during childhood (Government of India, 2022). This means that vulnerability of children of the state in the context their well-being which can be conceptualised in terms of survival, physical growth, cognitive development of children and their protection from a range of social, cultural, economic, and environmental hazards is unacceptably high. However, very little is currently known about the factors that contribute to unacceptably high child vulnerability in the state. Children are the future of the society and their vulnerability in terms of survival, physical growth, cognitive development, and protection has implications for social and economic development and improvement in the quality of life. Mitigating child vulnerability, therefore, is an integral component of any social and economic development agenda. Investing in children is investing in the future of the society.

The present paper, based on a primary survey carried out in the rural areas of district Chhindwara of Madhya Pradesh, India reveals that child vulnerability in the context of child well-being is quite pervasive in the district and a cause of development concern. Classification of children as vulnerable or not vulnerable was carried out following a 15-point vulnerability criterion which assumes that the dimensions of vulnerability are age-specific and different for different domains of child well-being. The development of the vulnerability criterion was based on mapping the most relevant domain of child well-being to children of different ages.

The present analysis reveals that nearly half of the children in the rural areas of the district appear to be vulnerable in terms of increased probability of adverse outcome and expected welfare loss in the sense that these children are not covered through specific interventions directed towards securing survival, ensuring normal physical growth and cognitive development, and protecting children from social, cultural, economic, and environmental hazards. The analysis reveals that vulnerability varies widely by the age, sex, and birth order of the child. In children aged 1-3 years, vulnerability appears to be nearly universal as more than 90 per cent children of this age group have not been found to be vulnerable in terms of at least one dimension of

child well-being relevant for the age. Child vulnerability has also been found to be very high in children aged 0-1 year and children aged 14-19 years. On the other hand, vulnerability is found to be higher in girls compared to boys and in higher birth order children compared to children of first birth order. Vulnerability is found to be particularly marked in girls aged 1-3 years.

Both household level and village level factors have been found to influence child vulnerability in addition to child-specific factors. The most important household factor having bearings on child vulnerability is the education of the head of the household. Child vulnerability is found to decrease with the increase in the education of the head of the household. Household standard also has bearings on child vulnerability. More specifically, vulnerability in children aged 14-19 years is found to be high in households not having latrine and not having a separate kitchen.

At the village level, the most important factor influencing child vulnerability is the village connectivity. Child vulnerability is found to be relatively high in villages not connected by a surfaced road. It appears that the delivery of child well-being services in the rural areas of the district are contingent upon the village connectivity and delivery of these services are not up to the mark in villages where connectivity is a problem. The situation appears to be particularly serious in those villages which get cut off from the rest of the world during the rainy season. In these villages, delivery of child well-being and child welfare services is disrupted during rains which results in higher vulnerability of children living in these villages.

The analysis suggests that children in the rural areas of the district can be segmented or grouped into 14 mutually exclusive groups and each group has distinct individual, household, and village level characteristics. Moreover, child vulnerability, as measured in terms of the child vulnerability index, varies widely across these mutually exclusive groups. In children aged 0-3 years, it is the village connectivity which is the key determinant of child vulnerability. On the other hand, children aged 1-3 years, vulnerability is markedly high in girls as compared to boys in villages connected through a surfaced road. In villages not connected through a surfaced road, there is little distinction in vulnerability faced by girls and boys. In children aged 3-6 years, it is the education of the head of the family that matters the most in villages connected through a surfaced road while social class matters in villages not connected through a surfaced road. In children aged 6-14 years also, education of the head of the family and the social class of the household are the main influencing factors of child vulnerability. Finally, in children aged 14-19 years, availability of a latrine or a separate kitchen in the household are the key influencing factors.

The sensitivity of child vulnerability or the proportion of children having higher probability of adverse outcomes or welfare loss to a host of child-level, household-level and village-level highlights the complexities involved in mitigating child vulnerability in the prevailing social, economic and cultural context. Most of the factors influencing child vulnerability are exogenous to the child well-being services delivery system and

reflect the impact of the prevailing social, cultural and economic environment on child vulnerability. These factors can be address only through a broader development approach that focuses on broader social and economic development.

At the same time, exceptionally high child vulnerability in the rural areas of the district also reflects the poor organisational effectiveness of child well-being services and interventions. Ideally, all child well-being and child welfare services are designed to deliver a comprehensive set of child well-being services to all children irrespective of social, cultural, and economic characteristics of children. The present analysis, however, reveals that child well-being and child welfare services are neither able to reach all children nor able to deliver comprehensive child well-being and child welfare services so as to mitigate child vulnerability. The prevailing child well-being and child welfare services do not appear to be able to counter the exogenous factors of child vulnerability. It is well known that the only way to address the exogenous factors that contribute to child vulnerability is to improve the organisational effectiveness of child well-being and child welfare services. The current organisation of child well-being and child welfare services in the district seems to be wanting in this regard.

The limitations of the current organisation of child well-being and child welfare services in mitigating child vulnerability appear to be both conceptual and operational. A mapping of the goals and objectives of a number of child well-being and child welfare schemes on the 15-point vulnerability criteria adopted in the present study suggests that there is no scheme, programme or intervention which addresses all the dimensions of child vulnerability in a comprehensive yet cohesive manner. The current approach to mitigating child vulnerability can best be described as fragmented and piece-meal. There does not appear to be any scheme, programme or intervention that follows the child right from the day of conception to the time the child reaches 18 years of age and ensures that the child receives a comprehensive set of services and entitlements necessary for its well-being which vary with the age of the child. The need of such an approach was emphasised by the First Health Survey and Development Committee in India (commonly known as Bhore's Committee) way back in 1946 (Government of India, 1946) but it could not be materialised till to date. All the schemes that are currently in vogue focus on selected aspects of child well-being but ignores other aspects and thus contribute to child vulnerability. Individually, these schemes may be efficient in their own context, but they are collectively inefficient in mitigating child vulnerability as revealed through the present analysis.

At the same time, the poor to very poor organisational effectiveness of individual interventions or schemes directed towards a specific component of child well-being as characterised in terms of survival, physical growth, cognitive development, and protection of children, especially, at the local level also appears to be a major concern in mitigating child vulnerability. There is a need to carry out a comprehensive organisational effectiveness analysis of different child well-being and child welfare schemes at the local level by linking inputs into the scheme or intervention to outcomes and impact via processes and outputs. The present analysis, however, suggests that

there is significant scope of improving the organisational effectiveness of different ongoing schemes, programmes and interventions at the local level, the interface with the community. There are many factors endogenous to the child well-being services delivery system that constrain the delivery of child well-being and child welfare services at the local level, thereby affecting the efficacy of these services in mitigating child vulnerability. Very little is currently known about these endogenous factors. However, improving the organisational effectiveness of the ongoing child wellbeing and child welfare services is important because child vulnerability attributed to factors exogenous to the child well-being and child welfare services delivery system can best be addressed through improving the needs effectiveness and capacity efficiency of the child well-being and child welfare services.

In conclusion, the present analysis reveals that an unacceptably high proportion of children in the rural areas of the district are vulnerable. It appears that child well-being services in the district are, either conceptually or operationally, not effective enough to address the vulnerability faced by children. The vulnerability faced by the children of the district have also been found to be influenced by a host of factors exogenous to child well-being services delivery system. This implies child vulnerability is essentially a broader development concern and not just delivery of specific child well-being interventions. It is, therefore, important that mitigating child vulnerability is recognised as a priority development agenda. It must also be recognised that one way of addressing child vulnerability is to improve the organisational effectiveness of child well-being services, particularly, at the local level, the interface with the people. A comprehensive analysis of the organisational effectiveness of child well-being services at the local level, therefore, is the need of the time. Such an analysis will also help in assessing up to what extent existing child well-being services are able to overcome household and village level factors of child vulnerability. At the same time, it is also important to analyse how the resources and inputs made available to meet the well-being needs of children are get translated into positive outcomes for children which are necessary to mitigate child vulnerability in the context of their well-being – survival, physical growth, cognitive development, and protection from a range of social, cultural, economic, and environmental hazards.

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# The Right to Matter

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## Abstract

This paper assesses what it means for the people to matter and demonstrates that mattering – in the best sense of playing an influential role in the democratic self-rule of a legality – first depends upon the norms that determine our creation. The paper argues that mattering, as commonly invoked today, is physically impossible without first changing the norms that dominate the way we now create people. The paper emphasises that, to make us matter, the creation norms would have to ensure some minimum levels of welfare at birth and equal opportunities in life, sustainable or even regenerative natural ecologies, and an influential role in the political and legal systems that control our lives. The paper recommends changing the near universal norm that wrongly treats the act of having kids as a matter of parental self-determination and calls for orienting the norm as a collective process that gives all children an eco-social fair start in life – a ground of basic social and environmental well-being that lays a foundation for influential democratic participation. There is a need to build constitutional systems bottom-up through smaller families investing more in each child so that they will matter and be included.

## Introduction

What does it mean for someone to matter? This paper explores a few possible meanings, before tracing the ideal to law, and to practical reforms designed to make people matter that would have an exponentially greater impact on the crises we face today, from climate change to inequity, than currently considered reforms (Hamity et al, 2019). The paper argues that it is physically impossible for us to matter without reconstructing universally accepted notions of the right to have children, and the family law and policies that flow from that right (Conly, 2016). The best reading of what it means to matter begins with the influential role that one has at the podium of their democracy (Tsai, 2014; Bennett, 2020). If, in the most basic form of mattering, each person has the right to speak as part of a group of free and equal people deciding the rules under which to live, mattering will depend on the number of people present, as well as their dispositions, equity, and their relation to natural ecologies that support their lives. In other words, mattering by people depends, first, on their creation.

However, right now, most of us live in nations created by and under God-like icons in which power flows top-down in a pyramidal or representative fashion from concentrations of power, presidents and prime ministers included, and other patriarchal forms relative to whom we do not matter.

Contrast this vision with other forms of mattering. In the current social-justice and political climate, “mattering” has become synonymous with the Black Lives Matter movement. What has been acknowledged by scholars is the implied word “too,” or Black Lives Matter [too], to emphasise the push for true equity in addition to racial recognition and valuation (Farmer-Hilton, 2017). And yet when the United States Supreme Court grappled with racial equity in education in *Fisher v University of Texas at Austin* (597 US 297, 2013), the significance of a student’s race and familial backgrounds in predetermining their potential to “do well” seemed to evade the consideration of some on the court (Kopan, 2015). The illusion that we do matter irrespective of our creation and development, and how our creation and development position us relative to others and our ecology, is a “just so” argument with no logical basis, but one furthered by most theories of personal and political autonomy, which ignore the dominant role our creation plays in the process (Anderson, 2013).

But it is not the post-hoc reference to litigants and comparable scenarios in cases like *Obergefell v. Hodges* (576 US 644, 2015) that determines whether we will matter – fundamentally in terms of being empowered as part of a democratic group of people – as described above. It is the first, ex-ante and tacit reference to persons in the constitutional system (“We the People”) that controls that case, and all cases, which through placing people in the social contract determines how and whether people matter. Mattering must happen in creation, in the way we structure relations between persons that will then impact each person’s ability to influence the systems in which they live, which depends on things like the number of persons, and the civic quality of each in the system in question (Bartlett, 2000).

How can changing the way we are created make us matter? This change entails limiting the total quantum of human power, or influence, and decentralizing it (Landau et al, 2020). We will show using the specific family planning modelling that it is feasible to move towards a preindustrial-like state of nature and ecosystem balance that may be termed as existential justice. This is a state of 1) political justice because voices in smaller democracies are empowered; 2) environmental justice as we are not subjected against our will to the climate crisis and other environmental calamities; and 3) economic justice because wealth has been redistributed to ensure true equality of opportunity for those born into the system.

It appears that all prior systems of population ethics, including the one suggested by Rawls (Schramme, 2006), to the extent that it can be treated as such, have failed to do this antecedent work of positioning persons to fundamentally matter via the creation through family planning of small and eco-centric democracies comprising of persons enjoying equal opportunities in life. Given that we are before we do, determining optimal population ranges is inescapably the antecedent question, but that

itself implies the need to determine the nature of the right to have children, which – if we value liberalism and self-determination and recognize the moral significance of future generations – must first involve limiting and decentralizing the power we hold over one another.

We can analogize this process, this change, to free speech. A necessary condition of freedom is the right to express yourself, which at a bare minimum means limiting others' rights of expression so they do not always speak over you. The same applies to the right to have children, but the comparable work defining it has never been done.

Neoliberal economic policies riding on this failure – and where humans are statistical inputs in a model of unsustainable growth (Simon, 2019) – are making it worse. These policies drive a particular flow: the creation of more people, in whom we have invested less, with no regard to their positioning relative to others or their impacts on the nonhuman environment, or (4) their fundamental ability in terms of group size and other qualities to influence the systems of governance that control their lives. This flow exacerbates the climate crisis, which represents the harmful power of other persons forced upon us and our children, against our will.

This paper provides a pathway to change this sad situation. It advocates reversing the flow through the idea of an eco-social fair start in life as a peremptory norm that overrides property and other rights, so that we can distribute that wealth and power as a family planning incentive/entitlement that will result in the correct relative empowerment of future generations – or qualitatively optimal populations.

This discussion need not be abstract. It is simply an argument to choose population policies that move us towards the current and future Japan, for example, over the current and future China, with a test for optimality that treats the capacity for self-determination as inverse to growth, such that each person is empowered equally relative to a neutral position like the nonhuman world. We can move towards that dynamic optimality through the simple use of significant family planning incentives, geared to promote delayed parenting, smaller families, and economic equity in the context of fertility and development. In other words, we can treat all policies as illegitimate – including property assignments - unless they are to begin with promoting and addressing the rights of the child as articulated in the Convention on the Rights of Children (Lundy, 2012)

It is also important to discuss at what level of priority should we pursue such policies? We assume that things akin to written constitutions are peremptory or overriding. We, however, argue that norms, whatever type of they may be, should determine our creation and, therefore, should of course come first. This would be as fair as we expect constitutions to be. Unless we assume that it is an unfair God that creates the norms, there seems little reason not to make the creation rule fair. In other words, we are before we do, and the creation norm determines who we are in a unique way – making it the true *grundnorm* (Spaak, 2020).

The issues that we highlight in this paper, have not been seriously addressed to date. They lie somewhere at the intersection of Foucauldian biopolitics (which is simply the idea that the state controls power by controlling the bodies of its citizens, often to physically grow its base); theories of political obligation and constitutional identity; theories of personal and political autonomy; deontological procreative and population ethics – especially the work of Feinberg on children’s right to an open future (Conly, 2016; Feinberg, 1974), the study of intergenerational justice (Meyer, 2017) proposals for parental licensing (LaFollette, 2010); and the practical realm of family law and reproductive rights (Fox, 2019).

## Mattering, Relative to What?

If we take lessons from recent events in the United States, mattering could mean that we should be valued by others in ways that – at the very least – will protect our lives from the deadly violence by the state. In the parlance of the United States constitutional doctrine, and if we focus on the events surrounding the killing of George Floyd (Dreyer et al, 2020), the narrow meaning of mattering would involve bodily autonomy and equity interests inherent in the Fourth Amendment privacy protections against unreasonable seizure (*Graham v. Connor*, 490 US 386, 1989).

More broadly, and if *Graham v. Connor* were wrongly decided, mattering would include the broader autonomy and equity interests inherent in the fused equal protection and substantive due process doctrine of *Obergefell v. Hodges*. There, being valued by others should enable us to act as they do, in marriage for example, or entitle us to some level of education (957 F.3d 616, 2020), or to being enfranchised as voters (Somin, 2016). The broadening could keep going to the point of living in police defunded zones where law need not be coerced (Jacobs et al, 2021), towards being free from the worst ravages of the climate crisis (Mank, 2020). Mattering, in substantive due process, could mean a lot.

From narrow to broad, to matter seems to mean for persons to do carry around themselves some zone of Hohfeldian empowerment (Hohfeld, 1913), or secured value (Froomkin and Colangelo, 2020) – which we might see alternatively as equity, liberty, self-determination, etc. – and which triggers duties on others to do and not do certain things (Pettit, 2011). Yet this is a myopic, and dangerous misconception of what it could mean to matter. How do persons arrive in the scenarios of interaction with others in the first place and in relative positions where they are prevented from mattering? If we wish to matter, we will have to assess how these people came to be situated where they are (Mahoney, 2004). In this assessment, we may not matter because our representatives behind the Rawlsian veil of ignorance failed in some way to negotiate rules that ensured we were fundamentally positioned relative to others and our ecology in ways that would empower us (Kunc, 1992).

But even this hypothetical conception begs questions about how the negotiators arrived in their position, and what preceded their gathering. It would be preferable if we could be included in the process that effectively determines our actual relations with others, and proactively situates us to matter, rather than playing reactive whack-a-mole to all the variety of ways failure to do that antecedent work makes us not - as in the case of race-based state violence in the United States - matter.

Social self-determination in this sense, at the podium of a democracy where all are equal influencers, could be prerequisite states of affairs for true self-actualization rather than the misguided self-absorption that we currently misconstrue as self-actualization.

Such an inclusive and reflective creation norm would be the opposite of the media zeitgeist today that pushes increased population growth, irrespective of values like nature, equity, and democracy where every voice matters or is heard, in response to a “baby bust” crisis (Longman, 2004). Such a norm would create people for town halls where they matter, not create people for shopping malls where they do not.

That ex-ante approach would be preferable to even the most comprehensive downstream solutions that attempt, post-hoc, to correct for the nature of the relations. For example, rather than just prohibiting police misconduct we could first eliminate the birth inequity and exclusion of many from the democratic processes that have led to police misconduct (Simonson, 2021). Similarly, we might see that downstream and post-hoc efforts to make us matter, like education reforms untethered to the family planning and early child development phases that matter most of all (Hansen and Reich, 2015), cannot suffice, and by offering a decoy may make things worse. So do dozens of other downstream approaches that do not include physically constituting ourselves in ways that matter.

This process of “mattering through creation” would exceed historical and document-based attempts at constituting, because the physical and dynamic constituting of people themselves (Tsai, 2014) creates outcomes – like mitigation of the climate crisis and others described below - that even the most well thought out post-hoc creation systems for a constitutional right to self-government, based on the United States’ assembly clause, for example, do not (Bowie, 2020).

Without such a baseline for creation (Marshall, 1987), we arguably remain in states of pre-constitutionality, in the sense of not having been empowered in functional democracies. Even the ideal “We” in the United States Constitution is an exclusive “we;” intentionally de-constituting or under-constituting Americans of colour as less than “we.” As Justice Marshall stated, “[t]he original intent of the phrase, “We the People,” was far too clear for any ameliorating construction.”

This all may sound obscure, but I lay out a test for such an assessment of mattering, empowerment, and legitimacy in the following pages, for any polity/legality and its norms, using reflective equilibrium (Posner, 1998) that can be initiated with Justice Kennedy’s existential claim in *Planned Parenthood v. Case* (505 U.S. 833, 1992)

(Rabkin, 2003). The test, which could be implemented through emerging technologies, assesses whether we are physically constituting or de-constituting, in terms of whether we matter or are empowered relative to others, and hence whether the political groups (states/nations/charters) in question are legitimate, or in relative states of pre-constitutionality.

## The Mistake

What does it mean to be free in a world beset by others' harmful influence – like climate emissions, from which we cannot escape, and over which we have no individualized control, or a deadly pandemic against which others refuse to take basic precautions?

The key to this essay is a simple point: the dominant creation norm under which we live, which is the universal right to have children as universally upheld by governments and international bodies, never limits the right to have children in such a way as to protect the rights of those very children, once they are born, or the collective rights of the communities they would comprise. In other words, while we recognize certain living conditions, including climate changes, as violating the Children's Convention, we do not use the Convention as a limit in family planning, requiring ourselves to collectively plan so that all children are born into Convention-compliant conditions (Dillard, 2010).

We do not do that limiting now, in large part, because of historical power relations that made familial privacy something akin to the sacred. These power relations include resistance on the part of elites to give up the wealth that would be necessary to level the playing field for all children. Treating the interpersonal act of having children as personal conveniently shielded this wealth, while simple technological impracticalities - lack of birth control, health care access, systems to reduce child mortality - made fundamental reform of family planning systems impossible. Moreover, even if we wanted to regulate procreation to ensure democracy, the human brain is not inclined to think that far ahead (Dillard, 2021). Skipping this step and failing to connect creation to justifiable organization means we do not account for the simple fact that every member of a democracy dilutes others' vote (Stephanopoulos, 2021).

Addressing this reality requires revisiting a line of cases in the United States – focused on *Skinner v. Oklahoma* (316 U.S. 535, 1942), and the cases that subsequently misinterpreted it – that could be the key in moving towards the ideal of a physical legality in which people matter (Stone, 2022). *Skinner* is a case, the analytical modelling of which in some way prefigured *Obergefell*, which focused on the literal addition of parties to the social contract. Envisioning the social contract in this physical way shows a particular alignment: between welfare and autonomy: by requiring high levels of birth, development, and educational conditions for all that help create trustworthy citizens, high levels of social cohesion, and equal opportunities for all in smaller democracies



where participation matters, each person is empowered as a relatively self-determining agent, freed from the power of others that is represented by vast economic inequity, dysfunctional democracies, massive educational differences, and ecological degradation (Dillard, 2021).

The change model proposed is fairly simple: interpret Article 16 of the Universal Declaration of Human Rights, and all related authority and precedent, like *Skinner*, to orient around a child-centric (Press et al, 2012) focus that ensures an ecological and social fair start for all children (comparable to what the Children's Rights Convention requires). This can be defined by a specific threshold which can be applied in a variety of systems and cultures as a uniquely peremptory norm (Chilton et al, 2020). That child-centric standard is also the test for whether we are sufficiently self-regarding to constitute because it takes regard of the countless future entities at stake, over the whims of extant would-be parents.

The proposed change has implications for other aspects of United States law, for example, moving the ordered liberty test of *Washington v. Glucksberg* (521 US 702, 1997), to an *oriented* liberty test using the concepts discussed herein, tethered to physical power in the world. It asks abortion jurisprudence to assess why the state, as a legality of self-determining persons, would have any interest in future citizens whose mothers did not want to have them. It also challenges property claims. If we have no property rights until we have paid taxes to the state settling our public rights and obligations vis-à-vis the system that created the property (Murphy and Nagel, 2002), is that property first subject to fair start resources distributions so that there can be a legitimate state to assess the taxes?

## The Solution

The *grundnorm* described herein (the constituting norm /existential justice) may be comprised of four interdependent evaluative requirements to minimize the loss of political autonomy in a human-rights-based democracy, and hence to maximize consent, integration, and justified political obligation that is necessary in the logical Rawlsian ordering: 1) each new entrant must be of a minimum constitutive quality or capable of constituting with others; 2) there must be a maximum number of members constituting the human-rights-based democracy; 3) they enter relative to each other so that they exclude equally; and 4) they are capable, given their quality, quantity, and relativity, of reconstituting their legalities relative to (or approaching) some level of non-polity or biodiverse nature, that represents their capacity to convert power into law.

The existence of these four variables is inevitable in the act of procreating. The *grundnorm* thus necessitates backdating the standards, e.g., requiring conditions of entry that ensure constitutive quality and emancipation, rather than ignoring entry and subsequently excluding persons as insufficient in some way.

Where is the parents' interest or right in all of this? Rather than the contradiction in terms of procreative autonomy, the right or interest is aligned with the above, and focused on continuing the parents' life genetically or through rearing by having one or two children, consistent with the conditions above. This is not about people as numbers, or population. It is about making people matter, politically, and freeing them from the power – or physical influence from disparate inherited wealth to ecological impacts – of others so that they may consent or become self-determining. The closest analogy to this, in our current lexicon, is the freedom to associate.

The actual thresholds above can be set using existing legal standards we claim to already adhere to, like basic parental fitness, Children's Rights Convention, biodiversity and wilderness restoration targets, education benchmarks, federalism, and representative ratios (Michener, 2021), redistribution policies that attempt to create equality of opportunity, etc. The model will show that, by our own standards existing in law today, we are not who we should be or who we claim to be, but the product of a truly original sin of not ensuring people matter.

The model above represents the implied and justified antecedent “we” in any normative claim, assuming the fundamental value of self-determination, or grouping of persons from which the claimant is operating and in which they matter. At its base, democracy involves the capacity to influence, which, in turn, begins with the existence of the person. If we take democracy seriously, we must focus on the creation of individuals and thereby unravel the age-old legal conundrums of balancing community and autonomy, unified independence, and ordered liberty.

We can think about this in more familiar terms of state, or collective, interest in procreation. Assuming that the state is a human rights-based democracy, its interest is in ensuring all children a fair start in life and thus the creation and eventual emancipation of persons with the mutual, self-determining capacity.

To ensure that capacity we would have to start at the state of nature or absence of human influence and maintain that position (e.g., a world environment not ubiquitously beset by the climate crisis or sequestered to 280 ppm of atmospheric carbon) so that as any group of persons grows, the capacity for self-determination is directly inverse to the capacity for determination by others. Knowing and acting according to that inversion is the proof that people are free and equal, or that they matter politically, because their capacity to equally self and other determine is recognized. Without this change, the act of having children becomes capable of subjugating people.

For example, we would need to change family planning policies to minimize the impact that climate-related changes may have on infants and young children and their self-determination. We would have to ensure smaller families creating less emissions, in which each child had health care sufficient to mitigate the harm - perhaps by targeting those responsible for the crisis to pay for family planning incentives and health care.

The simplest analogy for such groups of truly self-determining people would be the notion of functional constitutional conventions whose numbers are pegged to historic representative ratios that allow voices to matter. This vision reflects the fact that the ultimate orders of human power are not lines on a map, but bodies and their influence. If people, in Rawls original position, operate free from the power of others so that they could devise rules to determine the regulation of that power (Kukathas and Pettit, 1990), and each had a turn at the podium to make their case in the negotiations, it would have had to look something like this.

Not limiting the right to have children to account for this interest, or the interests of the future child, is like a room full of people where not all are permitted to speak, or some are drowned out by eternal background noise. Those speaking feel free to do what they like, but the total quantity of autonomy is reduced.

There are no obligations that precede the obligation to maintain this neutral position - the obligation to ensure all children eco-social fair start in life. A system is fair and obligatory when it fully accounts for its power and without this step it cannot require that we adhere to obligations like honouring government issued property rights to wealth. The owners of that wealth orient from a system whose people are incapable of setting the rules that set market costs and benefits as they never fully accounted for the power of the system in which they live (Posner, 1998).

Several objections to the model exist, but in the context of mattering, one common theme is that the modelling is already accounted for because our existing systems create systems of various sub-forms, like corporations, clubs, and families that allow for self-determination. This argument is like arguments that our participation in law making evinces consent, and the agreement behind the laws we pass contravenes arguments for the need to constitute.

All these claims fail for three reasons, at least. First, they make the naturalistic fallacy mistake of assuming that we are constituents of consensual and legitimate democracies capable of properly legislating. We are not, for the reasons given herein. Second, even if one instance of truly democratic legislating occurs (delegating authority to representatives, for example), self-determining constituents need to be correctly situated for the next instance, or to repeal what they have done. They always must return to the baseline. Third, we cannot foist our insufficient semblances of democracy on future generations. They deserve to constitute properly. Contra Rawls, people cannot agree away the need to be properly situated.

Finally, to sharpen the point, we can apply what might be called the lesser power asymmetry: many people make claims that are based on an assumption about the legitimacy of their underlying political system, e.g., their nation. They will make that assumption based on abstract measures - like the right to vote, or speak freely, rather than assessing the actual people who comprise that system. If we ask the people making the claims about legitimacy to identify groups of people would trust with what might be called "lesser powers," being given access to our property and homes, the

claimants will end up rejecting many people in their nation, whom they do not know and would not trust with such powers. And yet such powers are lesser powers that are included in the greater powers each citizen holds - in a democracy - as the ultimate source of government. The government's considerable power over property and homes derives from the collective citizens' power over the same. Yes, representative government filters this in some respects, through officials, judges, police, and others with expertise. But the underlying authority derives from the people and through law-making they can exercise it, especially were the nation to engage in a constitutional convention or other fundamental change. If we trust people so little with lesser powers, why do we trust them with these greater powers? Why not live in societies in which we trust the people, to whom we are ultimately subjected, not just via the political system but in our day to day lives? The answer, of course, has to do with family models that do not focus on building trust and social cohesion, as discussed herein, though they could. We can determine optimal populations for legalities (Dasgupta, 2005), in a political/qualitative sense, by employing reflective equilibrium around these questions, sifting through our reasons for a lack of trust and applying those – as the thresholds in the model above – prospectively.

No body of rules for any system of social organization can get around the insufficiency of the people who comprise the system, and the oppression their presence creates.

Without a norm to ensure relative self-determination through the act of physically constituting just legalities, we find ourselves determined by others against our will – in many ways incapable of mattering. This is the state of the world today – multiple ecological crises, massive inequity, children born into foreseeable torture and abuse, and a political system where it is irrational for most to even participate (Somin, 2016). All of these are beyond everyone's control and maintained through the threat of violence, and all set-in motion through the self-contradictory concept of procreative autonomy.

As discussed above, it was a mistake to use a creation norm that focuses on the self-contradiction of the parents' procreative autonomy over the self-determination of the child. The latter would have been centred around the objective values like welfare – perhaps consistent with the Children's Convention (Dillard, 2008), birth equity relative to others in one's generation, ensuring an influential voice in one's democracy, and regenerative environmental standards of living. The costs of that mistake - and the population growth it enabled - are child poverty, inequity, disempowerment, and ecocide that could have all been avoided had the population growth curve been pushed down with child-centric family planning reforms.

But there is a more subtle cost as well, in terms of the structure of our normative systems. Founding the right to have children on human subjectivity, e.g., parental desire, those rights - like rights to a healthy environment, children's rights to high levels of welfare, or our having an effective role in our democracies, etc. - come

into conflict with the subjective desire of parents to procreate (Marmor, 2001). If human rights are meant to be objective norms, they should not be limited and undone by human subjectivity, at the most basic level.

This mistake in how we structure our norms breaks the process by which objectivity enables true subjectivity, e.g., the freedom to operate as a relatively self-determining agent in a functional democracy and the alignment of autonomies discussed below. What does it mean for me to be self-determining in a world beset by anthropogenic climate change, where the influence of others has eroded the physical liberty, I have from them? What does it mean that those contributing to the crisis defend their actions under the sense of personal autonomy ensured by the mistake?

Alternatively, moving towards constituting through existential justice modelling restores the framework of objective values that enable true subjectivity. For example, the autonomy that the would-be parents gain through self-development and by meeting a standard of readiness to parent, aligns with objective, constitutive and naturalistic reasons for having children and the quality–quantity trade-off of a smaller family. The greater investment in and education of each person aligns with emancipation, self-actualization, and becoming capable of reasonable behaviour and social self-determination. These things align with the autonomy of a highly developed child and the morally valuable options and equality of opportunities they will have, which further aligns with the autonomy created by gender equity, cooperativeness within groups like townhalls, a level of inherent security in groups that avoids the need for top-down limitations on autonomy, and fluidity among groups. The resulting smaller populations and high levels of development align with having a meaningful voice in public affairs and the rules under which one must live.

This participatory agency aligns with the autonomy created by fulfilling one's need for meaningful group membership, which in turn aligns with reduced consumption and property. Imagine setting one's baseline for consumption around systems that maintain natural ecosystems, rather than around the impact daily advertising has on us (Tye et al, 1987). Which is more reflective of self-determination versus being determined by others? This re-orientation supports the decentralization of concentrations of power into future generations, discussed below. All of these align with a healthy and safe environment and the freedom—or autonomy—from others that is only possible through interaction with the nonhuman world. This in turn aligns with the autonomy advocated by the animal liberation movement. This alignment also spans many types of freedom, from communitarian to libertarian, which might be seen as conflicting. This alignment is absent if we live under the myth of procreative autonomy. The mistake in how we structure our norms, and our failing to cabin or limit human subjective decision-making with objective norms that we can all value - like a right to have children that respects all of the interests and values at stake, has practical ramifications. Rather than breaking into impromptu constitutional conventions and suspending political processes (Tsai, 2014) because insufficient rights to speak freely require doing so, the nature of our populaces has historically required that these

processes – including their appointment of process-based courts – override any invocation of human rights as supreme natural law. The cost of our returning to states of nature and/or anarchy long enough to revisit how to become a legality would have been too high. This tension is well represented, regardless of our opinion of the Second Amendment, in the recent standoffs over the supreme nature of gun rights (Fields, 2020).

## Conclusion

To reiterate, the tension here must be – fundamentally – traced back to the glaring contradiction between jurisprudential doctrines regarding the uber-compelling interest nations have in the development of future generations into people capable of self-rule, and doctrine that treats the creation of these generations as a matter reserved to the whims of would-be procreators.

The democratic dilemma, or the need to be right and popular at the same time, has been exacerbated by our current parent-subjective creation norm, rather than being resolved by making relatively fewer people in whom we had invested much more to create in them the common core that democracy requires. Instead, we are trending towards mass subjectivism because we are excluded from the process of really determining and applying right and wrong in ways that actually matter, i.e., the systems that control us (Somin, 2016).

The model outlined above, and its praxis of using a duty to ensure a fair start combined with a right to nature to reverse the process of de-constituting, implies a litmus test for the emergence of systems in which people matter. To what degree are new democracies seceding and beginning to operate? If Catalan, Hong Kong, and the state of Jefferson are indicators, the world has a long way to go (Lecours and Dupré, 2020).

Is there any test for democratizing, physically? We, being the free and equal persons, should, logically, involve whether we first treat the capacity for the self-determination of every person as directly inverse to the population growth and relative to a neutral baseline such as the nonhuman world. Free people will always act to preserve their equal role, their mattering politically, in the process. In such a dynamic scenario, every person is politically empowered, and empowered equally, such that all groups are arcing down towards optimal and eco-centric population size. If people are empowered equally and thus matter politically this direct inversion, relative to neutral position that makes the concept of self-determination coherent, is inevitable. This inversion is crucial, and consistent with the need to invest equitably in every child so that children are empowered parts of functional democracies. Thus, the first reason that people would be obligated to follow laws is that the legal system intentionally includes, and reflects the will, of its constituents. This test determines whether systems are doing that.

How would we ensure birth and development conditions consistent with the spectrum? Because doing so is a first obligation that physically enables democracy, that obligation would override downstream state-issued property rights and enable redistribution of wealth as substantial family planning incentives/entitlements that would promote delayed parenting, parental readiness, smaller families, and equitable birth and development conditions that would approach true equality of opportunities in life. Fair Start encourages redistribution to incentivize parental readiness, delayed parenthood, equitable birth and development conditions, and a universal ethic of smaller families that would restore biodiversity and functional democracies. There are concrete standards for each of these areas, including existing standards of parental fitness, the Children's Rights Convention, measures of equality of opportunity, ideal representative ratios, and biodiversity targets. How feasible is it to achieve such a universal norm of better family planning? In other contexts, over the past few centuries, we have seen massive change in cultural norms, from the redistribution of property under socialist revolutions to the sea change in fertility rates that shows many groups of women having less than half the children their forbearers had. Given the massive disparity of wealth today, recognizing wealth at the top as first subject to equitable and sustainable family planning claims and applying the wealth as an incentive/entitlement could easily and quickly bend the arc of growth towards the low United Nations variants, and allow unprecedented levels of child welfare and sustainable development.

In the end to matter is to be included in systems of social organization where one is self-determining, or free and equal, and this situation is first contingent upon the norms that account for our creation. There is a pathway to future generations mattering, but it requires revising our current approach, from the International Bill of Human Rights to reforming family law and policy to bending the cultural influences that shape our everyday choices. The idea of a right to matter may appear abstract, or politically infeasible at this stage, despite the alignment of things like 1) massive economic inequity and 2) effectiveness of family planning incentives, as serendipitously convenient co-levers to effectuate change. However, the change is indeed afoot. The recent United Nations dialogue on the future of population growth has placed the much-needed focus on family planning and reproductive choices as some of the behaviours that will determine the future of our planet, our climate, our civilisation. Since the long-run impact of population growth and the associated resource demands on the environment is exponential, population increase/environment degradation has been identified as the biggest threat to the humanity by a group of Nobel Laureates. Consequently, the Sustainable Planet Alliance, a growing coalition of fifteen global organizations in population, economy and consumption, human well-being, media, environment, and women's leadership has openly petitioned the United Nations to consider pathways to change in positions on population and consumption issues (Barnard, 2022). The petition argues that climate crisis may prove to be the sort of existential change necessary to change something as fundamental as family planning, as the best chance to protect and make resilient the future generations who outweigh

those alive today in number and will suffer for what we have done. The petition emphasises that instead of treating demographics or population and consumption as separate issues generating separate issues, they must be treated as unified as it is impossible to separate the existence of the people from the environmental effects they generate. The petition recognises that ignoring the need for family planning and related development policy reforms has only exacerbated the climate crisis and greatly impeded the progress towards sustainable development goals. The petition recommends that a child centric approach should be adopted that prioritises equitable and sustainable development and the goals of the United Nations Convention on the Rights of the Child (United Nations, 1989). The petition argues that family planning and demographic issues are not solely about limiting human impacts. They can also help determining the resilience of future generations and the capacity of those generations to engage in collective, creative, and democratic solutions that planet needs. We are living in perilous times. Every one of the nearly eighty million new humans every year tips our planet closure to a dangerously destabilised planet, climate, and civilisation. These children - and those who are yet unborn – do not deserve this.

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# Advances in Reproductive Health Indicators in India, 1993 – 2021

John A Ross

## Abstract

India has experienced a revolution in reproductive behaviour that enhances the reproductive health of women, and especially young women. Using the five national surveys in India from 1992-93 through 2019-21, changes are traced for fertility declines, marriage postponements, fewer unwanted births, increased contraceptive use, and lessened unmet need for contraception. In addition, large improvements are documented for antenatal, delivery, and postnatal care. The infant, child and maternal mortality has also declined. All these advances interact with the status of women and their empowerment.

## Introduction

The reproductive health of women has commanded increased attention in recent decades, with incorporation into major United Nations goals for all countries. These began with the Millennium Development Goals (MDGs) (United Nations 2015) for the period from 2000 to 2015, followed by the Sustainable Development Goals (SDGs) (United Nations 2020) that run through 2030. With the principal focus on sexual and reproductive health and rights, sub-goals include the adolescent birth rate, coverage of births by skilled personnel, maternal mortality, infant and child mortality, and the proportion of unmet need satisfied by modern contraceptive methods.

In India, official concern about the health of mothers and children has long been part of the development agenda of the country, as reflected in the Five-year Plans. In 1952 the launch of the world's first official family planning programme related to improving the health of mothers and children. Subsequently, the Government of India launched the Expanded Programme of Immunisation in 1978, the Universal Immunisation Programme in 1985, and the Child Survival and the Safe Motherhood Programme in 1992. Then in 1996 came a World Bank supported Reproductive and Child Health Programme, which subsequently became the flagship programme of the National Rural Health Mission launched in 2005. Over the years these and other departures by the government have influenced the changes traced here.

This article traces a set of indicators related to the reproductive health of women in India, as they improved markedly over the 28 years from 1993 to 2021. The indicators fall naturally into six groups - fertility; marriage; contraception, unmet need,

and desire for another child; care during pregnancy, delivery, and the postnatal period; mortality of mother and child; and measures of female empowerment. These six groups are intimately related to broadly conceived reproductive health of women, and they document a historic revolution in India in the context of both childbearing behaviour and status of women.

## Methods and Data Sources

Data for the present paper come from the five rounds of the nationally representative National Family Health Survey (NFHS) in India conducted during 1992-1993; 1998-1999; 2005-2006; 2015-2016 and 2019-2021. The data collected during these surveys are available at the repository maintained by the Demographic and Health Survey (DHS) Program and are available online. The DHS STATcompiler was used to generate custom tables related to a number of reproductive health indicators. STATcompiler is a very useful online resource that permit uniform tabulations from data collected through different surveys under the DHS Programme. In addition, some information from the published reports of NFHS and from the World Health Organization (2019) has also been used to analyse trends in maternal mortality. The data and indicators, generally, are related to married/in-union women aged 15-49 years, but some indicators are related to all women aged 15-49 years, such as total fertility rate and age-specific rates.

The focus of the paper is primarily upon documenting changes over time rather than on the search for determinants, to take advantage of trends in the full 28-year survey series now extended to the present. The methods employed for the analysis are cross-tabulations and graphical presentations, to display the remarkable movement toward favourable outcomes in most indicators. For simplicity, the text and figures refer the five rounds of NFHS by their ending dates 1993, 1999, 2006, 2016, and 2021, respectively. Note that while some indicators available through NFHS are snapshots for the present, others are pooled events over 3-5 years period prior to the interview date, such as total fertility rate and age-specific rates (3 years). All indicators are, of course, subject to measurement error, but where changes are large and consistent across different rounds, they must be taken as indicative of substantial improvement in the status of women and their empowerment, working to enhance their health and wellbeing. Table 1 provides estimates of different reproductive health indicators available from different rounds of NFHS.

## Fertility

A prominent demographer has called for attention to the historic gain in reproductive efficiency during the shift away from the old regime of high fertility and high mortality (Davis, 1945). Throughout most of human history, substantial reproductive wastage occurred with high proportion of pregnancies and births failing

to produce surviving adults. Moreover, a major part of the lifetime of women was occupied by their reproductive roles and responsibilities, with heavy losses from maternal morbidity and mortality. Gradually, the transition to low fertility has fundamentally released women from the previously high risks of reproductive morbidity and mortality, enhancing their own health and the health of their offspring.

In India, childbearing has been transformed, whether measured by the total fertility rate or by the age-specific fertility rates or by fewer high order births or by longer birth intervals or by longer delays since the latest birth. Changes in four of these indicators are depicted in figures 1-4 and are discussed briefly below, along with other features of fertility change.

- Over the 28 years under reference, the total fertility rate fell by 41 per cent from 3.4 to 2.0 birth per woman of reproductive age (Figure 1). The decline has been fairly regular between successive rounds of NFHS.
- Fertility also decreased in all age groups of the reproductive period (Figure 2). Specifically, fertility in the age group 15-19 years decreased by 62.9 per cent whereas it decreased by 28.6 per cent in the age group 20-24 years; 28.2 per cent in the age group 25-29 years; 48.5 per cent in the age group 30-34 years; 68.2 per cent in the age group 35-39 years; 80.0 per cent in the age group 40-44 years; and 80.2 per cent in the age group 45-49 years. Barring the first age group, the percentage decline in fertility progressively increased with the increase in the age of women.
- Higher order births have now decreased significantly (Figure 3). The decrease in the fifth and higher order births has been the sharpest, but it is also substantial in fourth order births. As a consequence, the share of first and second order births to all births has increased. The first order births increased by 44.6 per cent while second order births increased by 41.6 per cent, but third order births decreased by 13.8 per cent; fourth order births by 44.9 per cent; and fifth and higher order births by 74.7 per cent.
- With the increase in contraceptive use, some births have been postponed, so the interval from the previous birth is lengthened (Figure 4). The median birth interval rose from 31.6 months to 32.7 months over 28 years. The pattern is interesting. With all intervals adding to 100 per cent, the shares changed irregularly for birth intervals less than two years; they then declined sharply at years 3 and 4; and they then rose at 5+ years. (Note that first births are omitted, as is behaviour following the latest of the two births, when some women deliberately avoid future births, thus many births are never followed by another one. (See following topic.)

Further, the open birth interval, the time since the most recent birth, has also increased, which means that more women are deferring the next birth, either pushing it into the future or permanently avoiding it. As more women register longer birth-free times, fertility tends to decline, and the correlations are strong between longer open birth intervals and fertility declines (Ross and Bietsch, 2020). A trend toward longer

intervals can signal the increasing use of contraception, among other determinants. Data about open birth interval from the first four rounds of NFHS are available from other work (Ross and Bietsch, 2019). These data show that, over the 23 years period, the open birth intervals in India became notably longer. Birth intervals longer than 3 years increased from only 54.4 per cent of all intervals to more than 70 per cent. Intervals longer than 5 years increased from 43.7 per cent to almost 60 per cent. So, quite apart from the dynamics of closed intervals, many women are changing their fertility by lengthy postponements into a longer interval, or never ending it.

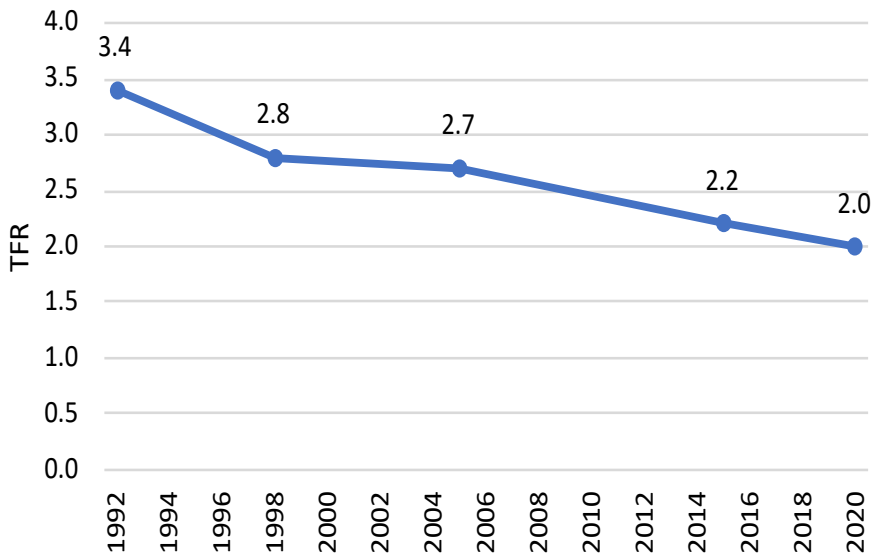


Figure 1: Trend in total fertility rate (TFR) in India.

Source: Author

Note that the period since the latest birth is equivalent to the age of the youngest living child (ignoring the mortality of a more recent birth). The older the child, especially after age 5 years or so, the more the mother freed for other roles outside the home, including labour force participation and increased personal income. This means that around 60 per cent women with open birth interval of 5 years and more tends to enhance women's empowerment.

Birth intervals in one sense are curious. Closed birth intervals pertain to past fertility behaviour, not to what women are doing currently to avoid or seek another child. The nature of closed birth intervals is changing, reflecting interactions with the overall decline in fertility and the changing mix of parities and age. Other effects include the onset of infecundity as women age, and interrupted cohabitation as the spouse dies or is otherwise absent. Many of these effects, along with increasing contraceptive use, shape the trend in both closed and open birth intervals.



REPRODUCTIVE HEALTH INDICATORS IN INDIA

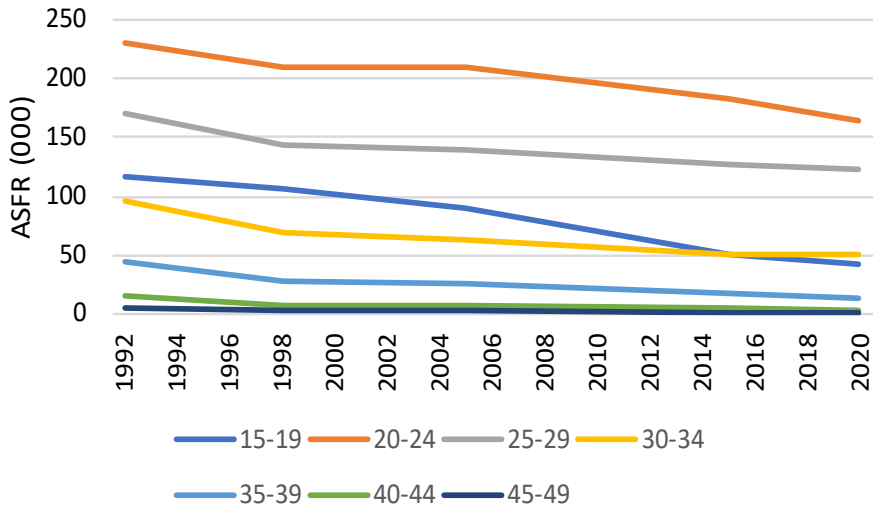


Figure 2: Trend in age-specific fertility rate (ASFR) in India  
Source: Author

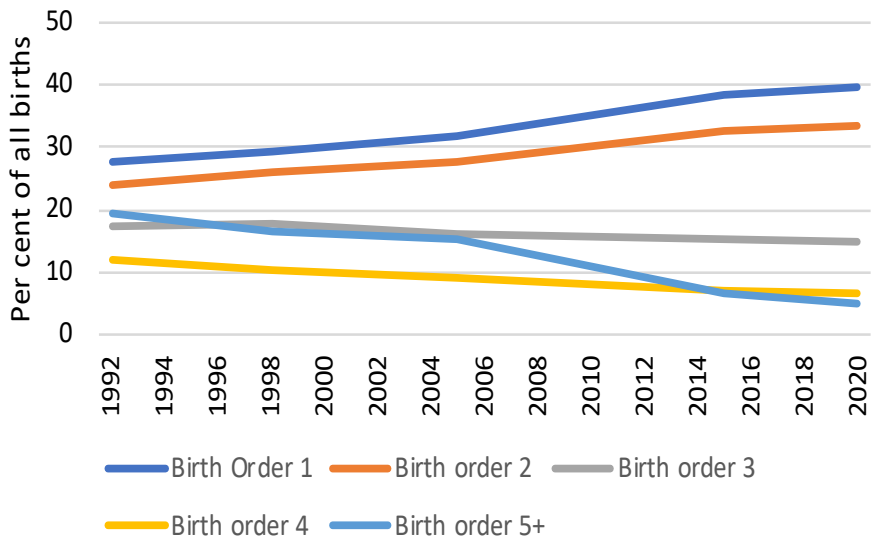


Figure 3: Distribution of births by birth order  
Source: Author

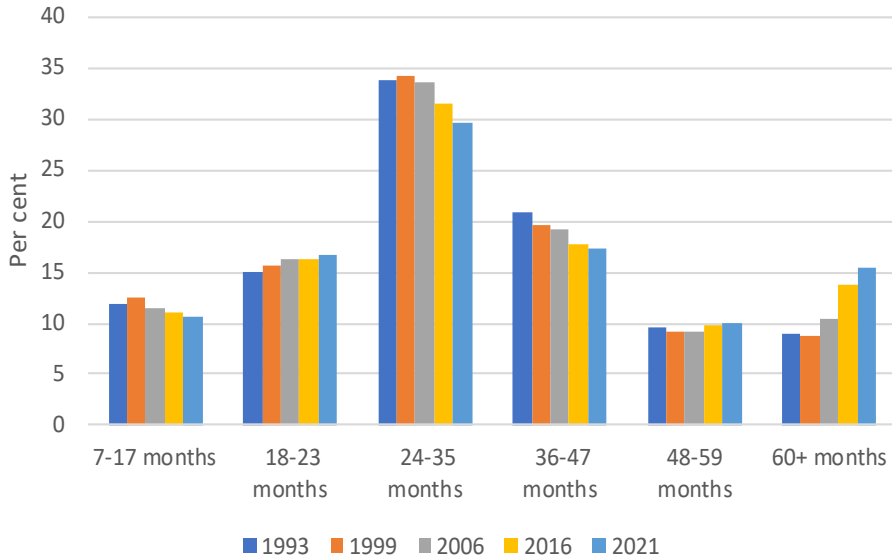


Figure 4: Distribution of births by birth interval  
Source: Author

## Marriage Behaviour

A marker of deep social change in marriage behaviour is the transition from very early female marriages, even earlier than 15 years of age, to females marrying in their late teens and early twenties. In India, women have married progressively later during the 28-year period (Figure 5). The female median age at marriage rose from 17.2 years to 19.8 years during this period - a 15 per cent change - as reported by women aged 25-29 years in each round of NFHS. Female marriages at a very early age, those prior to 15 years of age, have essentially disappeared in the country as the proportion of females married before 15 years of age decreased from 17.6 per cent in 1993 to a mere 0.4 per cent in 2021. Similarly, the proportion of females married before 18 years of age, the minimum legal age of female marriage in the country, fell from around 50 per cent to around 22 per cent while female marriages prior to 20 years of age fell from almost 70 per cent to around 42 per cent.

Postponement of the marriage leads to delay in the first birth. The percentage of teenage females (aged 15-19 years) who are already mothers or are pregnant with their first birth underwent a dramatic decline, from 23.2 per cent to only 6.8 per cent, as progressively more of these women were not yet married (Figure 6). An increase in contraception use and extended schooling of girls might also have contributed to this decrease.

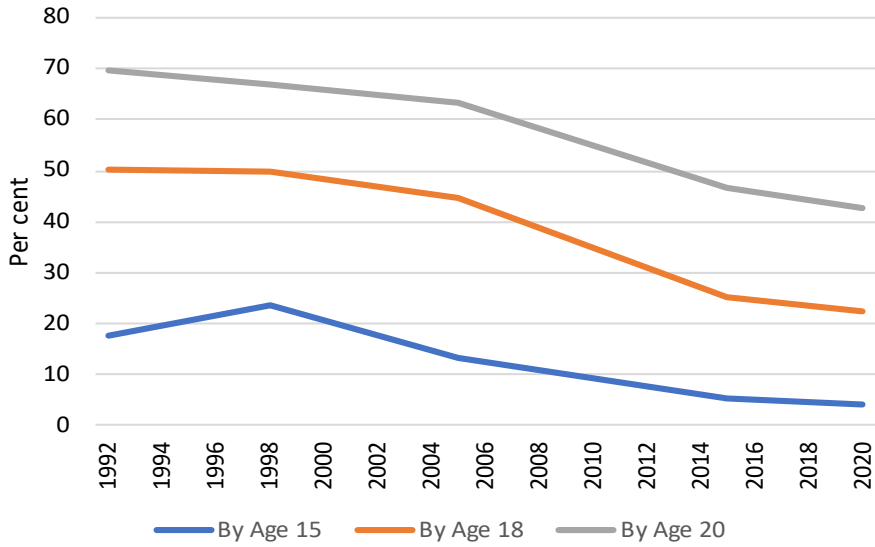


Figure 5: Percentage of women aged 20-24 years who were married by age 15 years, 18 years, and 20 years.  
Source: Author

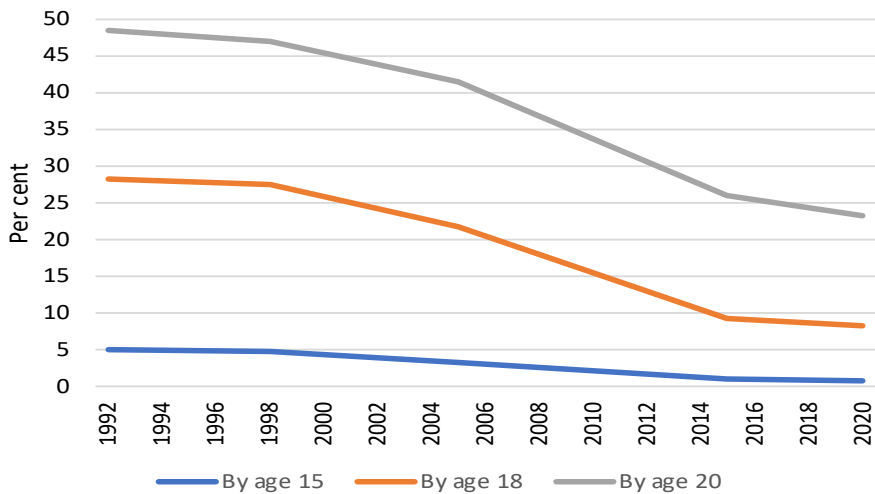


Figure 6: Percentage of women aged 20-24 years who gave first birth by age 15 years, 18 years, and 20 years.  
Source: Author

A kind of mirror image exists between postponed marriages and postponed first births (Figures 5 and 6). With the increase in the female age at marriage, early childbearing fell sharply. The percentage of women giving birth before 15 years of age fell by 86 per cent, the percentage of women delivering before 18 years of age fell by 70 per cent, and those delivering by 20 years of age fell by over half. The delay in the first birth freed many young women from the health risks of early pregnancies and allowed them to seek further education and work experience outside the home.

Several indicators of reproductive behaviour are inter-related. As the ideal number of children decreases, progressively more women say that they want no more children beyond the ones they already have. Simultaneously, more women and couples take action in line with their family formation objectives, to avoid unwanted pregnancies, so that more of the births that do occur are wanted births. As the percentage of wanted births increases there is also a selectivity effect, in the sense that these births are associated with lower risks of death of the new-born during infancy, and lower risks of death of the mother during pregnancy or soon after pregnancy (Stover and Ross, 2010).

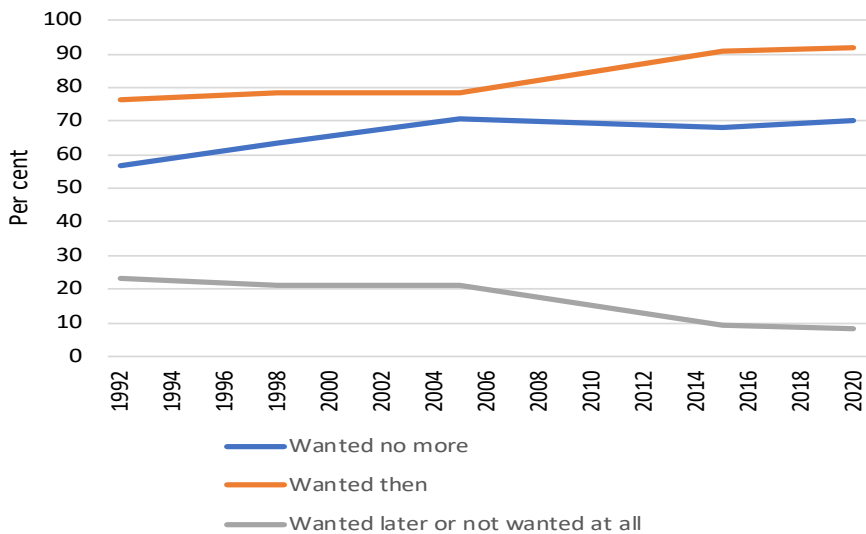


Figure 7: Trend in wantedness of births and women wanting no more children  
Source: Author

In summary, the ideal number of children wanted has declined, from 2.9 to 2.2, and more women say they now want no more children, rising over a fifth, from 56.9 per cent to 70.2 per cent. More of the recent births are declared as wanted, rising by one fifth, from 76.3 per cent to 91.9 per cent, and fewer are considered unwanted or ill-timed, 23.3 per cent to 8.2 per cent (Top and bottom lines in figure 7, for births, add to 100 per cent, while the middle line is for women wanting no more children.)

## Contraceptive Use and Unmet Need for Contraception

Many women declare in surveys that they are not using any contraceptive method, even though they want to defer or entirely avoid another pregnancy. That is sometimes termed “discrepant behaviour” and is regarded as the “unmet need” for contraception. Technically, unmet need is defined as the proportion of women who (1) are not pregnant and not postpartum amenorrhoeic, are considered fecund, and want to postpone their next birth for 2 or more years or stop childbearing altogether, but are not using a contraceptive method, or (2) have a mistimed or unwanted current pregnancy, or (3) are postpartum amenorrhoeic and their last birth in the last two years was mistimed or unwanted (International Institute for Population Sciences and ICF, 2021).

This section looks at the use and unmet need for modern methods only. It does not discuss use of traditional methods since use of modern methods is the focus of most action agencies and of the national family planning programme. (Modern methods include male and female sterilization, IUD, pill, injectable, condom, and other methods of very small use). Table 1 gives the trend in the use of all methods and in the use of modern methods.

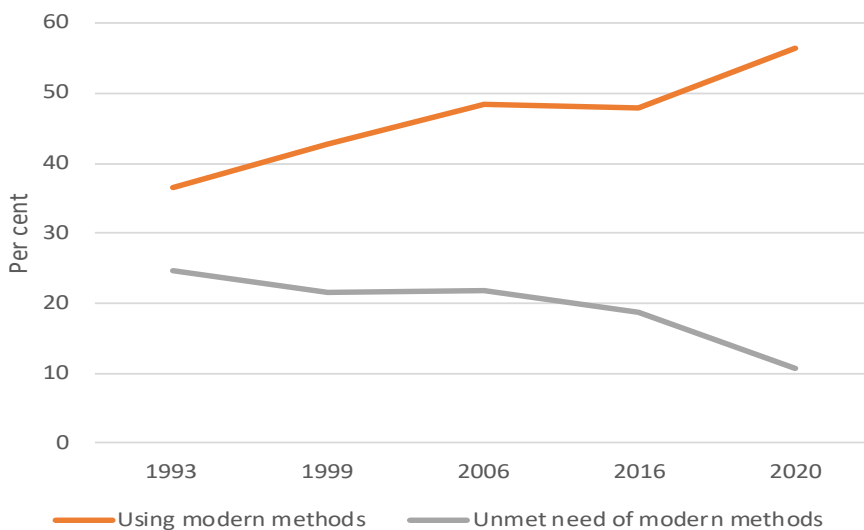


Figure 8: Trend in the use of modern methods and unmet need of modern methods  
Source: Author

As contraceptive use has risen, unmet need has diminished sharply (Figure 8). The unmet need for modern methods diminished from 24.6 per cent to 10.8 per cent, or about one-tenth of the currently married women, while the use of modern methods rose from 36.5 per cent to 56.4 per cent or over half of the currently married women.

Table 1: Reproductive health indicators in India, 1993 through 2021.

Reproductive health indicator	National Family Health Survey					Change %
	1993	1999	2006	2016	2021	
Total fertility rate (TFR) (Births per woman of reproductive age)	3.4	2.8	2.7	2.2	2.0	-41.2
Age specific fertility rate (ASFR) (Births per 1000 women of age)						
15-19	116.0	107.0	90.0	51.0	43.0	-62.9
20-24	231.0	210.0	209.0	184.0	165.0	-28.6
25-29	170.0	143.0	139.0	128.0	122.0	-28.2
30-34	97.0	69.0	62.0	51.0	50.0	-48.5
35-39	44.0	28.0	25.0	17.0	14.0	-68.2
40-44	15.0	8.0	7.0	4.0	3.0	-80.0
45-49	5.0	3.0	3.0	1.0	1.0	-80.0
Birth order (Per cent distribution)						
1	27.6	29.5	31.9	38.4	39.9	44.6
2	23.8	25.9	27.8	32.8	33.7	41.6
3	17.4	17.7	16.1	15.3	15.0	-13.8
4	11.8	10.4	9.1	7.0	6.5	-44.9
5+	19.4	16.5	15.1	6.5	4.9	-74.7
Birth interval in months (Per cent distribution)						
7-17	11.8	12.5	11.4	11.1	10.7	-9.3
18-23	15.1	15.7	16.3	16.2	16.6	9.9
24-35	33.8	34.2	33.6	31.5	29.6	-12.4
36-47	20.8	19.6	19.2	17.7	17.4	-16.3
48-59	9.6	9.2	9.1	9.8	10.1	5.2
60+	9.0	8.8	10.4	13.7	15.5	72.2
Open birth interval in months (Per cent distribution)						
0-2.9	45.6	39.6	35.7	29.5		-35.3
3.0-4.9	10.7	11.5	11.4	10.6		-0.9
5.0-6.9	10.1	9.9	9.5	9.0		-10.9
7.0-8.9	8.0	7.7	8.7	8.6		7.5
9.0-10.9	6.8	6.9	7.3	7.5		10.3
11.0+	18.8	24.4	27.4	34.8		85.1
Mean ideal number of children (Number)	2.9	2.7	2.4	2.3	2.2	-24.1
Want no more children (Per cent)	56.9	63.6	70.5	68.2	70.2	23.4

Reproductive health indicator	National Family Health Survey					Change %
	1993	1999	2006	2016	2021	
<b>Wantedness status of latest birth</b>						
(Per cent)						
Wanted then	76.3	78.4	78.5	90.9	91.9	20.4
Ill timed, wanted later	14.5	11.9	10.7	4.9	4.8	-66.9
Not wanted	8.8	9.4	10.6	4.2	3.4	-61.4
Wanted later or not wanted at all	23.3	21.3	21.3	9.1	8.2	-64.8
<b>Marriage by age</b>						
(Per cent)						
15 years	17.6	23.4	13.1	5.4	4.0	-77.3
18 years	50.2	50.5	44.5	25.3	22.3	-55.6
20 years	69.8	67.1	63.3	46.8	42.5	-39.1
<b>First birth by age</b>						
(Per cent)						
15 years	5.1	4.9	3.4	1.0	0.7	-86.3
18 years	28.1	27.6	21.7	9.3	8.3	-70.5
20 years	48.6	47.1	41.6	26.1	23.4	-51.9
<b>Contraceptive prevalence</b>						
(Per cent of married women aged 15-49 years)						
All methods	40.7	48.2	56.3	53.5	66.7	63.9
Modern methods	36.5	42.8	48.5	47.8	56.4	54.5
Female sterilisation	27.4	34.1	37.3	36.0	37.9	38.3
<b>Unmet need* for</b>						
(Per cent of married women)						
Spacing	13.6	9.8	8.2	7.2	3.4	-75.0
Limiting	10.9	11.6	13.5	11.4	7.4	-32.1
total	24.6	21.5	21.7	18.6	10.8	-56.1
<b>Infant and child mortality</b>						
(Per 1000 live births)						
IMR	78.0	68.0	57.0	41.0	34.0	-56.4
U5MR	109.0	95.0	74.0	50.0	40.0	-63.3
<b>Maternal mortality (MMR)</b>						
(Per 100 thousand live births)						
	370.0	286.0	210.0	158.0	145.0	-60.8
<b>Antenatal care</b>						
(Per cent of married women of reproductive age)						
Doctor			50.2	58.8	62.6	24.7
Nurse/Midwife			23.0	20.4	22.5	-2.2
Birth attendant			1.1	0.3	0.4	-63.6
Others			2.8	4.0	8.4	200.0
No ANC			22.8	16.4	6.1	-73.2

Reproductive health indicator	National Family Health Survey					Change %
	1993	1999	2006	2016	2021	
<b>Frequency of antenatal care visits</b> (Per cent of married women of reproductive age)						
None			22.8	16.5	6.1	-73.2
1			6.0	5.7	6.6	10.0
2-3			33.5	25.8	27.5	-17.9
4+			37.0	51.2	58.4	57.8
8+			12.9	20.1	19.2	48.8
<b>Place of delivery</b> (Per cent)						
Public sector			18.0	52.1	61.9	243.9
Private sector			20.7	26.8	26.7	29.0
Home			61.1	20.8	11.2	-81.7
Others			0.2	0.2	0.2	0.0
<b>Assistance at delivery</b> (Per cent)						
Doctor			35.2	56.0	61.8	75.6
Nurse/Midwife			10.3	24.7	27.2	164.1
Birth attendant			36.5	11.0	5.9	-83.8
Relatives/Others			17.3	8.0	4.9	-71.7
None			0.5	0.3	0.3	-40.0
<b>Time of first postnatal care</b> (Per cent)						
Less than 4 hours			24.7	56.2	73.4	197.2
1-2 days			33.8	65.3	81.5	141.1
No postnatal care			61.9	30.3	15.0	-75.8
<b>Postnatal care provided by</b> (Per cent)						
Doctor/Nurse/Midwife			33.4	62.5	77.6	132.3
Others			0.4	2.8	3.9	875.0
No postnatal care within 2 days			66.2	34.7	18.5	-72.1

Source: International Institute for Population Sciences (1995); International Institute for Population Sciences and ORC Macro (2000); International Institute for Population Sciences and Macro International (2007); International Institute for Population Sciences and ICF (2017; 2021).

Remarks: The unmet need of contraception has been defined as the proportion of married women who (1) are not pregnant and are not postpartum amenorrhoeic, are considered fecund, and want either to postpone their next birth for 2 or more years or to stop childbearing altogether, but are not using any contraceptive method at the time of the survey, or (2) have a mistimed or unwanted current pregnancy, or (3) are postpartum amenorrhoeic and their last birth in the last two years was mistimed or unwanted (International Institute for Population Sciences (IIPS) and ICF, 2021).



Unmet need is usually divided into spacing versus stopping motivations, according to the expressed aim of the woman - whether she wants only to defer the next pregnancy (spacing) or to stop childbearing (limiting). By 2020, the unmet need for spacing and the unmet need for limiting were in an approximate two to one ratio in favour of limiting - more women wishing to stop childbearing (7.4 per cent versus 3.4 per cent), but equally, this means that 31 per cent of all unmet need (3.4/10.8) was for spacing between births rather than for stopping births.

Parenthetically, female sterilization has been used more than any other method. It accounted for about two-thirds of total family planning use until the latest survey, when it dropped to 56.8 per cent. However, the share of female sterilisation in the use of modern methods is still more than two-third. India is the only country in the world with such a high share of female sterilization in contraceptive use.

The year-by-year changes in the four variables appear in Table 1, along with the percentage change from the earliest to the latest survey. As the text notes, these show quite large movements with contraceptive use growing and unmet need diminishing.

The reproductive health of women is a function partly of the practice of abortion to terminate the pregnancy. The term itself has become complex due to the advent of “medical abortion,” which uses oral administration without any vaginal procedure. A careful study of abortions in India has found that 81 per cent of all abortions in India were of “medical” type (Singh et al, 2018) while most of the rest (14 per cent) were performed surgically in health facilities. Around 5 per cent of abortions are done elsewhere, probably with unsafe methods.

The incidence of abortion has averted an unknown number of unwanted births over the years. Any computation of births averted due to abortion is difficult since an abortion may avert a birth, but it may also end a pregnancy that was destined to end in a miscarriage. Moreover, the aborted pregnancy might also have ended in a stillbirth which would have used up more of the childbearing time of women. On balance, abortions have contributed to fertility decline, but both the degree and the trend are uncertain. Equally unknown currently is the proportion of women who take up, or return to, contraceptive use soon after aborting the pregnancy. Doing so can avert another conception among highly fecund women.

## **Antenatal, Delivery, and Postnatal care**

For improved reproductive health, the most intimately related variables are the care received before, during, and after delivery. These are the “proximate variables” closest to the event of birth and are the “doorways” through which medical advances can be the most immediate and the most effective. Data for time trends are available only for the most recent three rounds of NFHS: 2005-2006, 2015-2016 and 2019-2021. For each survey, the data pertain to events over the previous five years.

## Antenatal Care

- How extensive was antenatal coverage? In 2006 about three fourths (77.2 per cent) of the pregnant women received some type of care. This proportion grew to 93.9 per cent in 2021.
- Who provided antenatal care? It is increasingly being provided by doctors; their share of the total increased from 50.2 per cent to almost two-thirds (62.6 per cent) of all pregnant women. Most of the remaining women received antenatal care from nurse/midwife and this proportion has remained steady at about 22 per cent. Two or more antenatal visits grew from 70.5 per cent to 85.9 per cent of all pregnant women.
- In addition, the proportion of pregnant women receiving iron tablets or syrup grew from 65.1 per cent to 87.6 per cent while the proportion who received intestinal parasite drugs increased from a mere 3.8 per cent to 31.1 per cent.

## Delivery Care

- Where did the deliveries occur? Home deliveries shrank drastically, from three-fifths (61.1 per cent) to only a tenth (11.2 per cent) of total deliveries, whereas the proportion of deliveries in health facilities grew from 38.7 per cent to 88.6 per cent. (Most of this growth was in the public sector.)
- Who attended the deliveries? Most deliveries are now attended by doctors; their share increased from 35.2 per cent to 61.8 per cent currently. Deliveries attended by nurse/midwives also rose, from 10.3 per cent to 27.2 per cent, while there has been a sharp fall in deliveries attended by traditional birth attendants, from 36.5 per cent to only 5.9 per cent. With the increase in deliveries attended by doctors, the percentage of caesarean births grew from 8.5 per cent to 21.5 per cent.

## Postnatal Care

- Who provided postnatal care? Postnatal care provided by either doctor or nurse/midwife grew from 33.4 per cent to 77.6 per cent. No care at all accounted for nearly the rest of cases.

The forgoing observations indicate that there have been fundamental advances in all three stages of reproductive care over a period of 15 years.

## Infant, Child, and Maternal Mortality

Over the period of 28 years the infant mortality rate (IMR) fell by more than half, from 78 to 34 infant deaths per 1000 live births, whereas the under-five mortality rate (U5MR) fell by nearly two thirds, from 109 to 40 under-five deaths for every 1000 live births. The decline in IMR is constrained partly by the neonatal component, which is less responsive to public health measures.

Maternal mortality, as measured by the number of maternal deaths per 100,000 live births, has also declined markedly based on the estimates prepared by the World Health Organization (2019), which collaborates with its sister agencies to publish estimates for each country, based upon all available information combined with modelling adjustments using Bayesian techniques (World Health Organization, 2019). These estimates show a decline of 60 per cent in maternal mortality ratio (MMR), from 370 to 145 maternal deaths per 100,000 live births over a period of 15 years. The large base of annual births in India suggests that there are around 35,000 maternal deaths in a year.

Contraceptive use reduces maternal mortality first by reducing the sheer number of pregnancies and associated births and, therefore, the number of times the women are exposed to the risks of death associated with pregnancy and delivery. In addition, contraceptive use also reduces the risk of a maternal death per birth, by changing the mix of births, with fewer proportion of higher order births at older ages, which carry a higher risk of death during pregnancy and delivery. In one study of maternal mortality (Stover and Ross, 2010) these selectivity effects were quantified using 146 DHS surveys.

## Empowerment of Women

The reproductive health of women is related in numerous ways to their empowerment. Health indicators are clearly worse for women with little control over their own life circumstances. Under traditional practices, women had little say as to decisions affecting their activities, with an extreme dependence upon their husband and other family members, and with few roles other than delivering births, childrearing, and home making.

There are several indicators that suggest that the autonomy of women has increased in India over the years. For example, the proportion of women who reported that important decisions were taken jointly with husband, rather than by husband alone, increased between 2006 and 2021. More specifically,

- Who decides about the health care of the wife? The proportion of married women who reported that the decision was taken jointly with the husband increased from 35.1 per cent to 68.8 per cent while the proportion of women who reported that the decision was taken by the husband only fell from 30.1 per cent to 19.8 per cent.
- Who decides about major household purchases? The proportion of married women who reported that the decision was taken jointly increased from 44.4 per cent to 73.6 per cent while the proportion reporting that the decision was taken by husband only fell from 32.2 per cent to 14.8 per cent.
- Who decides about wife visit to her family or relatives? The proportion of married women who reported that the decision was taken jointly increased

from 49.8 per cent to 76.0 per cent while the proportion reporting that the decision was taken by husband only fell from 26.8 per cent to 12.6 per cent.

An interesting test of the autonomy of women is their full or partial ownership of their house or the land. Related data are available from the fourth (2015-2016) and the fifth (2019-2021) round of NFHS, indicating that house ownership by the wife alone or jointly with the husband grew from 37.1 per cent to 46.5 per cent. For land it increased from 28.3 per cent to 33.8 per cent.

A telling shift in the attitude of women that is evident from the NFHS is their response as to what justifies wife beating by the husband. Here are the falloffs in the percentages of women agreeing to each reason between 2006 and 2021:

If she burns the food. 20.4 per cent to 13.4 per cent.

If wife argues with the husband. 30.3 per cent to 20.6 per cent.

If wife goes out without telling husband. 29.0 per cent to 20.9 per cent.

If wife refuses to have sex with husband. 14.1 per cent to 8.4 per cent.

As a summary, 46.9 per cent of women disagreed with all of the reasons of wife beating in 2006 but this proportion increased to 67.8 per cent in 2021.

The status of women has risen over the decades in other ways also. The 28 years since 1993 saw a revolution in the education of women. Having no education at all declined from 61.5 per cent to only 22.4 per cent. By 2021, two-thirds (65.8 per cent) of the women had secondary education, and 15.7 per cent of them had more than secondary education.

About a third of the women surveyed also reported participating in the labour force and, therefore, had their own earnings. The reported trend in the percentage of currently married women who were employed during the last 12 month was, however, uneven, at 37.5 per cent, 42.8 per cent, 30.6 per cent and 38.1 per cent respectively in 1999, 2006, 2016 and 2021. On the other hand, the proportion of women who said that they decided jointly with their partner about how to use their earnings increased from 56.5 per cent to 66.3 per cent, a ten percentage points gain between 2006 and 2021. Also interesting is the trend toward equality of earnings between the woman and her partner. In 2006, 20.2 per cent of women reported that their earnings were equal or more than that of their partner, but this percentage jumped to 42.2 per cent in 2016 and to 43.8 per cent in 2021.

These changes in the reproductive health situation suggest that women in India now have greater freedom of action outside the home and have better opportunities for personal income. The transitions to better equity for women appear to have had broader effects in the society at large. As the World Bank (1995) has argued, "... gender equality is a core development objective in its own right.... but greater gender equality is also smart economics, enhancing productivity and improving other development outcomes." It urges closing of gender gaps for access to economic opportunities, earnings, and productivity.

## Discussion and Conclusions

The reproductive health of women in India has improved through truly historic changes, with large advances for the status of women and for alternative roles to childbearing. Women are initiating marriage and first births later. They are having fewer children and fewer child deaths. Smaller proportions of their reproductive years are occupied by pregnancies and births, and there are probably fewer abortions as contraception has taken hold and more births are wanted.

However, challenges in meeting the reproductive health needs remain. Only 56 percent of married women are using modern methods, and female sterilization accounts for an inordinate share of modern methods use at nearly two-thirds, one of the highest shares recorded. It is difficult for any country to attain a high level of total contraceptive use when the choice of methods is severely restricted. The growing use of traditional methods may reflect that constraint, despite their high discontinuation and failures.

This paper has focused strictly upon the national picture. It does not focus upon the wide variations in reproductive health indicators across states/Union Territories and districts of the country which are known for their strength and persistence. For example, the latest round of NFHS (2019-2021) reveals that TFR varies from 3 births per woman of reproductive age in Bihar to 1.1 births per woman of reproductive age in Sikkim. Similarly, the infant mortality rate varies from 50.4 infant deaths per 1000 live births in Uttar Pradesh to just 2.9 infant deaths per 1000 live births in Puducherry while the maternal mortality ratio varies from 205 maternal deaths per 100 thousand live births in Assam to 30 maternal deaths per 100 thousand live births in Kerala (Government of India, 2022). These variations are even wider at the district level. An additional proviso is that the paths of change in some indicators have been irregular, with dissimilar changes between inter-survey pairs.

Posed against the remarkable gains for reproductive health is the built-in growth of the total population, with the attendant pressures it exerts on the welfare of individual families and the society at large. India's population will soon surpass China's, and it is projected by the Population Division of the United Nations to grow to over 1.6 billion by 2050, thirty years from now (United Nations, 2022). That growth will be due primarily to the momentum factor, in which large numbers of childbearing age women will produce large numbers of births, even with few births per woman.

However, births per woman will be responsive to the use of contraceptive methods, for which there is a substantial room for growth from the current level of only about two-thirds (67 per cent) of married women are using some method. About ten per cent of married women say they wish to avoid pregnancy but are not using a method. The wanted fertility rate of 1.6 is still below the actual TFR of 2.0, and 8.2 per cent of births are declared as unwanted or ill-timed. Some 70.2 per cent of married women say they wish to stop childbearing. Single, sexually active women and men add to the relevant population.

All this suggests that the reproductive and child health programme of the country which is the flagship programme of the National Health Mission must move more vigorously to meet the reproductive health needs of the people of India. There is also a need to enlarge the contraceptive method mix beyond female sterilization and make other contraceptive methods more available in practice to the people.

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# Healthy Aging and Wellbeing of Older Adults in a Northern City of Canada

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## Abstract

Chronic health conditions, loss of loved ones, feelings of loneliness, and reduced ability to perform tasks are common concerns of advanced age. Regular engagement in physical, mental, and social activities can support health and wellbeing of the old people. This paper examines how, in their pursuit of healthy aging and overall wellbeing, old people cope with adversities associated with the age. Following the qualitative approach, the study suggests that acceptance of changing conditions of life, positive attitude, spiritual beliefs, keeping occupied, staying physically active, socially involved, and doing mental stimulation exercises are the most common strategies of enhancing or maintaining wellbeing by the old people in a city in Ontario province of Canada.

## Introduction

With aging, the human body undergoes many physiological changes, which are governed by environmental and behavioural factors. These changes, though experienced differently by different individuals, reduce the capacity to function and increase the risk of many diseases (WHO, 2015). The chances of chronic health conditions and disability escalate during the old age (Moreno-Agostino et al, 2020; Sinha, 2012) which impose restrictions on the autonomy and self-confidence of the old people. Active lifestyle can garner successful and healthy aging (Allain and Marshall, 2017; Katz, 2013). Successful aging describes the quality of aging. It focuses on the processes of social and psychological adaptation in the later years of life (Urtamo et al, 2019).

Healthy aging is defined by the World Health Organization (WHO) as “the process of developing and maintaining the functional ability that enables well-being in the older age” (WHO, 2015). Here, functional ability is considered as the health-related ability of individuals to do what they value in life while wellbeing encompasses performance, satisfaction, and happiness (WHO, 2015). In this sense, wellbeing comprises a positive component of the quality of life (Muhli and Svensson, 2017;

Meiselman, 2016; MacLeod et al, 2016; Krieger et al, 2014) and involves confidence, fulfilment, optimism, contentment, and a meaning in the life. Wellbeing covers a range of domains and health is only one of them (WHO, 2012; Canadian Index of Wellbeing, nd), perhaps the most important for the old people.

The concept of healthy aging includes physical and mental capacities of an individual and external factors that affect life such as social, cultural, and physical environment (WHO, 2015). During the old age, a higher level of physical and mental functioning, ability to engage with life and a lower probability of disease lead to successful aging (Rowe and Kahn, 1987). However, physical, and mental health can deteriorate and the zest for life can diminish with the advancing age due to the loss of the loved ones and other traumatic experiences (Hoare, 2015; Bonanno, 2004). Many people can “bounce back” or recover from such difficult situations. Overcoming adversities of life through positive attitude and actions shows resilience of individuals (Van Breda, 2018; Hartling, 2008; American Psychological Association, 2012).

A proper understanding of the adjustments made by individuals with the advancing age for their wellbeing can help policymakers address more appropriately the potential challenges faced by the old population. It is pertinent to understand that specific adjustments of an old person or the old population are governed by the dimensions of physical, social, economic, and political environment of the particular locale. More specifically, appropriate housing conditions, financial independence, availability of community services, opportunities to participate in various activities, social networking and support to the physical and mental health enhance the quality of life of the old people. Moreover, there is a great variation in the needs of daily activities, access to support, decision-making capability, and motivational practices that add to personal wellbeing (Hayman et al, 2017).

Population ageing is an inevitable consequence of demographic transition characterised by the declines in fertility and increases in longevity and is usually associated with social and economic development (United Nations, 2017). It is a universal phenomenon. The proportion of the global population aged 60 years and above increased from 8.5 per cent in 1980 to 13.7 per cent in 2021 (United Nations, 2022). This proportion is projected to continue to rise over the coming decades, reaching 16.6 per cent in 2030, and 22 per cent in 2050. In Canada, population aged 60 years and above increased from 13.3 per cent in 1980 to 25.3 per cent in 2021 while population aged 80 years and above increased from 1.8 per cent to 4.5 per cent during this period (United Nations, 2022). The medium variant of the population projections prepared by the Population Division of the United Nations projects that the population aged 60 years and above in Canada would increase to 31.7 per cent by the year 2050 while the proportion of the population aged 80 years and above would increase to 10.2 per cent (United Nations, 2022). Securing healthy aging and wellbeing of the old people in Canada in the coming years will therefore be a major development challenge. It is in this context that an understanding of processes and behaviours adopted by the old people of the country to secure health aging and wellbeing becomes important.

This paper attempts to analyse how old people age successfully in their pursuit for healthy aging and wellbeing in the Greater Sudbury city in the Ontario Province of Canada which experiences long cold winters. The climate of the city is extremely seasonal, with average January lows of around -18 °C and average July highs of 25 °C. According to the 2021 population census, the city had a population of 166,004. The paper also examines the support system that the old people employ when they navigate through the stresses of their life. The study adds to the existing knowledge on healthy and successful aging and wellbeing of the old people. More specifically, the study focusses on physical activities, positive attitude, coping style, and social support in the later years of life.

## Literature review

With the rising life expectancy, the number of older people with multiple chronic conditions is expected to grow (Williams et al, 2009). It is, therefore, pertinent to identify factors that contribute to the quality of aging (Atallah et al, 2018). At the old age, people are more vulnerable to injury, disability, and disease and realise the need to deal with potential health problems through active participation in the aging process rather than passively becoming the object of dominant aging discourse and stereotypes. They seek information and change their behaviour so that they can maintain good health and stay independent with the advancing age (Drewnowski and Evans, 2001). They view their health and wellbeing positively and usually become “health optimists” (Paskulin and Molzahn, 2007).

Most of the literature on healthy aging revolves round activity level (Moreno-Agostino et al, 2020; Daskalopoulou et al, 2017; Cano, 2016; Gilmour, 2012; Rejeski and Mihalko, 2001). Activity level refers to the participation in active activities rather than passive activities. Staying physically active is essential for the existence of the old people and their quality of life and wellbeing (Kadariya et al, 2019; Cano, 2016; McAuley et al, 2006). Participation in physical activities contributes to healthy aging (Daskalopoulou et al, 2017) and prevents disability associated with the advancing age (Moreno-Agostino et al, 2020). Physical activities that old people enjoy the most enhance their mental health and wellbeing (Kadariya et al, 2019). For some of the old people, the pleasure of participation in favourite sports activities offsets the notion of pain, risk of injuries and even death (Allain, 2020).

Staying physically active and participating in social activities provides several benefits to the old people, their families, and communities, and to the health care system. Studies suggest that physical activities can increase self-efficacy in the old people and enhance their perception of control (Robinson and Lachman, 2018; Gilmour, 2012; Rejeski and Mihalko, 2001). This is crucial for the old people who lose control of their lives in many ways, such as driving, mobility, social participation, house maintenance, and even personal care. Having autonomy and the ability to fulfil personal needs has a positive impact on the mental health of the old people (Kadariya et al, 2019;

Rowe and Kahn, 1987). This is particularly noticeable in performing social roles compared to daily activities (Costa and Neri, 2019; Levasseur et al, 2004).

Despite declining health with advancing age, an increasing proportion of the old people continue living in their own home (Iwarsson et al, 2007) and resist moving to a long-term care facility. During the COVID-19 pandemic, the high death toll among institutionalised seniors has raised questions about the quality of care being provided in the long-term care facilities, leading to the wisdom that home is the safest place for aging (Inzitari et al, 2020). Staying at home is also a viable financial option for the already burdened healthcare system (Marek et al, 2012). Hence, the older adults are encouraged to “stay at home” or “age in place” (Roy et al, 2018) and lead an independent, safe, secure, and healthy life in a family environment (Vanleerberghe et al, 2017; Wiles et al, 2012). Aging at home is sustained by affordable and accessible community-based services. It endorses the idea of the quality of life and overall wellbeing (van Leeuwen et al, 2019; Williams et al, 2009).

Wellbeing is a multidimensional concept that includes physical, mental, emotional, social, and spiritual conditions (Ruggeri et al, 2020; Muhli and Stevansson, 2017; Bell et al, 2004). The Canadian Index of Wellbeing identifies eight domains of quality of life: community vitality, demographic engagement, education, environment, leisure, and culture, living standards, time use, and healthy population. The ‘healthy population’ domain includes physical health, life expectancy, mental health, functional health, lifestyle, public health, health care, and personal wellbeing (Canadian Index of Wellbeing, nd).

In their study of depression, Krieger, and colleagues (2014) used an index of wellbeing developed by the WHO (called WHO-5) which contained five items: feeling cheerful and in good spirits, calm and relaxed, active, and vigorous, fresh, and rested, and able to do things in daily life that are of interest to the individual. Some scholars emphasized the importance of perception rather than just biomedical measures of wellbeing (Muhli and Svensson, 2017; Drownowski and Evans, 2001). Low and colleagues (2013) argued that the dropping levels of physical, psychological, and social functioning in a person indicates the onset of aging process. Perception of this process and adaptation to the changing conditions vary, indicating the importance of subjectivity in assessing the abstract idea of wellbeing (van der Deijl and Brouwer, 2021).

Krok (2018) has identified two types of wellbeing: subjective and psychological. Subjective wellbeing includes the feeling of satisfaction and fulfilment in life and emotional reaction to various events, whereas psychological wellbeing encompasses acceptance of self, positive relations with others, autonomy, environmental control, and purpose in life (Ryff, 1989, cited in Krok, 2018). Subjective wellbeing is subjected to the experiences, which are governed by the characteristics, perspectives, and circumstances of the individuals. The focus of subjective theories of wellbeing is on the satisfaction of desires, preferences and values attached to the state of affairs (van der Deijl and Brouwer, 2021). However, with advancing age, perception

of wellbeing changes within the shifting context of personal and social environment (Douma et al, 2017).

Wellbeing can also be achieved through social participation as the involvement of the old people in social activities provides them satisfaction (Baeriswyl and Oris 2021; Levasseur and St-Cyr-Tribble, 2008), reduces the likelihood of depression, and enhances the quality of life (MacLeod et al, 2016; Krieger et al, 2014). The factors that support social participation are accessibility of physical environment, programmes geared to the needs of the old people, and community support networks, whereas barriers to social participation include cultural values and ageing-related policies (Lewis and Lemieux, 2021). Social participation also includes social roles that keep changing with the age (Gilmour, 2012). For the old people, social inclusion may be a symbol of respect and love which generates positive emotions of happiness and satisfaction and promotes wellbeing. Social inclusion is beneficial not only for the old people but also for the rest of the society because the experiences and perspectives of the old people can reward everyone (National Seniors Council, 2014) as old people can contribute to economic and community development, health promotion, and human rights through their social involvement (Sherman and Timony, 2011).

The positive emotions garnered in adverse time during old age reveal the strength of the old people. The ability to maintain a stable equilibrium reflects the protective factors that stimulate positive outcomes during adversity and is called resilience (Bonanno, 2004; Van Breda, 2017; Hoare, 2015). Some scholars consider resilience as the capacity of individuals, while others believe it as positive functioning meant to deal with adversity (Van Breda, 2018; Hartling, 2008). One needs substantial internal and external resources and proactively use them in dealing adverse situations (Manning and Bouchard, 2020). Anxiety, depression, and stress can be mitigated through social support (Hayman et al, 2017; Hoare 2015; Hartling, 2008) and access to health care (WHO, 2015).

Social support depends upon the presence of a partner and relationships with friends and family. It is also contingent upon the local context and socioeconomic status (Belanger et al, 2016). Strong social support is associated with better physical and mental health outcomes (Belanger et al, 2016). Socially isolated old people are at a higher risk of health problems, depression, and other conditions (National Seniors Council, 2014) and are more likely to be institutionalized (Medical Advisory Secretariat, 2008). Social support manifests social health that helps people come out of hardship and adversity with positive outcomes (Belanger et al, 2016; Hartling, 2008).

Social networks augment the ability to maintain functional health and mitigate the effect of losses that individuals experience in the older ages. According to Van Breda (2017), individual factors, such as optimism and spirituality; social factors, such as relationships with family and friends; and environmental factors, such as community safety and financial security, interact with wellbeing. With the increasing population of seniors, studies on successful healthy aging and wellbeing of the older adults become increasingly important.

## The Present Study

The old people are defined as people with at least 60 or 65 years of age. They constitute a diverse population group that spans multiple generations. They are also known as 'seniors' or 'senior citizens,' although, in academic writings, the term 'older adults' has become more popular in the recent years (Pinsker, 2020). The old people or older adults are further divided into three life-stage sub-groups: young-old (60 or 65 to 75 years of age), middle-old (75 to 85 years of age) and old-old (at least 85 years of age). The present study is confined to the people aged at least 80 years. The age of 80 years is considered as a threshold because the proportion of the people with severe loss of functionality and autonomy increases dramatically after 80 years of age (Benetos et al, 2019). We use the term older adults for such people.

The study area is the Greater Sudbury, a city located in the Ontario Province of Canada. Greater Sudbury is located north of the Great Lakes and its weather is influenced by the arctic airmasses. The city experiences long, cold, and snowy winters with average temperature remaining below zero from November to March. The coldest month is January when the average high temperature is minus 8°C and the average low is minus 17.9°C with record low going down to minus 48°C. The average annual snowfall is 263 centimetres, and most of the snow falls during November to March with highest snowfall in December (63.0 cm) and January (59.5 cm). The summer is, however, pleasant, but it is short lived. The harsh winter conditions limit the possibility of outdoor activities for several months during the year which has implications for the wellbeing of older adults as staying indoors for a long stretch of time can have detrimental effect on their physical and mental health.

We start with the hypothesis that staying active and socially connected supports health and wellbeing of older adults, and availability of adequate care services promotes autonomy and healthy aging. We have attempted to bridge the subjectivities of physical and mental health with activity levels and social interactions of older adults to explore how these experiences translate into their wellbeing. The approach is exploratory and qualitative. More specifically, we explore the physical activities of older adults, their functional limitations, and their lifestyle along with their experience with the healthcare system. The healthcare system of Canada is publicly funded, and it provides universal coverage of medically necessary health care services. Demonstrating the basic values of fairness and equity, the system is based on the health care needs of the people rather than the ability of the people to pay for health care (Government of Canada, 2019).

We have also investigated the social relations of older adults and their participation in social activities with the objective of assessing how older adults conduct their life, cope up with the challenges of aging, and sustain their wellbeing. The focus of the investigation was on exploration rather than determination to understand how older adults face the harsh climatic conditions that have implications for their wellbeing.

## Methodology

The study on which this paper is based was carried out 2018-2019 in Greater Sudbury which focussed on the quality of life of older adults. After obtaining approval from the Research Ethics Board of the Laurentian University, semi-structured in-depth interviews were conducted with 20 older adults aged at least 80 years to gather information on different aspects of the quality of their life. A purposive sampling approach was adopted to select the sample for the study with the motivation to recruit participants from group homes and independent living arrangements. Posters with an invitation to participate in this study were placed in various retirement homes, community centres, and other places which are frequently visited by the old people. However, despite repeated advertisements in these places, only twelve old people volunteered to participate in the study. It was, therefore, decided to recruit some additional participants through snowball sampling. The snowball sampling involved requesting those older adults who volunteered to participate in the study to identify other older adults to participate in the study.

All the participants were given the option of being interviewed at the place most suitable and convenient for them. However, all the participants decided to be interviewed in their own residence. During the interviews information was elicited on the background, housing, financial situation, health, mobility, socialization, use of technology, safety and security, recreation, cultural needs, and demographic characteristics of the participants. Probing techniques were used to get more specific information. Through these in-depth interviews we could also uncover the struggles of the life of the participants and their approach to dealing with different adverse situations. Each interview usually lasted for 60 to 90 minutes and was audio recorded with the permission of the participant.

The interviews were transcribed, and the transcripts contained a total of 581 pages. These transcripts were coded where categories were created from the phrases or meanings in the text (Thomas, 2006). These codes were grouped into themes (Auerbach and Silverstein, 2003), which were then evaluated and revised by the authors. These themes were also corroborated with the broad themes identified in the literature. A thematic analysis approach was used for analysing the collected information and narrating results (Fereday and Muir-Cochrane, 2006). To enhance the credibility of the findings of the study, the draft of the study report was shared with the study participants of the study for member checking (Lincoln and Guba, 1985; Creswell and Miller, 2000; Thomas, 2006) and for including the feedback received in the final report. For the present paper, we have used only the relevant text from each transcript to make the work more manageable (Auerbach and Silverstein, 2003). To protect the identity of the participants, pseudonyms are used in the text.

Out of the twenty older adults who volunteered to participate in the study, sixteen were female and four were male. The age of the participants varied from 80 to 95 years, with 16 participants in their eighties and the rest in their nineties. Six

participants were married, two lived common-law (living with a partner without legal marriage), and twelve were widowed. Thirteen participants were living in independent houses, five in apartments, and two in retirement homes.

The concept of healthy aging used in the study includes physical and mental capacities of the individual and the external factors that affect her or his ability to engage with the life such as social, cultural, and physical environment (WHO, 2015). In order to assess wellbeing, we have given importance to the perception of the older adults (Muhli and Svensson, 2017; Drewnowski and Evans, 2001) about their life situations and the ways of dealing with them. Our concept of wellbeing is inspired by the Canadian Index of Wellbeing (no date). We consider six domains of wellbeing - physical health (chronic conditions), mental health (depression and other mental illnesses), functional health (mobility, pain, emotions, memory), personal wellbeing/social health (relationships with family and friends, sense of community), lifestyle (physical activity), and health care (satisfaction with health care services).

We also assume that healthy aging and wellbeing cannot be achieved without being resilient. The concept of resilience is used in the sense of resistance to the adversities of the old age, whether they are related to the loss of loved ones or deterioration in physical or mental health or both. The focus is on the measures taken by older adults to cope up with the actual or potential disruptive life circumstances. Resilience is subjective as different individuals may respond in different ways to similar stressful situations (Hayman et al, 2017). We examine how older adults adjust their life for overall wellbeing in an environment which keeps changing with the advancing age.

## Findings

Greater Sudbury had a population of 161,531 in 2016, out of which 7,905 persons (4.9 per cent) were at least 80 years of age (Statistics Canada, 2017). According to 2021 population census, the population of the city increased to 166,004, however, the age-based data are still not available to have an idea of the proportion of the population aged at least 80 years. The proportion of the older adults of the city living in the retirement homes or long-term care facilities is very small. One reason is that the city has a shortage of such facilities and there is a long waiting list for accommodation in the existing facilities (Social Planning Council, 2007). Although the city has several community-support services, yet the older adults who participated in the study felt concerned about appropriate and accessible care, especially in the outlying areas (City of Greater Sudbury, n.d.).

### Physical Health

The aging process gives rise to activity limitations, which are not uniform either at the individual or at the community level. Many older adults experience acute and chronic conditions that may be related to their health, lifestyle, or diet. The following paragraphs describe some of the health issues experienced by the



participants in our study, and their ways to cope up with the situation to maintain or enhance wellbeing.

In our study sample, there was an acceptance of the changing conditions of life and the older adults moved forward undeterred by the new realities. For example, despite physical impairments, Harold had a positive way of framing his health:

*“Excellent [health], if you disregard knees, and ankles, and shoulders and hips, but they don’t make you feel bad; they just get in the road as far as feeling good, oh jeez. I love to get up in the morning and think about what I’m going to do all day.”*

Similarly, Shirley listed several physical limitations, including persistent pain, but considered her health good:

*“My health is fairly good. I have several conditions that disable me. I have neuropathy in both legs, and I have scoliosis in my back, and both are very painful, and there’s some arthritis in there too. So, I’m in a lot of discomforts a lot of the time, including right now, but my general health is quite good.”*

These assertions highlight the importance of perceived health in place of or supplementary to objective measures of health.

Health conditions can also generate negative feelings among older adults. Marlene used to get upset because some physical limitations prevented her from doing certain things:

*“With age, no matter how positive a person thinks, and how good a person feels, the body doesn’t always work along with them.”*

Mary also expressed this frustration:

*“Getting older isn’t much fun because most days I’m okay, but some days, I think, oh my god, I used to do this in fifteen minutes, it takes me one hour now.”*

Physical health is also governed by the diet. Many participants were very selective of their diet and took all precautions to stay healthy. For instance, Barbara emphasized:

*“I don’t eat [unhealthy food], I don’t buy anything like pop, I don’t buy any junk food, I don’t buy anything packaged, maybe a can of tomatoes.”*

These safeguards are important for healthy living, especially for those who are suffering from some chronic conditions, such as diabetes.

Obviously, the perspective and the adaptation of older adults towards healthy aging are varied. What is important is that the older adults continuously assess their healthcare needs and make decisions accordingly to their needs which is an indication of healthy aging.

## Mental Health

Mental health is crucial for healthy aging. The study participants usually perceived it in terms of brain functioning rather than mental illness. Some of them cited their alertness and cognitive functioning as their perception of good mental health. Most assumed that poor memory was an inevitable part of aging, but a couple of them stressed that memory issues were only emphasised in the old population, although they existed in every age group. Norman argued:

*“But all this talk about “hey seniors are very forgetful,” it’s really not. We all forget, regardless, but when you’re older you think, oh my god! I must be losing my mind because of my age.”*

Marlene also echoed the same perspective:

*“I can still think pretty good, I believe. Sometimes I forget, but then I guess we all forget, it’s only when we get older that you put more emphasis on it.”*

Adversities of life can cause depression sometimes. Loss of loved ones, health problems, and difficult financial situations are some of the reasons for going into depression. Marjorie lost her two grandchildren, aged 22 and 15 years, her daughter aged 51 years, her husband, and her son in the past several years. Since everyone has to go ultimately, she felt those who were left behind must “go forward.” She used to get depressed sometimes but not enough to be medicated. Her perspective toward life was clear - accept what life throws at you and move on. She emphasized:

*“Remember people, but never dwell too long.”*

Another old woman, Barbara, has devised a unique way of dealing with depression:

*“I get depressed sometimes, but then my philosophy with that is, just go right into the depression. Years and years ago I learned in one course I was taking, if it’s that bad, if you’re blue, get right down on the floor and roll around with it, bawl, and cry.”*

At one stage, the depression level of Barbara was so high that she asked her doctor about euthanasia to discuss her case. The situation was dealt with carefully and eventually, her firm belief in the divine power was ignited. She now asserts:

*“I firmly believe that a higher power, a God, some divine presence will work everything out.”*

These examples show that the negative emotions that older adults live with are associated with real-life experiences and that mental health cannot be underestimated or ‘brushed off’ due to their advancing age. During the course of the study, we found that the old people have great capacity to overcome such negative experiences and associated emotions and have developed strategies to cope up with the adversities.

The most common approach adopted by the older adults in dealing with adversities was “you can’t mope.” Most of them acknowledged having negative events or thoughts to deal with, but they discovered ways to cope with them. The most widely held approach to overcome negative thoughts was the positive attitude. Some of them recognised the value of mental stimulation and asserted that their coping mechanism has been developed by reading or playing brain exercise games (such as the mobile game ‘Words with Friends’) as well as through social interaction. These activities provided mental and emotional stimulus. For this reason, many participants were unwilling to sit around without indulging in any activity, getting bored and developing negative thoughts. Nancy stressed:

*“I’m busy all the time. I make sure that I’m not sitting here thinking, “oh gee, I’m so bored, I don’t know what to do.” I think that’s the secret for people staying out of depression. Old people like myself need to keep busy ... and reading, I still read.”*

## Functional Health

Although pain, mobility issues, dexterity, and memory loss are common concerns at the old age, old people do learn to live with them. Barbara had a rough time when she broke her arm a few years ago. Now she has a problem with her leg, her balance is poor, and she walks with a cane when she goes outdoor. She is taking a thyroid pill, as her immune system has killed off her thyroid. She also has asthma and uses puffers sometimes. She uses cannabis oil and reports, “the cannabis oil took away my asthma.” Edith had a hip replacement which left her with a bad leg. She states that it does not bother her too much and she still drives and is involved with the church. Despite having sore shoulders and a sore back, Edward has not slowed down:

*“I just live with it. It’s one of the vicissitudes of old age.”*

Accepting the functional adversities and “not slowing down” is a way to move forward at the old age.

Some older adults were disappointed that they were no longer able to participate in certain physical activities they used to enjoy. Mary felt that life was getting worse as she was not able to play sports:

*“I was very active in sports always, but it was my last bout with curling and that’s when I started having my problems. So, I miss it dearly.”*

In her acceptance of her weakening body, Nancy states:

*“There are all of those outdoor activities that I used to do, that I do miss.”*

Missing an important aspect of life has negative implications for the wellbeing of the old people.

Walking is one of the most popular physical activities amongst the old people. There are only few summer months when outdoor activities can be conducted.

However, some of the participants in our study expressed their concern about the difficulty in walking in certain parts of the city. They wanted the sidewalks to be clear with some resting spots for the old people who could not walk too far at a time. Otherwise, implicitly they were forced to stay indoors hindering their health and wellness.

The winter weather is a barrier to the outdoor activities. For indoor activities at public places during winter months, the participants voiced concern over lack of parking and difficulty in reaching the meters when they are blocked by snowbanks. Nancy expressed her disappointment at her inability to go to the seniors' club which provided opportunities for various activities and socialization:

*“Even ten years ago, my friends and I used to go to the Parkside Centre [seniors' club], but now parking's a problem for us. So, we don't go there anymore.”*

While older adults can and often do orchestrate their activities, this should not be entirely left up to them. They need a conducive environment to enhance their functional health, especially in cities with a growing population of the old people. With appropriate actions of the city, certain physical and social activities can be made accessible to old people which will contribute positively to their physical health and wellbeing.

## Health Care

There was a shared frustration among the participants of the study with the healthcare system, which was blamed to be organized for profit rather than for patients, with some older adults voicing grave concern about recent cuts to healthcare. Though there was an overall dissatisfaction with the healthcare system, the participants had mostly positive experience with the healthcare staff. We could see these mixed feelings with comments such as, “It [system] sucks. It's no good at all” – Priya; “It could be better for older people” – Grace; “Oh, I've been quite happy with them [healthcare staff]. I've been met with nothing but kindness. No complaints” – Margaret; “I had a series of bad nose bleeds for about a week, and I went eventually to the emergency, and I had to wait a while. As soon as I got here, the triage nurse put a clamp on my nose and that stopped the bleeding.” – Edward.

Such positive experiences with the healthcare staff support healthy aging and wellbeing.

Some participants shared their experiences with friends when they were not satisfied with the treatment or felt they did not get the required information. Some older adults shared experiences of encouraging their friends to seek medical help when they were too stubborn not do so, and more often, inspired them to question the medical advice or to push for more appropriate treatment. Social support was helpful for some participants to overcome anxiety associated with health concerns. Priya used to discuss her health issues with her friends and also looked for additional information on the internet:

*“I talk to my friends, and they say, “okay you do this, you do this, you do this,” or I will go to the internet and try to find some [remedy for] relief. And that is a compromise.”*

Although, such information cannot replace the expert advice of a doctor or nurse, but as Priya stated: *“that is a compromise.”* Such compromises were often made when older adults did not drive and could not find anyone to take them to a healthcare facility. However, the experiential advice obtained from friends and the knowledge gained on the internet provided Priya with some mental satisfaction.

Likewise, Barbara was scared of going to the hospital alone if something happened to her. She relied on her daughter and another woman for support:

*“I have a young woman in this town, she’s the same age as my daughter, I just have to call her, and she’d be right here. If I fall on the floor, my first call is to those two girls. I am not going to that hospital alone anymore without family.”*

For such older adults, social support and trust in some people are vital to their successful aging.

There was also a sense of promoting preventative care rather than after-the-fact treatment. Some study participants adamantly voiced concern for the priorities of the healthcare system, stating that it was not designed to prevent illness or to keep people healthy in the first place. This growing resentment shows that some old people were vying for a change. This is noteworthy because older adults make up a large proportion of healthcare clients.

## Social Health

In the WHO model, social health falls in the domain of personal wellbeing that is derived from a network of family and friends and staying socially active. Family members and friends provide support at the time when one feels lonely and in need, thus contributing to healthy aging and overall wellbeing.

## Friends and Family

Many study participants saw their wellbeing in circles of friends that met quite regularly with standing monthly schedules. They stayed in touch with each other over the phone. It seemed important to them to take care of one another in their circle of friends. Eleanor explained how friends circle took care of each other:

*“Between the group of friends, we look after one another, phoning, and visiting.”*

Joyce considered friends as a means of staying busy as well as mutual aid:

*“So that keeps me busy and involved with my friends. Two of my friends, kind of need a bit of a helping hand, or a boost in their morale.”*

For Nancy, friends were there to overcome loneliness, especially when people lost their partner, and a vacuum was created in their life:

*"I have a couple of friends who were so dependent on their husband and when their husband died, they were totally lost. They didn't know what to do. So, people like that are dependent, either a husband dependent on wife or wife dependent on husband. It's a problem because these people end up being very lonely."*

With the depletion of social networks, some of the study participants found their life diminished not only socially and mentally, but also physically. Norman stated:

*"I'm losing friends on a regular basis now."*

Margaret felt that her social life had shrunk:

*"I'm really old and I have noticed since several of them [friends] have died, that my actual social life has kind of dwindled."*

Helen lost all her companions for her walks:

*"I like going out to the lake and walk around, but I don't have anyone to walk with, so it is a little lonelier. They're all too old, a lot of my friends are older, and they can't do anything."*

Apparently, the loss of friends diminishes wellbeing in the advanced age.

Most of the study participants had family living in the area or were in regular contact with their family members. They either had a child or grandchild in the town and a few had siblings living close by. Margaret said:

*"My family lives close by. That's a big plus when you get older."*

Older adults who had family living close by or who communicated with them frequently expressed great pleasure in having their support as it enhanced their wellbeing.

However, a few of the study participants did not have enough contact with their family and it was a point of discontent for them. Some of them kept themselves busy with their friends. Edward provided a schedule of his regular meetings with friends for various activities, such as having lunch together, taking turns in cooking, doing budgeting, spending time at the church, choir practice, etc. He claimed he remained very busy. Staying busy is a tool for successful aging and enhancement of wellbeing; family and friends are instruments of staying busy.

## Social Participation

Social participation is a key aspect of mental health and wellbeing of older adults as they are often more likely to become socially isolated. There was a concern about the mental health and wellbeing of those who were isolated due to a lack of family and friends. The study participants preferred attending events or contributing to

social activities. When some of them were unable to bring their friends or spouse to these activities due to their ill health, they also gave up some of the activities, such as going to the theatre or on walks.

There was a sense that many older adults were not aware of all of the social activities being offered in the city. Louis raised this concern:

*“I think one of the problems is finding out what is available ... and access to that is not always easy.”*

Eleanor supported these sentiments:

*“There are quite a number of senior people who aren’t aware of what they could have.”*

Perhaps the formally organised activities are not meeting the needs of the old people and they prefer to build informal friends’ groups. Those who are more privileged had better access to information about programmes and opportunities for social participation and those who are less privileged had different needs and wants.

## Lifestyle

Many study participants who were more active did not ‘feel old’ and sometimes distinguished themselves from stereotypically ‘old people.’ One participant happily stated

*“It’s a busy life [that] keeps a guy young.”*

The desire to increase or maintain exercise (whether walking or playing tennis or hiking) was voiced by many of the participants with some sharing their frustration that activities took *“longer than they used to.”* These findings draw attention to the importance of subjective perceptions of one’s health, reflecting the trend away from relying solely on objective measurements of health. Activity levels, as well as types of activities, play a role in the overall wellbeing - physical, mental, and social.

Many study participants regularly participated in physical activities. Edward had been a runner:

*“Last March, I hurt my right knee stomping snow off my feet if you can believe. How stupid is that? I haven’t been back to running since. My knee’s fine now, but I’m working the treadmill downstairs.”*

The physical exercises of Edward also included cutting grass from his lawn, shredding leaves, and composting, thus contributing to the environmental protection and community wellbeing.

On the other hand, Louis who was a hiker, was hesitant in going alone:

*“I’m not sure about walking by myself in the bush. I’ve just ordered a GPS monitor which includes automatic fall alarms. So, if you don’t answer they’ll send the ambulance out.”*

Louis realised that it was risky at his age to walk alone in the bush and planned to use modern technology to enhance his comfort engaging in activities that contribute to his health and wellbeing.

Participation in other activities also helped maintaining a sense of identity and engagement, especially for older adults who were largely retired and had stopped or changed the activities they were involved in previously. After retiring from their formal occupation, which was often the main indicator of their sense of identity, older adults looked to other roles they could play to continue having this descriptor of themselves. Participation in activities was also looked at as a way of organising time and many older adults stressed the importance of maintaining some sort of schedule. For example, Edward kept himself busy in Church every Sunday morning for about three hours and in choir practice every Thursday night. Edith was involved in church activities looking after their memorial fund and she also made bed socks for the hospice. Norman was a political and social activist, very concerned about environmental issues and involved in the development of several community facilities. The mental satisfaction one gets through involvement in social activities enhances the wellbeing of participants.

Older adults negotiate their identities through activities that they deem appropriate for their physical and mental health. Shirley, one of the study participants said:

*"I love anything to do that is educational or enriching, something, even if I knew it to remember sometimes. And there's one lady that comes in here that gives slide shows and gives talks on various topics and things that are good mental stimulants, I think we all need. Many of us seniors don't have good eyesight anymore, and that's why the discussion groups we have here are so good. They make us dredge up memories, anything that exercises the grey matter is really good for us...and the more you use your head, the better you are when you get old."*

This quote shows how seamlessly activities, social interaction, and mental health come together to improving wellbeing of older adults.

## Discussion

Chronic conditions, functional limitations, and slowing down of the body with the advancing age can hinder successful aging. The vicissitudes of aging exert a heavier toll on the health of some old people and severely reduce their functioning leading to the generation of negative feelings and frustration to the extent that some may elude life. Others, however, accept the new realities with a positive attitude and adapt to their circumstances. They learn to live with pain and become more realistic about the expectations from their bodies by either lowering their expectations or purposefully focussing on those aspects of life which provide them more satisfaction (Levasseur and St-Cyr-Tribble, 2008). They deal with some of the chronic conditions by addressing their healthcare needs, lifestyle, and dietary practices.



Healthy aging incorporates ability, autonomy, self-confidence, and control over the immediate environment. Continuous and ongoing changes in the old people and their immediate environment can create obstacles in the level of participation in various activities of daily living (WHO, 2015). These changes pose a challenge before older adults in adjusting to their lives. The process of finding a balance between physical, mental, and social health (Iwarsson et al, 2007) is observed in some older adults suggesting that they reflect on their capacities and make decisions accordingly (Allain, 2020). They often manage to cope up with any emotional challenges that they face through introspection and drawing on support from loved ones.

Negative feelings like depression, sadness, stress, and discontent affect the mental health of a person adversely. Despite experiencing adversities, many older adults control their negative feelings and move on with their life because they “can’t mope.” They develop a sense of coherence, and enjoy a healthier life (Van Breda, 2017). For some of them, coping mechanism involves acceptance of realities of life and faith in the divine power. By keeping themselves busy, they bounce back and continue the journey of their life with activities that give them pleasure (Rejeski and Mihalko, 2001).

The inadequacy of the healthcare system is a matter of concern for healthy aging. Free healthcare comes with a baggage where required services may not be available when needed. The long waiting period to avail needed healthcare services can enhance anxiety and suffering. Quality of healthcare and experiences with healthcare professionals play an important part in determining health-related challenges that old people need to manage; those with positive experiences are better equipped to deal with their health issues, while those who have negative experiences, face greater difficulty managing their health. Timely, affordable, and appropriate healthcare can benefit the physical and mental health of the old people. When care from healthcare professionals is not available on time, people ‘compromise’ with the situation and resort to informal support from friends and virtual resources that may not be very effective. Older adults are the largest clients of the healthcare system, and their frustration is indicative of a need of improving the efficiency of the system. An efficient healthcare system is for the wellbeing of the entire society and not just for the old people.

Wellbeing of the old people can also be secured through social support (Paskulin and Molzahn, 2007). Some older adults inspire and support each other to navigate from negativity to positivity. However, with advancing age, social networks keep depleting (Vitorino et al, 2013) due to mortality of friends and relatives, activity limitations (Iwarsson et al, 2007) or increased level of institutionalisation. Some older adults stop participating in social and physical activities when they lose their company. As a result, they become lonelier and depressed. On the other hand, some want to maintain a higher level of activities so that they feel and stay young. Participation in social activities and perception of social support directly affect the health and wellbeing of older adults (Gilmour, 2012). Social involvement also gives a sense of engagement, identity, and belonging, and augments mental satisfaction and wellbeing.

The present study has found an apparent lack of organised social events that are accessible to older adults so that most of the study participants had built informal networks of peers to engage in activities on a semi-regular basis. This shows the capacity of the older adults to deal with the shortage of services by collaboratively creating solutions that fit into their perception abilities. Environmental factors may be more influential than individual factors in increasing or decreasing activity levels. Perception about self-efficacy is facilitated when the social environment is modified to participate in activities that are enjoyable (Rejeski and Mihalko, 2001).

Health programmes and organisations often put the onus on the individuals and what they can do themselves to improve their lives (Rubinstein and de Medeiros, 2015). They tend to ignore environmental factors, such as making communities and services friendly to the old people (Levasseur et al, 2008). The climatic factors, infrastructure, community safety, and transportation have a pivotal effect on the participation of the old people in physical and social activities. In places which suffer from harsh cold climate, avenues for indoor activities may provide opportunities to older adults to engage in physical and mental activities. It is imperative that to keep older adults healthy, active, and well connected, there is a need to provide appropriate services to support healthy aging (Sinha, 2012). Unfortunately, increasing neoliberal ideologies tend to put the onus of healthy aging and wellbeing on older adults themselves and shirking away of the government from the responsibility of successful aging (Rubinstein and de Medeiros, 2015). Better health of the older adults may increase their participation in society (WHO, 2015).

There is a cyclical relationship between health, healthcare, perception of one's ability to participate in various activities, sense of control, confidence, self-efficacy, self-image, mental health, and perceived physical health. These concepts work holistically with other social and environmental factors and influence the overall health and wellbeing of older adults. The environment or the context is important for understanding wellbeing. Since the environment encompasses physical, social, economic, and political factors that vary from place to place, it is more meaningful to conduct separate studies at the city level as problems and perspectives of the old people cannot be generalised at the national or even the provincial level.

## Conclusions

This paper has situated the experiences of health and wellbeing of twenty older adults in a northern city of Ontario, Canada within the discourse of successful aging. These older adults actively negotiated their physical health to reach new equilibriums that were appropriate for their abilities, by choosing activities that suited their own needs and preferences. They also developed strategies to navigate their negative emotions linked to crises or chronic conditions, finding their ways to overcome or cope with such emotions, and most of them were able to maintain a positive outlook on life.

This study also underscores the importance of social support in the overall health and wellbeing of older adults. Support networks, social interaction and an active lifestyle all contribute to the perceived health and wellbeing. Involvement in activities and social participation fortify successful aging, while loneliness shows a negative impact on mental health, which in turn may impact physical health. Having social ties can encourage participation in more physically engaging activities. Social networks can also make older adults feel more secure in seeking help for physical, mental, or other issues, knowing well that there are people who can share their experiences and extend advice when needed.

We conclude that policymakers, governments, and activists should not overlook the unique experiences and relationships that older adults have with perceived health, healthcare, and activity because they all impact quality of life uniquely through the interactions between them. The findings of this study support the increasing trend towards a holistic approach to studying the health and wellness of the society. Ultimately, policymakers and researchers must listen to what people, such as older adults, say about their own lives and must rely on these experiences to inform programmes. There is a place for measurement and efficiency, but measurement and efficiency mean little if it comes at the expense of the wellness of those who are the beneficiaries of the policy.

We conclude with the words of one of our participants:

*“The quality of life is how good you feel and everything else fades” – Harold*

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# Fertility and Family Planning in India, 1992-2021: Evidence from National Family Health Survey

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## Abstract

We analyse the relationship between fertility and family planning in India based on the inter-state/Union Territory variation in total fertility rate and contraceptive prevalence using the data from different rounds of the National Family Health Survey. The paper observes that fertility family planning relationship in the country based on different rounds of the National Family Health Survey is essentially different and there is a regression discontinuity between the first three rounds and the last two rounds of the survey as regards the fertility reduction effect of family planning is concerned. Evidence from the first three rounds of the survey suggests that 10 per cent point increase in contraceptive prevalence accounted for a decrease of 0.43 points in *TFR* whereas evidence from the last two rounds of NFHS suggests that 10 per cent point increase in contraceptive prevalence was associated with a decrease of 0.13 points in *TFR*. The paper also discusses policy and programme implications of the weakening of fertility and family planning relationship in the country.

## Introduction

Contraceptive use is one of the proximate determinants of fertility (Davis and Blake, 1956; Bongaarts, 1978; Bongaarts, 2015; Stover, 1998). The association between contraceptive use, measured in terms of contraceptive prevalence (CPR) and fertility, measured in terms of total fertility rate (TFR), has been found to be the strongest among different proximate determinants of fertility based on the cross-country data. This relationship suggests that every 15 per cent points increase in CPR is, on average, associated with a decrease of 1 point in TFR (Bongaarts, 1984; Mauldin and Segal, 1988; Ross and Frankenberg, 1993; Tsui, 2001; Westoff, 1990; United Nations, 2000). In recent years, however, this relationship appears to have weakened. The increase in CPR in many countries has been found to be associated with less than expected decrease in TFR (Westoff and Bankole, 2001; Bongaarts, 2015; 2017; Jain et al, 2014; Adamchack and Mbizvo, 1990; Thomas and Mercer, 1995; Jurczynska et al, 2016). In some countries, *TFR* decreased despite decrease in TFR (Bietsch et al, 2021). Many reasons have been put forward to explain the weakening of the relationship. These include unobserved heterogeneity (Bongaarts, 2015; 2017; Stover and Winfrey, 2017), shifts in method mix towards less effective methods (Bertrand et al, 2014; Toss et al, 2015; Zheng et al, 2012) and measurement mismatch (Choi et al, 2018).

India was the first country in the world to launch an official family planning programme way back in 1952 with the objective of limiting births and control population growth. The evidence available from the National Family Health Survey indicates that TFR in the country has decreased from 3.4 births per woman of reproductive age during 1992-1993 to around 2 births per woman of reproductive age during 2019-2021 while CPR has increased from 40.7 per cent to 66.7 per cent during this period (Government of India, 2022b). The TFR in the country is now below the replacement level, although it varies widely within the country, across states and Union Territories (Government of India, 2022a; 2022b). The latest round of the National Family Health Survey, 2019-2021, suggests that TFR in the country has varied from 3 live births per woman of reproductive age in Bihar to 1 live birth per woman of reproductive age in Sikkim during 0-3 years before the survey (Government of India, 2022b). There are 5 states in the country where TFR was above the replacement level. These states include Uttar Pradesh and Bihar, the two most populous state of the country. At the same time, the contraceptive prevalence (CPR), defined as the proportion of currently married women of reproductive age or their husband using a contraceptive method, has varied from more than 77 per cent in the Union Territory of Chandigarh to less than 27 per cent in Meghalaya. There are 8 states/Union Territories where CPR was less than 60 per cent during 2019-2021.

To the best of our knowledge, however, we have not come across any study which has attempted to analyse fertility and family planning relationship in India based on the variation in TFR and CPR across the states and Union Territories of the country. An understanding of the relationship between fertility and family planning in India is important as it helps to inform future investments in family planning, particularly, in official family planning efforts, when the country has achieved the replacement fertility. Family planning has always been an integral component of the social and economic development agenda of the country after the independence as is evident from different Five-year Development Plans that the country had since independence. Family planning is also an integral element of the reproductive and child health component of the National Health Mission (Government of India, 2013).

In this paper, we analyse the relationship between fertility, measured in terms of TFR and contraceptive use, measured in terms of CPR in India based on the state/Union Territory level data on fertility and family planning available through different rounds of the National Family Health Survey. The analysis reveals that the relationship between fertility and family planning based on within India, across- state/Union Territory data has not been as strong as revealed through the relationship based on the cross-country data. Another revealing observation of the present analysis is that the relationship appears to be different based on different rounds of the National Family Health Survey. We, therefore, first test whether the data available from different rounds of the National Family Health Survey can be pooled to analyse the fertility family planning relationship by examining whether there is regression discontinuity in fertility family planning relationship obtained from different rounds of the National Family Health Survey. If there is a regression discontinuity in the fertility family planning relationship based on different rounds of the National Family Health Survey, then data from different rounds of the survey cannot be pooled for analysing the fertility family planning relationship.

The paper is organised as follows. The next section of the paper discusses the trend in fertility and family planning use in India and across states/Union Territories during the period 1992-1993 through 2019-2021 based on the data available from different rounds of the National Family Health Survey. The third section examines regression discontinuity in fertility family planning relationship across different rounds of the National Family Health Survey using state/Union Territory level variation in TFR and CPR. The Chow test (Chow, 1960; Fisher, 1970; Toyoda, 1974; Schmidt and Sickles, 1977) has been used for the purpose. Application of the Chow test suggests that there is regression discontinuity in fertility family planning relationship based on the first three rounds of the National Family Health Survey and fertility family planning relationship based on the last two rounds of the National Family Health Survey. The fifth section examines fertility family planning relationship by pooling data from the first three rounds of the survey and by pooling data from the last two rounds of the survey and observes that fertility family planning relationship based on the first three rounds of the National Family Health Survey is essentially different from the last two rounds of the survey and observes that there has been a decrease in the fertility reducing effect of contraceptive use. The sixth section analyses the contribution of the decrease in the fertility reducing effect of contraceptive use on the decrease in fertility. The seventh section of the paper discusses possible reasons that may be responsible for the decrease in the fertility reducing effect of contraceptive use. The eighth and the last section of the paper summarises the main findings of the analysis and discusses their policy and programme implications.

## Levels and Variation in TFR and CPR

Table 1 presents levels and trend in TFR in India and in states/Union Territories based on different rounds of the National Family Health Survey whereas table 2 presents levels and trend in CPR. The estimates of TFR refer to the period 0-3 years prior to the survey whereas estimates of CPR are for the year in which the survey was conducted. The TFR, in India, decreased from around 3.4 births per woman of reproductive age according to the first round of the survey to around 2 births per woman of reproductive age according to the fifth round of the survey. This means that TFR in the country decreased by more than 40 per cent during the 30 years period between the first and the fifth round of the survey. On the other hand, increase in CPR has relatively been faster as it increased by almost 64 per cent from around 40.7 per cent according to the first round of the survey to around 66.7 per cent according to the fifth round of the survey.

The state/Union Territory level variation from these national averages has been substantial and the variation was different in different rounds of the survey. During 1992-1993, TFR was the lowest in Goa but the highest in the undivided Uttar Pradesh (Uttar Pradesh and Uttarakhand). During 1998-1999, TFR was the lowest again in Goa but the highest in Meghalaya. During period 2005-2006, TFR was the lowest in the undivided Andhra Pradesh (Andhra Pradesh including Telangana) but the highest in undivided Bihar (Bihar including Jharkhand). During 2015-2016 and 2019-2021, TFR was the lowest in Sikkim but the highest in Bihar. On the other hand, CPR was the lowest in Nagaland but the highest in Kerala during 1992-1993. During 1998-1999 and 2005-2006, CPR was the lowest in

Meghalaya but the highest in Himachal Pradesh. During 2015-2016, CPR was the lowest in Manipur but the highest in Punjab whereas, during 2019-2021, CPR was the lowest again in Meghalaya but the highest in Chandigarh. During 1992-1993, TFR was less than or equal to the replacement fertility in only 2 of the 25 states – Goa and Kerala. During 2019-2021, TFR was less than or equal to the replacement fertility in 31 of the 36 states and Union Territories of the country. The CPR, on the other hand, was equal to or more than 60 per cent in only 2 of the 25 states during 1992-1993 – Goa and Kerala. During 1998-1999, 7 out of 26 states were having a CPR of at least 60 per cent while 12 out of 29 states were having a CPR of at least 60 per cent during 2005-2006. During 2015-2016, however, there were only 9 out of the 35 states/Union Territories where CPR was equal to or more than 60 per cent. This number, however, increased to 29 out of 35 states and Union Territories during the period 2019-2021.

We have measured the inter-state/Union Territory variation in TFR and CPR in terms of an index of variation which is a modification of the conventional coefficient of variation. The index of variation is defined as the ratio of the positive root mean squared deviation from the median to the median whereas the coefficient of variation is defined as the ratio of the positive root mean square deviation from the mean to the mean. The index of variation is more appropriate to measure the variation across spatial units such as variation across states/Union Territories than the conventional coefficient of variation, although both are spread-to-shift ratio. The coefficient of variation is based on the assumption that the variable of interest is distributed 'normally.' If the variable of interest is not distributed 'normally,' then it may be difficult to interpret the mean and the standard deviation and hence the coefficient of variation. Moreover, if there are outliers in the data then the coefficient of variation is adversely affected (Arachchige et al, 2022). In case of skewed distributions, the coefficient of variation does not take into account for the skewness in the distribution. When the variable of interest is distributed 'normally,' then the index of variation is the same as the coefficient of variation as the median is the same as the mean so that the positive root mean square deviation from the median is the same as the standard deviation.

There are other measures also that have been proposed for measuring the disparity or variation across spatial units. These include quartile-based measures (Ospina and Marmolejo-Ramos, 2019; Bonett, 2006), and the coefficient of dispersion (Gastwirth, 1988; Bonett and Seier, 2006; Ospina and Marmolejo-Ramos, 2019). We have used the index of variation in the present analysis as it is simple, straightforward, and analogous to the coefficient of variation. A comparison of the index of variation with the coefficient of variation shows how the skewness present in the data influences the coefficient of variation as the median is not influenced by the outliers present in the data.

It may be observed from tables 1 and 2 that both TFR and CPR are not distributed 'normally' across the states and Union Territories of the country and the inter-state/Union Territory distribution of both TFR, and CPR has changed over time. As such, the index of variation is more appropriate to measure the inter-state/Union Territory variation in TFR and CPR than the commonly used conventional coefficient of variation. The index of variation correctly accounts for the disparity across spatial units, especially when one or two spatial units have exceptionally high or low values of TFR or CPR.

Table 1: Trend in TFR in India, States, and Union Territories, 1992-93 through 2019-21.

Country/State/Union Territory	1992-93	1998-99	2005-06	2015-16	2019-21
India	3.4	2.8	2.7	2.2	2.0
Andaman and Nicobar Islands	na	na	na	1.4	1.3
Andhra Pradesh, including Telangana	2.6	2.2	1.8	1.8	1.7
Arunachal Pradesh	4.3	2.5	3.0	2.1	1.8
Assam	3.5	2.3	2.4	2.2	1.9
Bihar, including Jharkhand	4.0	3.5	3.8	3.2	2.8
Chandigarh	na	na	na	1.6	1.4
Chhattisgarh	na	na	2.6	2.2	1.8
Dadra and Nagar Haveli	na	na	na	2.3	na
Dadra and Nagar Haveli, Daman and Diu	na	na	na	na	1.8
Daman and Diu	na	na	na	1.7	na
Goa	1.9	1.8	1.8	1.7	1.3
Gujarat	3.0	2.7	2.4	2.0	1.9
Haryana	4.0	2.9	2.7	2.1	1.9
Himachal Pradesh	3.0	2.1	1.9	1.9	1.7
Jharkhand	na	na	3.3	2.5	2.3
Jammu, Kashmir & Ladakh	3.1	2.7	2.4	2.0	1.4
Karnataka	2.8	2.1	2.1	1.8	1.7
Kerala	2.0	2.0	1.9	1.6	1.8
Ladakh	na	na	na	na	1.3
Lakshadweep	na	na	na	1.8	1.4
Madhya Pradesh, including Chhattisgarh	3.9	3.3	3.0	2.3	1.9
Maharashtra	2.9	2.5	2.1	1.9	1.7
Manipur	2.8	3.0	2.8	2.6	2.2
Meghalaya	3.7	4.6	3.8	3.0	2.9
Mizoram	2.3	2.9	2.9	2.3	1.9
Nagaland	3.3	3.8	3.7	2.7	1.7
New Delhi	3.0	2.4	2.1	1.8	1.6
Odisha	2.9	2.5	2.4	2.0	1.8
Puducherry	na	na	na	1.7	1.5
Punjab	2.9	2.2	2.0	1.6	1.6
Rajasthan	3.6	3.8	3.2	2.4	2.0
Sikkim	na	2.7	2.0	1.2	1.0
Tamil Nadu	2.5	2.2	1.8	1.7	1.8
Telangana	na	na	na	1.8	1.7
Tripura	2.7	1.9	2.2	1.7	1.7
Uttar Pradesh, including Uttarakhand	4.8	4.0	3.8	2.7	2.3
Uttarakhand	na	na	2.5	2.1	1.8
West Bengal	2.9	2.3	2.3	1.8	1.6
Andhra Pradesh	na	na	na	1.8	1.7
Bihar	na	na	4.0	3.4	3.0
Madhya Pradesh	na	na	3.1	2.3	2.0
Uttar Pradesh	na	na	3.8	2.7	2.3
Median	3.0	2.5	2.4	2.0	1.7
Index of variation	0.700	0.734	0.676	0.457	0.340

na Not available

Source: Government of India (1995; 2000; 2007; 2017; 2022b)

Table 2: Trend in CPR in India, States, and Union Territories, 1992-93 through 2019-21.

Country/State/Union Territory	1992-93	1998-99	2005-06	2015-16	2019-21
India	40.7	48.2	56.3	53.5	66.7
Andaman and Nicobar Islands	na	na	na	50.8	65.8
Andhra Pradesh, including Telangana	47.4	59.6	67.6	64.5	69.9
Arunachal Pradesh	23.6	35.4	43.2	31.7	59.1
Assam	43.0	43.3	56.5	52.4	60.8
Bihar, including Jharkhand	23.2	24.5	34.5	27.8	57.1
Chandigarh	na	na	na	74.0	77.4
Chhattisgarh	na	na	53.2	57.7	67.8
Dadra and Nagar Haveli	na	na	na	38.0	na
Dadra and Nagar Haveli, Daman and Diu	na	na	na	na	68.0
Daman and Diu	na	na	na	32.3	na
Goa	47.8	47.5	48.2	26.3	67.9
Gujarat	49.3	59.0	66.6	46.9	65.3
Haryana	49.7	62.4	63.4	63.7	73.1
Himachal Pradesh	58.4	67.7	72.6	57.0	74.2
Jharkhand	na	na	52.6	57.3	59.6
Jammu, Kashmir & Ladakh	49.4	49.1	35.7	40.4	61.7
Karnataka	49.4	58.3	63.6	51.8	68.7
Kerala	63.3	63.7	68.6	53.1	60.7
Ladakh	na	na	na	na	51.3
Lakshadweep	na	na	na	29.7	52.6
Madhya Pradesh, including Chhattisgarh	36.7	44.3	55.2	53.0	70.7
Maharashtra	54.1	60.9	66.9	64.7	66.2
Manipur	34.9	38.7	48.7	23.6	61.3
Meghalaya	20.7	20.2	24.3	24.3	27.4
Mizoram	53.8	57.7	59.9	35.3	31.2
Nagaland	13.0	30.3	29.7	26.5	57.4
New Delhi	60.3	63.8	66.9	54.8	76.4
Odisha	36.3	46.8	50.7	57.3	74.1
Puducherry	na	na	na	61.9	66.0
Punjab	58.7	66.7	63.3	75.8	66.6
Rajasthan	31.8	40.3	47.2	59.7	72.3
Sikkim	na	53.8	57.6	46.7	69.1
Tamil Nadu	49.8	52.1	61.4	53.2	68.6
Telangana	na	na	na	57.2	68.1
Tripura	56.4	55.5	65.7	64.1	71.2
Uttar Pradesh, including Uttarakhand	19.8	28.1	44.3	45.9	62.8
Uttarakhand	na	na	59.3	53.4	70.8
West Bengal	57.7	66.6	71.2	70.9	74.4
Andhra Pradesh	na	na	na	69.5	71.1
Bihar	na	na	34.1	24.1	55.8
Madhya Pradesh	na	na	55.9	51.4	71.7
Uttar Pradesh	na	na	43.6	45.5	62.4
Median	49.3	53.0	57.6	52.8	66.6
Index of variation	15.346	13.940	12.825	15.176	10.759

na Not available

Source: Government of India (1995; 2000; 2007; 2017; 2022b)

Tables 1 and 2 suggest that the index of variation across states and Union Territories of the country has decreased over time in both TFR and CPR, although the decrease has not been consistent during the period under reference. This implies that states/Union Territories of the country have sigma-converged over time in both TFR and CPR or the disparities in TFR and CPR across the states and Union Territories of the country have reduced over time (Monfort, 2008). The sigma convergence in TFR and CPR, across states/Union Territories, has, however, not been consistent as there have been periods when disparity across states/Union Territories appears to have increased. More specifically, the inter-state/Union Territory disparity in TFR increased in the and the second (1998-1999) round of the National Family Health Survey compared to the first round of the survey (1992-1993), but then states/Union Territories sigma converged in terms of fertility as the index of variation in TFR across states/Union Territories decreased from 0.734 during 1998-1999 to 0.340 during 2019-2021. On the other hand, the CPR sigma-converged during the first three rounds of the National Family Health Survey as the index of inter-state/Union Territory variation in CPR decreased from around 15 during the first (1992-1993) to around 13 during the third round (2005-2006). However, states and Union Territories of the country appear to have diverged in terms of CPR during the fourth round (2015-2016) of the survey as the index of inter-state/Union Territory variation in CPR increased during the period 2015-2016 compared to that during the period 2005-2006. However, during the period 2019-2021, states/Union Territories of the country appear to have converged again as the inter-state/Union Territory index of variation decreased to around 10 as revealed through the fifth (2019-2021) round of the National Family Health Survey.

Table 4 presents the trend in CPR in India and in states/Union Territories. The increase in CPR in the country has been faster than the decrease in TFR. The increase in CPR in the country has been the most rapid during the period 2015-2016 through 2019-2021 whereas the CPR decreased, instead increased, during the period 2005-2006 through 2015-2016. Among different states and Union Territories, trend in CPR has varied widely and Mizoram is the only state/Union Territory in the country where average annual per cent change in CPR was negative during the period 1992-1993 through 2019-2021 suggesting a decrease in the contraceptive use. Besides Mizoram, there has been virtually little increase in CPR in Kerala during the period under reference. Other states/Union Territories where the increase in CPR has been very slow are Jharkhand, Maharashtra, Punjab, Tripura, and West Bengal. In all these states, AAPC during the period under reference has been less than 1 per cent per year. A notable feature of table 4 is that in 20 states/Union Territories, the CPR decreased during the period 2005-2006 through 2015-2016.

## Trend in TFR and CPR

The trend in TFR or CPR during a given time period is conventionally measured in terms of annual per cent change (APC) under the assumption that the trend is linear which means a constant rate of change. If the time-period is defined by the interval  $(t_b, t_e)$ ,  $t_b < t_e$ , then APC is defined as

$$APC(x_{t_e}, x_{t_b}) = \frac{x_{t_e} - x_{t_b}}{(t_e - t_b) * x_{t_b}} \quad (1)$$

However, when the trend is not linear, then APC does not characterise the trend completely and can lead to erroneous conclusions (Clegg et al, 2009). In such a situation, it is more appropriate to estimate APC in different time-segments of the given time-period and then to combine APC in different time-segments into a single summary measure of trend in the given time-period. If the trend period  $(t_b, t_e)$ ,  $t_b < t_e$ , is divided into time segments  $t_b < t_1 < t_2 < \dots < t_e$ , then the APC in the time segment  $(t_i, t_{i+1})$  is first calculated as

$$APC_i = \frac{x_{t_{i+1}} - x_{t_i}}{(t_{i+1} - t_i) * x_{t_i}} \quad (2)$$

and then a summary measure of the trend during the trend period  $(t_b, t_e)$  may be calculated as (Clegg et al, 2009)

$$AAPC = \sum_i w_i * APC_i \quad (3)$$

where

$$w_i = \frac{t_{i+1} - t_i}{t_e - t_b} \quad (4)$$

The advantage of AAPC in analysing the trend over time is that it takes into consideration the differential rate of change in different time segments of the trend period. When the annual rate of change in different time segments of the trend period is the same, the AAPC is equal to the conventional annual rate of change. The AAPC depicts a more accurate picture of the trend than the conventional annual rate of change when the trend in different time segments of the trend period is different and different time segments are of unequal length.

Table 3 presents the APC in TFR between different rounds of the National Family Health Survey along with AAPC for the period 1992-1993 through 2019-2021. The AAPC in TFR in India, during 1992-1993 through 2019-2021, was -1.776 per cent whereas the APC during the same period was -1.497 which shows considerably slower trend in TFR as compared to the trend shown by AAPC because the trend has been different between different rounds of the survey. The decrease in TFR in India was the most rapid during the period 1992-1993 through 1998-1999 but the slowest during the period 1998-1999 through 2005-2006 when the decrease in TFR in the country nearly stagnated. Although, the decrease in TFR accelerated since then but the decrease in TFR during 2015-2016 through 2019-2021 has been slower than that during 1992-1993 through 1998-1999.

The AAPC during 1992-1993 through 2019-2021 was also higher than APC during the same period in most of the states of the country. There are only three states – Kerala, Mizoram, and Tripura – where the APC during 1992-1993 through 2019-2021 is estimated to be higher than the AAPC during the same period. The trend in TFR has also been different in different states/Union Territories. The decrease in TFR has been the most rapid in Lakshadweep followed by Sikkim and Uttar Pradesh (including Uttarakhand) but the slowest in Kerala followed by Mizoram and Meghalaya. In majority of the states, the decrease in TFR has been the most rapid during the period 1992-1993 through 1998-1999. During the period 2015-2016 through 2019-2021, the decrease in TFR was very rapid in Nagaland, Jammu and Kashmir (including Ladakh) and Goa. On the other hand, the decrease in TFR virtually stagnated in Punjab and Tripura during this period and was very slow in Meghalaya where it decreased by less than 1 per cent per year.



Table 3: Trend in TFR 1992-93 through 2019-2021, India and States/Union Territories.

Country/State/Union Territory	APC <sub>1</sub>	APC <sub>2</sub>	APC <sub>3</sub>	APC <sub>4</sub>	AAPC	APC
India	-2.941	-0.510	-1.852	-2.020	-1.776	-1.497
Andaman and Nicobar Islands	-	-	-	-1.587	-1.587	-1.587
Andhra Pradesh, including Telangana	-2.564	-2.597	0.000	-1.235	-1.423	-1.259
Arunachal Pradesh	-6.977	2.857	-3.000	-3.175	-2.405	-2.114
Assam	-5.714	0.621	-0.833	-3.030	-1.888	-1.662
Bihar, including Jharkhand	-2.083	1.224	-1.579	-2.778	-1.172	-1.091
Chandigarh	-	-	-	-2.778	-2.778	-2.778
Chhattisgarh	-	-	-1.538	-4.040	-2.315	-2.122
Goa	-0.877	0.000	-0.556	-5.229	-1.249	-1.148
Gujarat	-1.667	-1.587	-1.667	-1.111	-1.556	-1.333
Haryana	-4.583	-0.985	-2.222	-2.116	-2.405	-1.909
Himachal Pradesh	-5.000	-1.361	0.000	-2.339	-1.820	-1.576
Jharkhand	-	-	-2.424	-1.778	-2.224	-2.090
Jammu, Kashmir & Ladakh	-2.151	-1.587	-1.667	-6.667	-2.570	-1.994
Karnataka	-4.167	0.000	-1.429	-1.235	-1.631	-1.429
Kerala	0.000	-0.714	-1.579	2.778	-0.301	-0.364
Lakshadweep	-	-	-	-4.938	-4.938	-4.938
Madhya Pradesh, including Chhattisgarh	-2.564	-1.299	-2.333	-3.865	-2.371	-1.865
Maharashtra	-2.299	-2.286	-0.952	-2.339	-1.812	-1.505
Manipur	1.190	-0.952	-0.714	-3.419	-0.802	-0.779
Meghalaya	4.054	-2.484	-2.105	-0.741	-0.635	-0.786
Mizoram	4.348	0.000	-2.069	-3.865	-0.436	-0.632
Nagaland	2.525	-0.376	-2.703	-8.230	-1.874	-1.763
New Delhi	-3.333	-1.786	-1.429	-2.469	-2.105	-1.697
Odisha	-2.299	-0.571	-1.667	-2.222	-1.617	-1.379
Puducherry	-	-	-	-2.614	-2.614	-2.614
Punjab	-4.023	-1.299	-2.000	0.000	-1.936	-1.630
Rajasthan	0.926	-2.256	-2.500	-3.704	-1.887	-1.616
Sikkim	-	-3.704	-4.000	-3.704	-3.842	-2.929
Tamil Nadu	-2.000	-2.597	-0.556	1.307	-1.086	-1.018
Telangana	-	-	-	-1.235	-1.235	-1.235
Tripura	-4.938	2.256	-2.273	0.000	-1.330	-1.347
Uttar Pradesh, including Uttarakhand	-2.778	-0.714	-2.895	-3.292	-2.379	-1.894
Uttarakhand	-	-	-1.600	-3.175	-2.089	-1.931
West Bengal	-3.448	0.000	-2.174	-2.469	-1.947	-1.630
Andhra Pradesh	-	-	-	-1.235	-1.235	-1.235
Bihar	-	-	-1.500	-2.614	-1.846	-1.724
Madhya Pradesh	-	-	-2.581	-2.899	-2.679	-2.447
Uttar Pradesh	-	-	-2.895	-3.292	-3.018	-2.722

AAPC Average annual per cent change between 1992-1993 and 2019-2021

APC Annual per cent change between 1992-1993 and 2019-2021

APC<sub>1</sub> Annual per cent change between 1992-1993 and 1998-1999

APC<sub>2</sub> Annual per cent change between 1998-1999 and 2005-2006

APC<sub>3</sub> Annual per cent change between 2005-2006 and 2015-2016

APC<sub>4</sub> Annual per cent change between 2015-2016 and 2019-2021

Remarks APC could not be calculated for Dadra & Nagar Haveli; Dadra & Nagar Haveli, Daman & Diu; and Daman & Diu as data are available at one point in time only.

Source: Authors

Table 4: Trend in CPR 1992-1993 through 2019-2021, India and States/Union Territories.

Country/State/Union Territory	APC <sub>1</sub>	APC <sub>2</sub>	APC <sub>3</sub>	APC <sub>4</sub>	AAPC	APC
India	3.071	2.401	-0.497	5.483	1.998	2.323
Andaman and Nicobar Islands	-	-	-	6.562	6.562	6.562
Andhra Pradesh, including Telangana	4.290	1.918	-0.459	1.860	1.562	1.726
Arunachal Pradesh	8.333	3.148	-2.662	19.208	4.795	5.470
Assam	0.116	4.355	-0.726	3.562	1.453	1.505
Bihar, including Jharkhand	0.934	5.831	-1.942	23.421	4.814	5.313
Chandigarh	-	-	-	1.021	1.021	1.021
Chhattisgarh	-	-	0.846	3.890	1.791	1.893
Goa	-0.105	0.211	-4.544	35.150	4.130	1.529
Gujarat	3.279	1.840	-2.958	8.718	1.535	1.180
Haryana	4.259	0.229	0.047	3.279	1.541	1.712
Himachal Pradesh	2.654	1.034	-2.149	6.706	1.158	0.984
Jharkhand	-	-	0.894	0.892	0.893	0.918
Jammu, Kashmir & Ladakh	-0.101	-3.899	1.317	11.716	1.381	0.905
Karnataka	3.003	1.299	-1.855	7.250	1.497	1.421
Kerala	0.105	1.099	-2.259	3.181	0.002	-0.149
Lakshadweep	-	-	-	17.134	17.134	17.134
Madhya Pradesh, including Chhattisgarh	3.451	3.515	-0.399	7.421	2.717	3.369
Maharashtra	2.095	1.407	-0.329	0.515	0.780	0.813
Manipur	1.815	3.691	-5.154	35.499	5.270	2.751
Meghalaya	-0.403	2.900	0.000	2.835	1.114	1.177
Mizoram	1.208	0.545	-4.107	-2.581	-1.514	-1.528
Nagaland	22.179	-0.283	-1.077	25.912	8.615	12.420
New Delhi	0.967	0.694	-1.809	8.759	1.163	0.971
Odisha	4.821	1.190	1.302	6.515	2.894	3.787
Puducherry	-	-	-	1.472	1.472	1.472
Punjab	2.271	-0.728	1.975	-2.697	0.587	0.489
Rajasthan	4.455	2.446	2.648	4.690	3.325	4.631
Sikkim	-	1.009	-1.892	10.659	1.679	1.323
Tamil Nadu	0.770	2.550	-1.336	6.433	1.384	1.373
Telangana	-	-	-	4.235	4.235	4.235
Tripura	-0.266	2.625	-0.244	2.461	0.925	0.954
Uttar Pradesh, including Uttarakhand	6.987	7.880	0.528	8.182	5.061	7.897
Uttarakhand	-	-	2.054	7.241	3.664	4.125
West Bengal	2.571	0.987	-0.042	1.097	0.976	1.052
Andhra Pradesh	-	-	-	0.512	0.512	0.512
Bihar	-	-	-2.933	29.230	7.049	4.389
Madhya Pradesh	-	-	-0.805	8.776	2.169	1.949
Uttar Pradesh	-	-	-2.327	8.254	0.957	0.361

AAPC Average annual per cent change between 1992-1993 and 2019-2021

APC Annual per cent change between 1992-1993 and 2019-2021

APC<sub>1</sub> Annual per cent change between 1992-1993 and 1998-1999

APC<sub>2</sub> Annual per cent change between 1998-1999 and 2005-2006

APC<sub>3</sub> Annual per cent change between 2005-2006 and 2015-2016

APC<sub>4</sub> Annual per cent change between 2015-2016 and 2019-2021

Remarks APC could not be calculated for Dadra & Nagar Haveli; Dadra & Nagar Haveli, Daman & Diu; and Daman & Diu as data are available at one point in time only.

Source: Authors

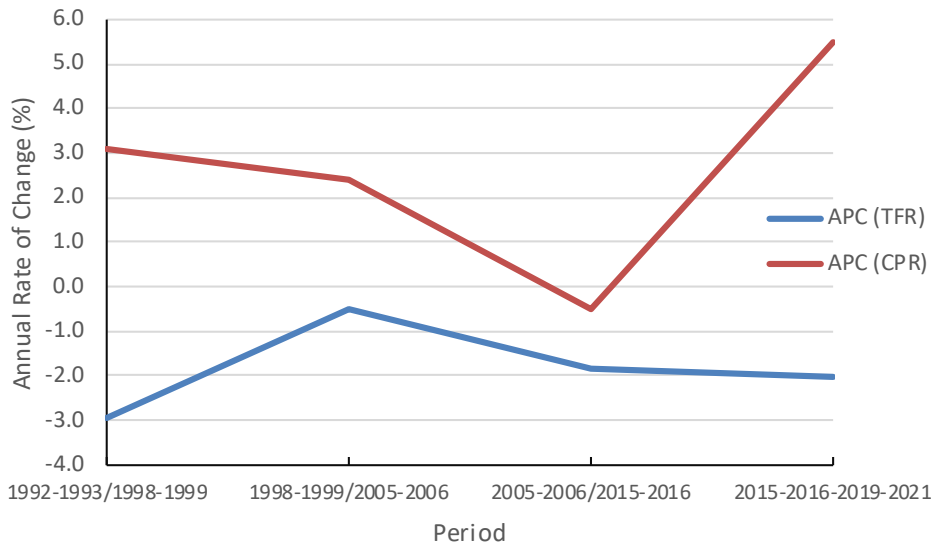


Figure 1: Annual per cent change in TFR and CPR in different time segment of the period 1992-1993 through 2019-2021.

Source: Authors

The trend in TFR and CPR between different rounds of the National Family Health Survey, measured in terms of annual per cent change (APC), has, however, been different. The decrease in TFR slowed down considerably between the second (1998-1999) and the third (2005-2006) round of the National Family Health Survey compared to the decrease between the first (1992-1993) and the second (1998-1999) round of the survey. The decrease in TFR accelerated between the third (2005-2006) round and the fourth (2015-2016) round but the acceleration in the decrease in TFR slowed down considerably between the fourth (2015-2016) round and the fifth (2019-2021) round of the survey (Figure 1). By comparison, the increase in CPR slowed down during the period between the first (1992-1993) round and the third (2015-2016) round of the survey but the increase in CPR accelerated very rapidly between the fourth (2015-2016) round and the fifth (2019-2021) round of the survey. It is apparent from the figure 1 that the trend in TFR in the country during the period 1992-1993 through 2019-2021 has not been commensurate with the trend in CPR in the country during the same period. Between the first (1992-1993) and the third (2005-2006) round of the survey, the decrease in TFR slowed down along with the slowdown in the increase in CPR but the slowdown in the decrease in TFR has been more marked compared to the slowdown in the increase in CPR during this period. On the other hand, Between the third (2005-2006) round and the fourth round (2015-2016) of the survey, the decrease in TFR accelerated despite a slowdown in the increase in CPR. Between the fourth (2015-2016) round and the fifth (2019-2021) round of the survey, the increase in CPR accelerated very rapidly but the decrease in TFR accelerated only marginally during this period.

## Fertility Impact of Family Planning

Table 5 presents results of ordinary least square regression of TFR on CPR based on state/Union Territory level data available from different rounds of the National Family Health Survey. The relationship appears to be different in the first three rounds of the survey compared to the last two rounds of the survey. The regression coefficient of TFR on CPR is higher in the first three rounds of the survey as compared to the last two rounds of the survey. Moreover, the first three rounds of the survey suggest that the impact of CPR in reducing TFR has increased over time but the impact of CPR on TFR has not only been low, but it has decreased over time according to the last two rounds of the survey. The last two rounds of the survey suggest that inter-state/Union Territory variation in CPR explains only a small proportion of inter-state/Union Territory variation in TFR whereas in the first three rounds of the survey, inter-state/Union Territory variation in CPR explains a substantial proportion of the inter-state/Union Territory variation in TFR. The regression coefficient of TFR on CPR is, however, found to be statistically significant in all the five rounds of the National Family Health Survey or during the 30 years period between 1992-1993 through 2019-2021.

Table 5: Results of OLS regression of TFR on CPR in different rounds of the National Family Health Survey

Parameter	National Family Health Survey				
	1992-1993	1998-1999	2005-2006	2015-2016	2019-2021
R <sup>2</sup>	0.449	0.579	0.671	0.285	0.149
Adjusted R <sup>2</sup>	0.425	0.562	0.659	0.264	0.124
Residual sum of square	6.497	5.393	4.021	5.168	4.864
B	-0.032	-0.039	-0.042	-0.016	-0.014
β	-0.670	-0.761	-0.819	-0.534	-0.385
't'	-4.332	-5.746	-7.427	-3.679	-2.471
'p'	0.000	0.000	0.000	-0.001	-0.018
N	25	26	29	36	37

Source: Authors

Table 5 suggests that the fertility impact of family planning in India is lower than that reflected from the cross-country data. At the same time, there appears to be regression discontinuity in the fertility impact of family planning based on the first three rounds of the National Family Health Survey and the fertility impact of family planning based on the last two rounds of the survey. Table 5 suggests that the causal effect of CPR on TFR based on the data from the first three rounds of the National Family Health Survey is essentially different from the causal effect based on the last two rounds of the survey. One implication of regression discontinuity is that the data from the first three rounds of the National Family Health Survey cannot be pooled with the data from the last three rounds of the survey for analysing fertility impact of family planning. It is also clear from table 5 suggests that the causal effect of CPR on TFR obtained from the data from the first three rounds of the survey is very similar and it has increased with time. On the other hand, the causal effect of CPR on TFR obtained from data from the last two rounds of the survey is very similar and, more importantly, the effect has decreased over time. However, the causal effect of CPR on TFR

obtained from the first three rounds of the survey is different from the causal effect obtained from the last two rounds of the survey. Similarly, the proportion of the inter-state/Union Territory variation in TFR which is explained by the inter-state/Union Territory variation in CPR is substantially higher in the first three rounds of the survey as compared to that in the last two rounds of the survey. More importantly, this proportion has decreased substantially between the fourth (2015-2016) and the fifth (2019-2021) round of the survey whereas it increased between the first (1992-1993) and the third (2005-2006) round of the survey.

We have applied the Chow Test (Chow, 1960) to examine the regression discontinuity in the fertility impact of family planning between the first three rounds of the survey and the last two rounds of the survey. Results of the Chow test are presented in table 6 which confirms that there is regression continuity in fertility impact of family planning between the first three rounds of the survey and the last two rounds of the survey. There is no regression discontinuity between the first three rounds of the survey. Similarly, there is no regression continuity between the last two rounds of the survey. There is, however, regression discontinuity between the 2005-2006 round and the 2015-2016 round of the survey. Application of the Chow test suggests that the data from the first three rounds of the survey can be pooled for analysing the fertility impact of family planning. Similarly, data from the last two rounds of the survey can be pooled but the data from the first three rounds of the survey cannot be pooled with the data from the last two rounds of the survey for analysing the fertility family planning relationship.

Table 6: Results of the Chow test to examine regression discontinuity in fertility family planning relationship based on different rounds of the National Family Health Survey.

NFHS rounds	Source	Sum of Square	df	Mean Square	F	Sig
1992-1993	Contrast	0.525	2	0.263	1.038	0.362
1998-1999	Error	11.890	47	0.253		
1998-1999	Contrast	0.092	2	0.046	0.250	0.780
2005-2006	Error	9.413	51	0.185		
2005-2006	Contrast	9.365	2	4.682	31.085	0.000
2015-2016	Error	9.188	61	0.151		
2015-2016	Contrast	0.027	2	0.014	0.093	0.911
2019-2021	Error	10.032	69	0.145		

Source: Authors

The application of the Chow test reveals that there is a discontinuity between the fertility family planning relationship as revealed through the first three rounds of the National Family Health Survey and the fertility family planning relationship revealed through the last two rounds of the survey. We have, therefore, fitted two regression models to characterise the fertility impact of family planning in India. The first model is based on the data from the first three rounds of the National Family Health Survey and refers to the period 1992-1993 through 2005-2006 while the second model is based on the data from the last two rounds of the survey and refers to the period 2015-2016 through 2019-2021. For the first model, we have pooled the data from the first three rounds of the National Family Health Survey. Similarly, for the second model, we have pooled the data from the

last two rounds of the National Family Health Survey. Moreover, since fertility impact of family planning is expected to be different in different states and Union Territories of the country, we have used the fixed effects regression model in place of ordinary regression model to control the variation in the fertility impact of family planning across states and Union Territories. The univariate general linear model has been used for analysing the association between inter-state/Union Territory variation in TFR and inter-state/Union Territory variation in CPR.

Table 7: Fertility impact of family planning in India during the period 1992-1993 through 2005-2006 and during the period 2015-2016 through 2019-2021 based on data from different rounds of the National Family Health Survey.

Particulars	Model 1	Model 2	Model 1a	Model 2a	Model 1b	Model 2b
Period	1992-1993 2005-2006	2015-2016 2019-2021	1992-1993 2005-2006	2015-2016 2019-2021	2015-2016 2019-2021	2015-2016 2019-2021
Dependent variable	TFR	TFR	TFR	TFR	TFR	TFR
Mean	2.810	1.916	2.810	1.916	2.810	1.916
SD	0.711	0.439	0.711	0.439	0.711	0.439
Independent variable	CPR	CPR	Adj CPR	Adj CPR	CPRM	CPRM
Mean	49.737	57.020	47.166	59.912	42.571	48.558
SD	14.132	14.816	12.641	15.803	14.232	14.035
R <sup>2</sup>	0.864	0.957	0.847	0.955	0.890	0.948
Adjusted R <sup>2</sup>	0.768	0.906	0.739	0.900	0.812	0.885
B	-0.043	-0.013	-0.049	-0.012	-0.055	-0.018
SE	0.007	0.002	0.010	0.002	0.008	0.003
't'	-5.773	-7.419	-4.934	-7.044	-7.217	-6.231
P	0.000	0.000	0.000	0.000	0.000	0.000
95% confidence interval						
Lower	-0.058	-0.017	-0.068	-0.016	-0.070	-0.024
Upper	-0.028	-0.010	-0.029	-0.009	-0.040	-0.012
Intercept	5.038	2.893	5.290	2.875	5.311	3.047
N	83	74	83	74	83	74

Source: Authors

Results of the regression modelling exercise are presented in table 7 (Model 1 and Model 2). The table shows that both models, model based on the pooled data from the first three rounds (1992-1993 through 2005-2006) and the model based on the pooled data from the last two rounds (2015-2016 through 2019-2021) of the National Family Health Survey, fit the observed data very well. In the first model (Model 1), the simple zero order correlation coefficient between the observed TFR and the TFR predicted by the model is 0.930 whereas it is 0.978 in the second model (Model 2). In both models, the regression coefficient of TFR on CPR is negative and statistically significant after controlling the state/Union Territory effects (fixed effects). However, the fertility reducing effect of CPR is substantially lower in the second model as compared to the first model. In the first model, an increase of 10 per cent points in CPR is associated, on average, with a decrease of 0.43 points in TFR whereas, in the second model, an increase of 10 per cent points in CPR is

associated, on average, with a decrease of only 0.13 points in TFR. A comparison of model 1 with model 2 suggests that the fertility reducing effect of CPR has reduced in the country during the period 2015-2016 through 2019-2021 as compared to the period 1992-1993 through 2005-2006. This decrease in the fertility reducing effect of CPR is illustrated in figures 2 and 3. Although, the regression coefficient of TFR on CPR is statistically significant in both models, the inter-state/Union Territory variation in CPR explained around 60 per cent of the inter-state/Union Territory variation in TFR during the period 1992-1993 through 2005-2006 (Model 1). By contrast, the inter-state/Union Territory variation in CPR explained only around 29 per cent of the inter-state/Union Territory variation in TFR during the period 2015-2016 through 2019-2021 (Model 2).

It has been argued that a potentially important reason behind the decrease in the fertility reducing effect of CPR is the 'mis-alignment' in the TFR-CPR relationship. It is argued that TFR, by definition, is not influenced by the population age structure, but the CPR is influenced by the population age structure (Choi et al, 2018). It has, therefore been suggested that an age-adjusted contraceptive prevalence (Adj CPR) which is independent of the population age structure should be used to analyse the fertility family planning relationship. Using the data from 259 surveys from 85 countries, it has been shown that inter-country variation in Adj CPR better explained the inter-country variation in TFR. However, even after using the Adj CPR, the regression model explained a lower amount of within-country variance during the recent time-period, compared to the within-country variance during the earlier time-period. (Choi et al, 2018).

We have also regressed TFR on Adj CPR using the state/Union Territory level data and the results are presented in table 7 (Model 1a and Model 1b) for the two time periods 1992-1993 through 2005-2006 and 2015-2016 through 2019-2021 (Model 1a and Model 2a). The table shows that there has been virtually little change in the explanatory power of regression models after replacing CPR by Adj CPR as the independent variable. In fact, the explanatory power of regression models decreased, albeit marginally, when Adj CPR was used as the independent variable. The weakening of the relationship may also be observed from figures 4 and 5. During the period 1992-1993 through 2005-2006, inter-state/Union Territory variation in Adj CPR accounted for about 49 per cent of the inter-state/Union Territory variation in TFR, although the fertility reducing effect of Adj CPR increased marginally. On the other hand, during the period 2015-2016 through 2019-2021, inter-state/Union Territory variation in Adj CPR accounted for less than 25 per cent of the inter-state/Union Territory variation in TFR and the regression coefficient of TFR on CPR has also decreased indicating that the fertility reducing effect of Adj CPR is even lower than the fertility reducing effect of CPR during this period. It is clear from the table that the population age structure effect on CPR in India has not been substantial enough to have a significant impact on the fertility reducing effect of CPR. Even if the CPR is adjusted for the change in the population age structure during 1992-1993 through 2005-2006 and during 2015-2016 through 2019-2021, there has been a significant decrease in the fertility reducing effect of contraceptive use in the country during the period 2015-2016 through 2019-2021 as compared to the fertility reducing effect of contraceptive use during the period 1992-1993 through 2005-2006.

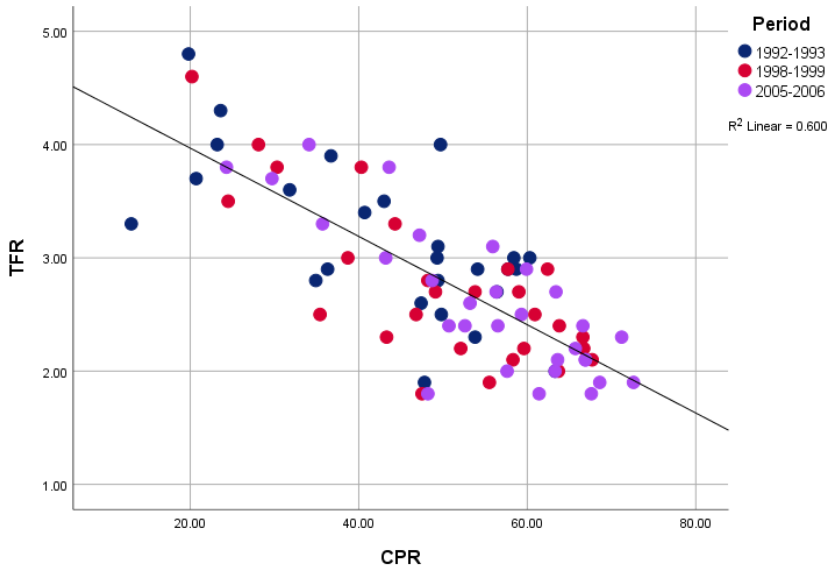


Figure 2: Relationship between TFR and CPR in India during the period 1992-93 through 2005-2006  
Source: Authors

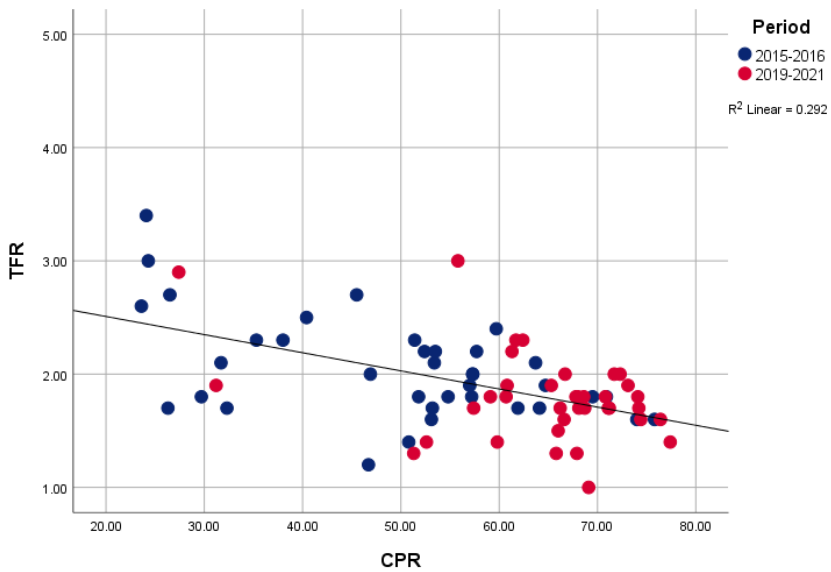


Figure 3: Relationship between TFR and CPR in India during the period 2015-2016 through 2019-2021  
Source: Authors



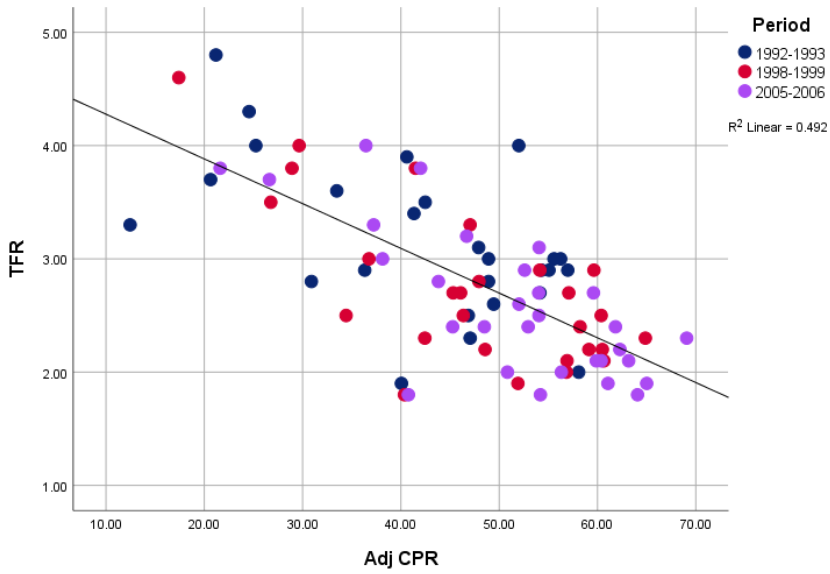


Figure 4: Relationship between TFR and Adj CPR in India during the period 1992-1993 through 2005-2006  
Source: Authors

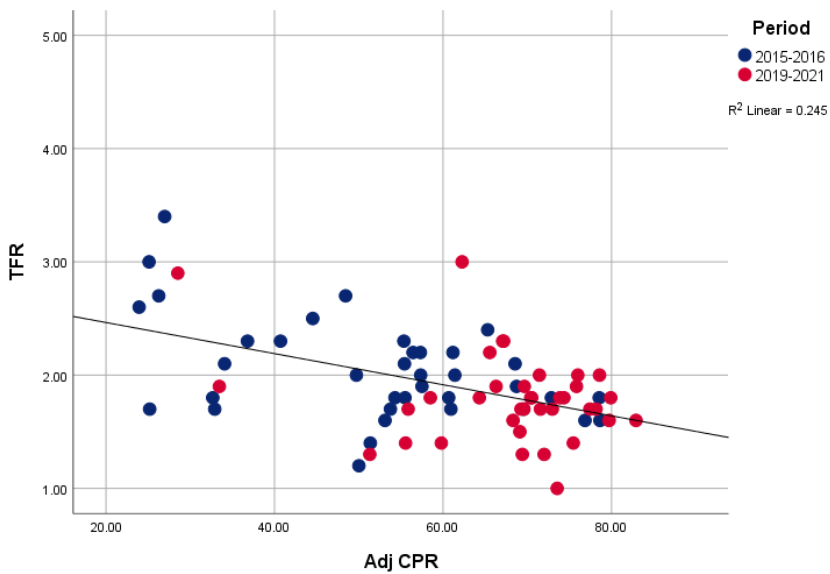


Figure 5: Relationship between TFR and Adj CPR in India during the period 2015-2016 through 2019-2021  
Source: Authors

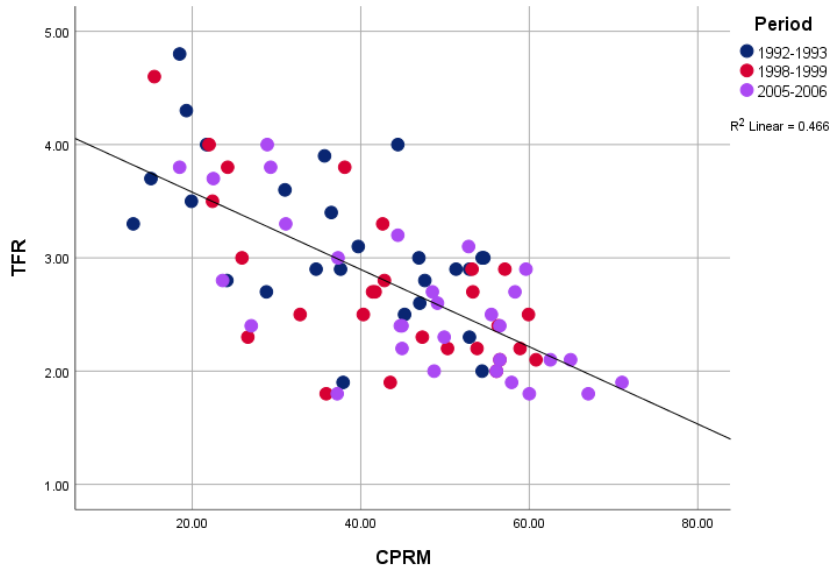


Figure 6: Relationship between TFR and CPRM in India during the period 1992-1993 through 2005-2006  
Source: Authors

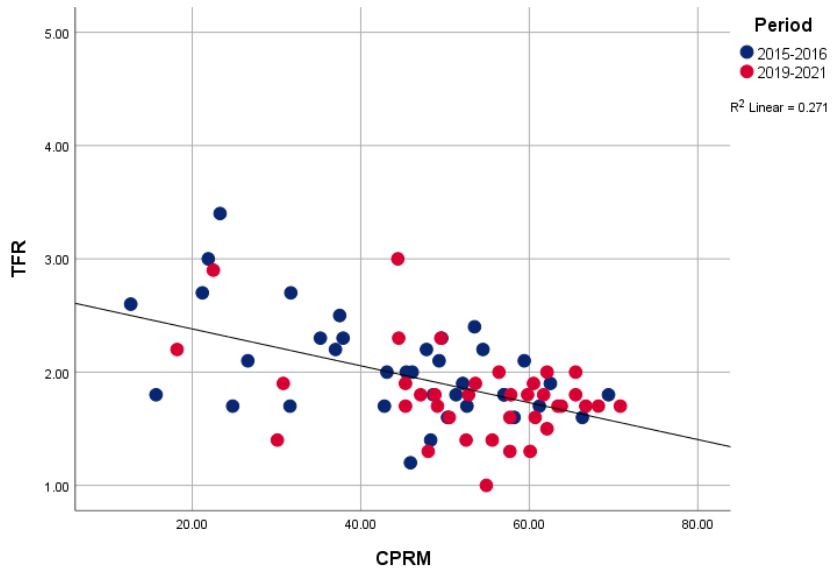


Figure 7: Relationship between TFR and CPRM in India during the period 2015-2016 through 2019-2021  
Source: Authors

We have also regressed TFR on modern methods prevalence (CPRM). Table 7 (Model 1b and Model 2b) shows that fertility reducing effect of CPRM is greater than that of CPR in both models but there is a marginal decrease in the explanatory power of both models in explaining the inter-state/Union Territory variation in TFR as may be seen from figures 6 and 7. A substantial decrease in the fertility reducing effect of family planning in the recent period as compared to the earlier period is very much evident from table 7.

## Decomposition of the Change in TFR

Given that fertility impact of family planning in India was essentially different during 1992-1993 through 2005-2006 as compared to 2015-2016 through 2019-2021, we have analysed how the change in fertility impact of family planning has contributed to the decrease in TFR. If  $f_1$  and  $c_1$  denote, respectively, the TFR and CPR at time 1 and  $f_2$  and  $c_2$  denote respectively the CPR and TFR at time 2, then

$$f_1 = \alpha_1 + \beta_1 * c_1 \quad (5)$$

$$f_2 = \alpha_2 + \beta_2 * c_2 \quad (6)$$

Now,

$$f_2 - f_1 = (\alpha_2 - \alpha_1) + (\beta_2 * c_2 - \beta_1 * c_1) \quad (7)$$

Now, following Ang (2016), we can write

$$(\beta_2 * c_2 - \beta_1 * c_1) = \frac{(\beta_2 * c_2 - \beta_1 * c_1)}{\ln\left(\frac{\beta_2 * c_2}{\beta_1 * c_1}\right)} * \ln\left(\frac{\beta_2 * c_2}{\beta_1 * c_1}\right) \quad (8)$$

$$(\beta_2 * c_2 - \beta_1 * c_1) = \frac{(\beta_2 * c_2 - \beta_1 * c_1)}{\ln\left(\frac{\beta_2 * c_2}{\beta_1 * c_1}\right)} * \ln\left(\frac{\beta_2}{\beta_1}\right) + \frac{(\beta_2 * c_2 - \beta_1 * c_1)}{\ln\left(\frac{\beta_2 * c_2}{\beta_1 * c_1}\right)} * \ln\left(\frac{c_2}{c_1}\right) \quad (9)$$

or

$$(\beta_2 * c_2 - \beta_1 * c_1) = B + C \quad (10)$$

where

$$B = \frac{(\beta_2 * c_2 - \beta_1 * c_1)}{\ln\left(\frac{\beta_2 * c_2}{\beta_1 * c_1}\right)} * \ln\left(\frac{\beta_2}{\beta_1}\right) \quad (11)$$

$$C = \frac{(\beta_2 * c_2 - \beta_1 * c_1)}{\ln\left(\frac{\beta_2 * c_2}{\beta_1 * c_1}\right)} * \ln\left(\frac{c_2}{c_1}\right) \quad (12)$$

Let

$$A = \alpha_2 - \alpha_1 \quad (13)$$

Then

$$f_2 - f_1 = A + B + C \quad (14)$$

In other words, the difference in fertility between two points of time can be decomposed into three components: 1) difference in the intercept (A) which is attributed

to the change in those factors which are not included in the regression model; 2) change in the regression coefficient (B) which is attributed to the change in the fertility reducing effect of contraceptive prevalence; and (3) change in the contraceptive prevalence (C). Since there is a regression discontinuity in fertility family planning relationship between the first three rounds (1992-1993 through 2005-2006) and the last two rounds (2015-2016 and 2019-2021), we have decomposed the change in TFR between 2005-2006 and 2015-2016. Results of the decomposition analysis are presented in table 8.

Table 8: Regression decomposition of the change in TFR in India between 2005-2006 and 2015-2016.

Particulars	Dependent variable	
	CPR	CPRM
Reported TFR, 2005-2006	2.700	2.700
Reported TFR, 2015-2016	2.200	2.200
Decrease in reported TFR	-0.500	-0.500
Estimated TFR, 2005-2006 (model 1)	2.629	2.642
Estimated TFR, 2015-2016 (model 2)	2.188	2.178
Decrease in estimated TFR between 2005-2006 and 2015-2016	-0.441	-0.464
Decrease in TFR attributed to the		
Change in the intercept	-2.138	-2.264
Change in fertility reducing effect of CPR	1.626	
Change in fertility reducing effect of CPRM		1.777
The change in CPR	0.071	
The change in CPRM		0.023
Total	-0.441	-0.464

Source: Authors

According to the third round of the National Family Health Survey, the CPR in India was 56.3 per cent during the period 2005-2006. This CPR implies a TFR of 2.629 according to the model 1 which is a close approximation of the TFR of 2.7 obtained directly from the birth history data collected during the third round of the survey. On the other hand, according to the fourth round of the National Family Health Survey, the CPR in India was 53.5 per cent during the period 2015-2016. This CPR implies a TFR of 2.188 according to the model 2 which is a close approximation of the TFR of 2.2 obtained from the birth history data collected during the fifth round of the survey. This means that between 2005-2006 and 2015-2016, the TFR in India is estimated to have decreased by around 0.441 absolute points according to regression models 1 and 2. The decomposition exercise suggests that the change in the intercept of the two regression models accounted for a decrease of 2.138 absolute points in TFR whereas the decrease in CPR accounted for an increase of 0.071 absolute points in TFR as CPR decreased, instead increased, during this period. On the other hand, the decrease in the fertility reducing effect of CPR between 2005-2006 and 2015-2016 accounted for an increase of 1.626 absolute points in TFR so that the net decrease in TFR between 2005-2006 and 2019-2021 was 0.441 points (Table 8). The decrease in TFR attributed to the change in the intercept of the regression model may be attributed to those factors which are not included in the regression model. This means that the entire decrease in TFR in the country between 2005-2006 and 2015-2016 may be attributed to factors other

than family planning as not only the CPR decreased during this period but also the fertility reducing effect of CPR has also decreased.

Similarly, the prevalence of modern family planning methods (CPRM) was 48.5 per cent during the period 2005-2006 which implies a TFR of 2.642, according to model 1b, whereas CPRM was 47.8 per cent during the period 2015-2016 which implies a TFR of 2.178 according to model 2b (Table 7). This means that TFR in the country decreased by 0.464 absolute points between 2005-2006 and 2015-2016. The difference attributed to the change in the intercept of the two regression models accounted for a decrease of 2.264 absolute points in TFR whereas the change in fertility reducing impact of CPRM accounted for an increase of 1.777 absolute points in TFR. At the same time, the decrease in CPRM from 48.5 per cent to 47.8 per cent between 2005-2006 and 2015-2016 accounted for an increase of 0.023 absolute points in TFR. As the result, the net decrease in TFR in the country during the period 2005-2006 and the period 2015-2016 was 0.464 absolute points. Both models suggest that a decrease in the fertility reducing effect of all methods contraceptive use or only modern contraceptive methods use has accounted for a deceleration in the decrease in TFR during the period 2015-2016 as compared to the period 2005-2006 or between the third and the fourth round of the National Family Health Survey.

## Discussions and Conclusions

The present analysis reveals that the fertility reducing effect of family planning in India has always been lower than the global norm of 1 point decrease in TFR for 15 per cent points increase in CPR and this effect has decreased considerably during the period 2015-2016 through 2019-2021 as compared to the period 1992-1993 through 2005-2006. Another revealing finding of the analysis is that there is a regression discontinuity in the fertility family planning relationship based on the first three rounds (1992-1993, 1998-1999 and 2005-2006) and the fertility family planning relationship based on the last two rounds (2015-2016 and 2019-2021) of the National Family Health Survey. A decrease in the fertility reducing effect of family planning around 2020 as compared to that around 1990 has also been reported globally based on the cross-country data (Choi et al, 2018; Dasgupta et al, 2022; United Nations, 2020). However, the decrease in the fertility reducing effect of family planning in India has been very rapid. The evidence based on the first three rounds of the National Family Health Survey suggests that 10 per cent points increase in CPR is associated with a decrease of 0.43 absolute points in TFR but the evidence from the last two rounds of the survey suggests that 10 per cent points increase in CPR is associated with a decrease of only 0.13 points in TFR. When the analysis is limited to modern family planning methods only, the fertility reducing effect of modern family planning methods increases in both periods, but the increase is more during the period 1992-1993 through 2005-2006 as compared to the period 2015-2016 through 2019-2021 so that the decrease in the fertility reducing effect of family planning in recent years becomes even more marked. The evidence based on the latest (2019-2021) round of the National Family Health Survey indicates that inter-state/Union Territory variation in the use of modern family planning methods explains less than 15 per cent of the inter-state/Union Territory variation in the total fertility rate (TFR). This suggests that inter-state/Union Territory variation in contraceptive prevalence is

now not the primary determinant of inter-state/Union Territory variation in fertility within the country.

Reasons for the low and diminishing fertility reducing effect of family planning in India are not known at present. One probable reason is that there is a difference between the age location of fertility and the age location of family planning use, and this difference has increased over time. During the period 1992-1993, the mean age at childbearing in the country was around 26 years which decreased to around 25 years during the period 2019-2021. During 1992-1993, around 76 per cent of the fertility in the country was confined to younger ages, ages below 25 years. This proportion increased to 83 per cent during the period 2019-2021. By contrast, the mean age of the users of modern family planning methods increased from around 34 years during the period 1992-1993 to almost 36 years during the period 2019-2021. During the period 1992-1993, around 32 per cent of the users of modern family planning methods were below 25 years of age. This proportion decreased to around 26 per cent during the period 2019-2021. The reason behind the increasing difference in the age pattern of fertility and the age pattern of contraceptive use appears to be the continued dominance of permanent methods of family planning – female and male sterilisation - in the country. India is the only country in the world where more than two-third of the total family planning users were using a permanent family planning method – female or male sterilisation.

Another reason that may be responsible for the decrease in the fertility reducing effect of family planning is the decrease in the effectiveness of family planning use in preventing births because of the shift in the family planning method mix. The family planning method mix in India has historically been highly skewed in favour of permanent family planning methods – female and male sterilisation – which have the maximum effectiveness in preventing a birth. This skewness in favour of permanent family planning methods has decreased over time (Chaurasia, 2021) which implies that the effectiveness of family planning use in reducing fertility has decreased. There has also been a very rapid increase in the prevalence of traditional family planning methods between the fourth and the fifth rounds of the National Family Health Survey. This increase in the prevalence of traditional methods also appears to have contributed to the decrease in the fertility reducing effect of CPR as the present analysis reveals that the fertility reducing effect of CPRM is higher than the fertility reducing effect of CPR.

The near disconnect between fertility and family planning as revealed through the present analysis calls for a comprehensive reinvigoration of family planning efforts in India. The family planning in the country needs to be remodelled as a family building strategy rather than a birth limitation intervention. The preoccupation of the country with limiting births to reduce fertility and control population growth has dictated family planning efforts, especially, official family planning efforts for almost 70 years. The country and most of its states and Union Territories have now achieved the replacement fertility so that the policy and programme impetus for reducing fertility through birth limitation no longer exists. Moreover, with the continued decrease in fertility, more and more births in the country are getting concentrated in the younger ages of the reproductive period. It is therefore necessary that family planning efforts in the country are aligned to the changing fertility scenario of the country. This need of the time has policy and programme implications as

the official family planning efforts are the mainstay of the delivery of family planning services in the country. It is now the high time that the official family planning efforts must be directed towards meeting family planning needs of couples rather than focussing on limiting births. This is a major challenge to planning and programming family planning services as family planning needs of couples are very diverse and dynamic.

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# Violence Against Women During Pregnancy in India: A Literature Review

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## Abstract

Violence against women is prevalent worldwide. Nearly 33 per cent of women have experienced any form of violence. This literature review aims to understand the magnitude of the problem through the review of existing literature. The paper is based on sixteen studies that satisfied the inclusion criteria. The PRISMA protocol has been followed to review the studies. We found that the prevalence of violence against women during pregnancy ranges from 7 per cent to 53 per cent in India. The prevalence of physical violence was found to be higher than that of other types of violence. Major risk factors for violence include alcohol use by the husband, illiteracy or low educational status of woman and husband, son preference, low or no social support, and history of miscarriage or abortion. Indian women who experience violence during their pregnancy are at higher risk of several negative health consequences for both the mother and the child. Effective interventions at both local and national level are needed.

## Introduction

Violence against women is a pervasive social issue and a challenging public health problem (García-Moreno et al, 2015; Ellsberg et al, 2015). It is a violation of fundamental human rights of women (Miller, 2004). Worldwide, 10 to 40 per cent women have experience of violence during their lifetime (Devries et al, 2013; Michau et al, 2015). It has serious consequences to the mental and social well-being of women (Coker et al, 2004; Ludermir et al, 2010; Hossieni et al, 2017). A systematic review suggests that women in South-East Asia are at a higher risk of experiencing partner violence during their lifetime than their counterparts from Europe and the Americas (García-Moreno et al, 2013). In India, 15-55 per cent women experience any form of violence by their partner (Derakhshanpour et al, 2014; Hillis et al, 2016).

Violence against women during pregnancy has drawn scholarly attention only recently (Tavoli et al, 2016; Almeida et al, 2014). A few Indian studies have reported its prevalence and risk factors (Mahapatro et al, 2011; Das et al, 2013; Sarkar, 2013;

Jungari, 2021). The fourth round (2015-2016) of the National Family Health Survey (NFHS-4) collected, for the first time, information on violence against women during pregnancy. Evidence from the survey indicates that the prevalence of violence against women during pregnancy in the country was around 3.3 per cent. This evidence provides the impetus for the present discourse.

Factors associated with violence against women in general and during pregnancy in particular have been analysed through a multi-disciplinary perspective and studies have reported a diverse range of risk factors. These include gender bias (Ritter, 2021), lower social status of women (Go et al, 2003), alcohol use by the partner (Jeyaseelan et al, 2007; Wagman et al, 2018), place of residence (George, et al, 2016; Jungari, 2021), and patriarchal mindsets (Michalski, 2004; Das et al, 2012). Community-level factors such as cultural norms (Kalra and Bhugra, 2013; Chaudhuri et al, 2014) and dowry-related issues (Jeyaseelan et al, 2015) have also been identified. Other risk factors, which are particularly significant during pregnancy, include son preference (Dasgupta and Fletcher, 2018; Weitzman, 2019), history of previous violence (Finnbogadóttir et al, 2014; Jungari and Chinchore, 2022), justification of violence (Begum et al, 2015), and couple having more than 3 children (Jungari and Chinchore, 2022). There is, however, dearth of scholarly work that uses qualitative data. Moreover, the dynamic nature of the phenomenon requires continuous study to understand both risk factors and their consequences.

Some studies have also provided evidence of dangerous consequences of intimate partner violence during pregnancy for both the mother and the child. Women who experience violence during pregnancy are less likely to utilise basic maternal health care services (Koski et al, 2011; Sakkar, 2013; Gebrezgi et al, 2017). They are less likely to be birth-prepared and more likely to breastfeed their newborn (Shroff et al, 2011; Laura et al, 2018). They experience antenatal and postpartum depression (Nayak et al, 2010; Halim et al, 2017). Women experiencing violence during their pregnancy are more likely to have poor mother-child bonding than women who do not experience violence during pregnancy (Muzik et al, 2013). Chances of neonatal and perinatal mortality are also high in these women (Ahmed et al, 2006; Alhusen et al, 2014).

Most of the studies have reported a significant association of violence during pregnancy with negative maternal and child health outcomes such as premature labour, miscarriage, and low birth weight (Muthal-Rathoreetel et al, 2002; Ludermir et al, 2010; Mahapatro et al, 2011; Sarkar 2013; Silverman et al, 2016; Dhar et al, 2018). Women who have experienced violence have reported more symptoms of gynaecological morbidities and mental health problems than those who did not (Jejeebhoy et al, 2010; Kumar, et al, 2013). Victims of violence during pregnancy have also reported injuries (Spiwak et al, 2015). Violence against women not only affects individual health and well-being but also the economic status of individuals, families, and communities. Studies have also shown evidence related to lost wages due to violence (Cadilhac et al, 2015), higher cost of medical care of violence injuries and trauma and hence greater economic burden on both the individual and the system. In many cases, violence against women

has even led to separation and divorce with adverse consequences for children (Fleury et al, 2000).

The help seeking behaviour of South Asian women has also been found to be poor because of the pervasive gender inequalities, lack of formal support systems and social stigma (Leonardsson and San Sebastian, 2017). Women tend to tolerate the violence for longer duration, which have significant psychological consequences. Although, a few studies from India have reported help seeking by women, yet help is mostly sought by the victim from a family member or friend instead of those in authority, specifically a healthcare provider (Jejeebhoy et al, 2013). The dangerous consequences of violence during pregnancy call for immediate attention of government programmes to promote interventions for reducing violence and minimising its consequences. To our knowledge, till date, there is no systematic review of India-specific studies on the issue of violence during pregnancy. To address this gap, this review attempts to present the perspective of violence during pregnancy in pregnancy in India during the last fifteen years as revealed through various studies that have been carried out within the country.

## Methods

### Inclusion Criteria

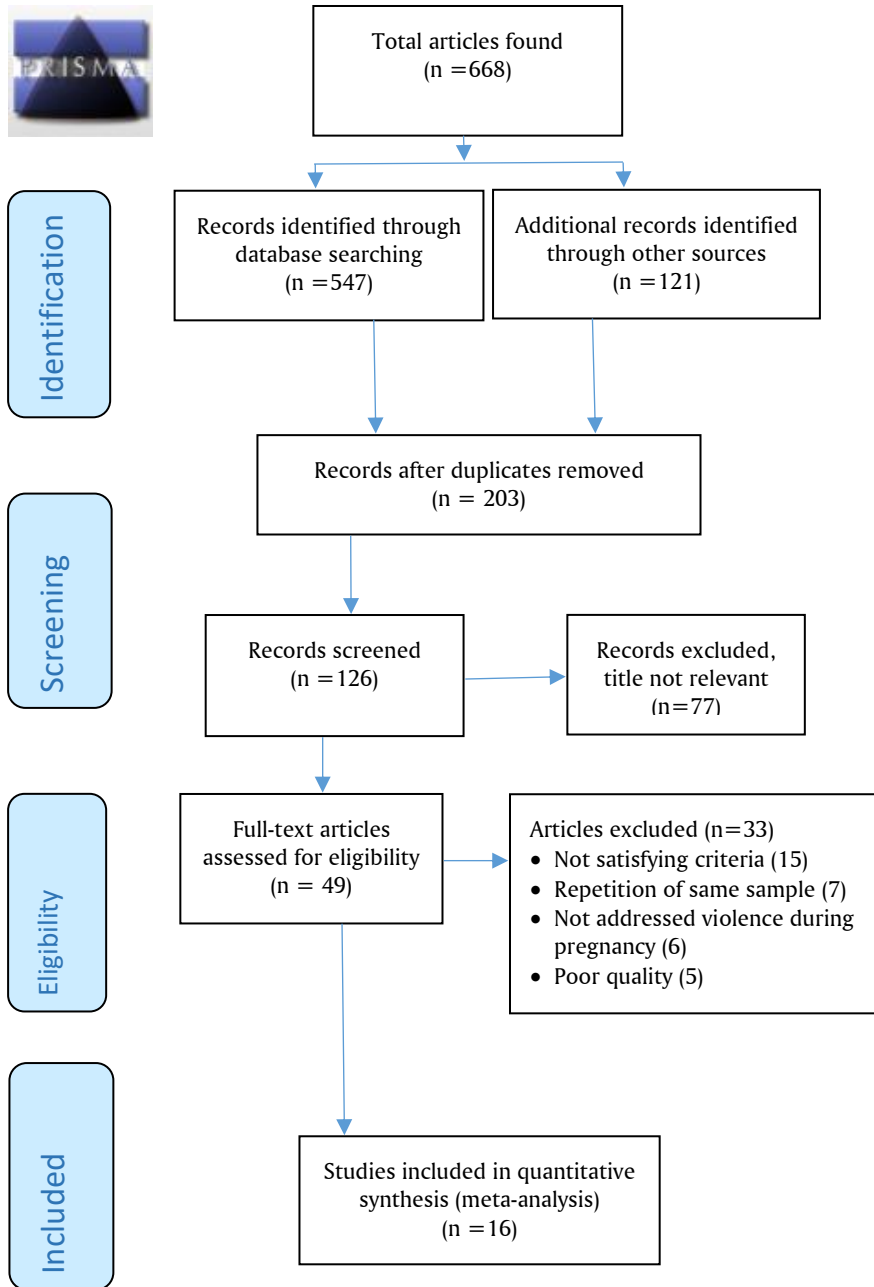
The present paper has used a systematic review design to identify, estimate, assess, and synthesise primary research on violence against women during pregnancy and during the postpartum period. The selection of the studies for inclusion in the systematic review was based on the following inclusion criteria:

- Primary studies that have estimated the prevalence of violence during pregnancy in India.
- Studies that have been published in English only. Studies published in other languages have been excluded.
- The studies that have been published between the years 2004 and 2020.

### Data Sources and Literature Search

For the selection of the studies for the review, different electronic databases were first searched for all studies, published during 2004 through 2020. These included PubMed, MedLine, PsycINFO, Scopus, Web of Science and Google Scholar. Various terms were used to identify more relevant studies based on the inclusion criteria. The following free text terms and MeSH terms were used in the search: violence during pregnancy; intimate partner violence; spousal violence; wife beating; spousal beating; domestic violence; types of violence; violence and pregnancy outcomes; gender preference and violence; violence during and after pregnancy; and factors triggering violence in pregnancy. In addition, some regional journals which are not included in the electronic databases were also searched.

Figure 1: PRISMA flow chart process of studies included in the review



## Screening Strategy and Quality Appraisal

Two of the authors extracted data from selected research papers independently following two-stage screening process. The first stage involved screening of the titles and the abstract to see if the study met the inclusion criteria. Selected studies were then appraised for their methodological quality using “Guidelines for Evaluating Prevalence Studies” (Boyle, 1998). The lead author rated the methodological quality of each study based on total quality score (Table 1).

## Data extraction

Data from all included studies were extracted using Microsoft excel spreadsheet. Data included measures used, authors of the study, year of publication, study design and sampling method, sample characteristics, study tool, estimated prevalence of violence, risk factors, and reported perpetrators. If there was disagreement among authors, the same was resolved through discussion. If there was more than one publication of similar nature, the more accurate and recent was retained.

## Data synthesis

Given the heterogeneity of the data, results of the review have been synthesised using narrative analysis. Narrative analysis is useful for understanding the findings of diverse studies on the same topic.

## Methodological issues and challenges

The review found that the prevalence of violence against women during pregnancy in the studies reviewed ranged from 1 to 60 per cent. Different forms of violence were reported in different studies. These variations may be attributed to different definitions of violence adopted by different studies and different methodologies used to collect data.

Each study used a different reference period. Some studies reported violence during the last pregnancy or during one month prior to the study. Others referred to any kind of violence that woman experienced during pregnancy. These differences posed significant challenges in comparing prevalence. In addition, high probability of underreporting of violence, particularly sexual violence, has influenced the accuracy of the prevalence estimates. Lastly, different studies used different study designs and sampling methods to collect the data which made meta-analysis more difficult.

## Results

The literature search identified total 668 studies, around 547 from search engines and 121 from other sources (Figure 1). After removing duplicate records, 203 studies were retained for further analysis, out of which 126 studies were retained initially as the title and the abstract of 77 studies did not satisfy the inclusion criteria

and so were excluded. The remaining 49 studies were assessed for the eligibility and 33 studies were excluded because they either did not satisfy the selection criteria or were repetition of the same sample or they did not address violence during pregnancy or were of poor quality. Finally, 16 studies were retained for the review. Figure 1 describes the complete review process.

All the studies included in this review examined the violence perpetrated against pregnant women during their latest (or the last) pregnancy. A few studies also reported violence experienced by women in all pregnancies that they had. Twelve studies used cross-sectional design (Peedicayil et al, 2004; Mahapatro et al, 2011; Raj, et al, 2011; Bontha and Kar, 2012; Das et al. 2013; Salvi et al, 2014; Supraja et al 2016; Silverman et al, 2016; Ramalingappa et al, 2018; Garg et al, 2019; Priya Aditya et al, 2019; Jungari and Chinchore, 2022); three adopted prospective study design (Koski et al, 2011; Khosla et al, 2005, Jain et al, 2016); and one used an experimental design with a pre- and post-test components (Arora et al, 2019). The duration of studies ranged between 3 months (Salvi et al, 2014) to one year or more (Ramalingappa et al, 2018; Khosla et al., 2005; Supraja et al, 2016).

The studies included in this review used different data sources and different analytical tools to analyse the violence against women during pregnancy. Some studies used data from the National Family Health Survey (Jungari, 2021; Koski et al, 2011; Mahapatra et al, 2011). Other studies were based on primary data collected specifically for the purpose (Peedicayil et al, 2004; Kosala et al, 2005; Raj et al, 2011; Babu & kar 2012; Salvi et al, 2014; Jain et al, Silverman et al, 2016; Suparja et al, 2016; 2017; Ramalingappa et al, 2018; Arora et al, 2019; Garg & Rustagi, 2019; Priya Aditya et al, 2019). Some studies used the Violence Assessment Screen Box (Arora et al, 2019; Kosala et al, 2005; Jain et al, 2016; Ramalingappa et al, 2016) to analyse the violence against women during pregnancy. Others used a questionnaire developed by the Demographic and Health Survey Program in which IPV is defined according to the World Health Organization multi-country study norms (Das et al, 2013; Jungari and Chinchore, 2022). One study included Prospective Assessment and Maternal Mental Health Study (Supraja et al, 2016). Another study included four different tools for collecting responses about different violent behaviours faced by pregnant women in the third trimester of their pregnancy. The study carried out by Supraja et al (2016) also included Gender Preoccupation Questionnaire, Daily Hassles and Stress Scale, Perinatal Anxiety Stress Scale and Violence Assessment Questionnaire developed by the Indian Council of Medical Research.

In studies which are based on primary data, the sample size ranged from 165 (Priya Aditya et al, 2019) to 14507 (Mahapatro et al, 2011). Some of the studies used probability proportional to size sampling method to select the sample (Mahapatra et al, 2011; Peedicayil et al, 2004). Among the five studies that reported different sampling methods, two employed simple random sampling (Peedicayil et al, 2004; Salvi et al, 2014; Jungari and Chinchore, 2022); two employed multistage sampling procedure to select the sample (Mahapatra et al, 2011; Babu and Kar, 2012).



Table 2: Quality appraisal checklist for including studies in the review

Authors and Year	Clearly defined target population	Use of probability sampling	Characteristics of respondents match those of the target population	Standardization of data collection method	Survey instruments are		Features of sampling design are accounted for in the analysis	Results include CI for statistical estimates	Score
					Reliable	Valid			
Peedicayil et al, 2004	Y	Y	Y	Y	Y	Y	Y	Y	8
Khosla et al, 2005	N	N	N	Y	Y	Y	N	Y	4
Mahapatro, 2011	Y	Y	Y	Y	Y	Y	Y	N	7
Koski et al, 2011	Y	Y	Y	N	Y	N	Y	Y	6
Raj et al, 2011	Y	Y	Y	Y	Y	Y	Y	N	7
Bontha and Kar, 2012	Y	Y	Y	Y	Y	Y	Y	Y	8
Das et al, 2013	Y	Y	Y	Y	Y	Y	Y	Y	8
Salvi et al, 2014	Y	Y	N	Y	Y	Y	N	Y	6
Supraja et al, 2016	N	N	Y	Y	N	N	N	Y	3
Silverman et al, 2016	Y	Y	Y	Y	Y	Y	Y	Y	8
Jain et al, 2017	N	N	Y	N	Y	Y	N	Y	4
Ramalingappa et al, 2018	N	N	N	Y	Y	Y	Y	Y	5
Garg et al, 2019	Y	N	N	N	N	N	Y	Y	3
Arora et al, 2019	Y	Y	N	Y	N	N	Y	N	4
Priya Aditya et al, 2019	Y	Y	Y	Y	Y	Y	Y	Y	8
Jungari and Chinchore, 2022	Y	Y	Y	Y	Y	Y	Y	Y	8

Note: Y = yes (indicates that the selection criteria were met); N = no (indicates that the criteria were not met)

Table 3: Summary of the studies included in the review

Author(s) and Year	Study aims and objectives	Study design and sampling technique	Sample characteristics	Measurement tools used	Prevalence of violence during pregnancy	Risk factors of violence during pregnancy	Perpetrators of violence during pregnancy
Peedicayil et al, 2004	To determine the prevalence of physical violence during pregnancy and the factors associated with it	Cross sectional probability sampling	Total 9938 married women of 15-49 years of age and having child less than 18 years old were interviewed at their residence	Study-specific tool with sections on six physical abuse behaviours	13 per cent during pregnancy and 13 per cent lifetime prevalence	Husband drunk, low education of women, 3 or more children, no social support, crowded household	Intimate partner
Khosla et al, 2005	To study incidence of domestic violence in pregnant north Indian women and factors which put women at higher risk	Prospective study	A total of 991 women were interviewed in the antenatal and labour ward of the Government college, Delhi	Study-specific tool derived from the abuse assessment screen	28.4 per cent	Low education of husband, alcoholism, addiction, lack of social support,	Intimate partner, husband's mother, and sister
Mahapatro et al, 2011	To study prevalence of different forms of domestic violence during pregnancy, its impact on women's health.	Cross section population-based multi-centre study	14,507 married women and 14,108 married men from 18 states of India were selected as sample for study	Interview schedule and semi-structured questionnaire	Psychological violence 63 per cent, physical violence, 26 per cent sexual violence, 22 per cent	Son preference	Husband, in-laws

Author(s) and Year	Study aims and objectives	Study design and sampling technique	Sample characteristics	Measurement tools used	Prevalence of violence during pregnancy	Risk factors of violence during pregnancy	Perpetrators of violence during pregnancy
Koski et al, 2011	To measure estimates of physical violence during pregnancy and its association with uptake of prenatal care in rural India.	Prospective study using two-stage sampling procedure	The women (15-39 years) in NFHS 1998-99 having at least one birth and 2002-2003 follow-up survey.	Survey instrument of NFHS-2 and follow-up survey tool with section on domestic violence.	22.8 per cent physical violence	No specific factors were mentioned	Intimate partner
Raj et al, 2011	Association between domestic violence and poor maternal and infant health concerns.	Cross sectional study	Primary data from 1,038 mothers seeking immunisation of infants	Study specific tool	44.7 per cent experienced violence during their last pregnancy	No specific factors highlighted	Husband, mother-in-law, father-in-law
Bontha and Kar, 2012	To examine experiences of physical, psychological and sexual domestic violence on pregnant women.	Cross-sectional study multistage sampling technique	1525 married women up to 50 years age. Samples were drawn from selected households in three eastern states of India.	Study-specific tool with sections on demography data and experience of violence during recent pregnancy.	Physical violence 7.1 per cent, psychological violence 30.6 per cent, sexual violence 10.4 per cent. Any Violence 34.7 per cent.	Urban living, higher maternal age, husband alcoholism, pressure for male child, salaried job	Intimate partner

Author(s) and Year	Study aims and objectives	Study design and sampling technique	Sample characteristics	Measurement tools used	Prevalence of violence during pregnancy	Risk factors of violence during pregnancy	Perpetrators of violence during pregnancy
Das et al, 2013	To explore prevalence of different forms of violence and their experience opinion on justifiability of wife beating.	Cross sectional study	2139 respondents were interviewed from 48 slum clusters of Mumbai. After confirming birth of the child, postnatal interview after 6 weeks of delivery.	Study-specific tool	Any violence 15 per cent, physical violence 12 per cent, sexual violence 2 per cent. psychological violence 8 per cent	husband consumed alcohol, women belonged to poor families, history of miscarriage, Muslim families	Intimate partner
Salvi, et al., 2014	To study the magnitude of physical domestic violence during pregnancy and risk factors in women who delivered at hospital,	Cross sectional study using simple random sampling method.	404 women who delivered at a general hospital.	Study specific tool with the section on history of domestic violence during the current pregnancy	Physical violence 9.15 per cent	Alcoholic husbands, urban residents, poverty, women with married life of less than 1 year	Husband, in-laws, neighbours
Supraja, et al, 2016	To study factors related to gender preference and pressure to have a male child and to examine prevalence of violence pregnancy	Cross sectional, sample selection method not specified	436 women in the second trimester of pregnancy, interviewed at the antenatal clinic of a government hospital.	Study specific tool and ICMR violence assessment questionnaire	6.9 per cent	No specific factors highlighted	Intimate partner, in-laws

Author(s) and Year	Study aims and objectives	Study design and sampling technique	Sample characteristics	Measurement tools used	Prevalence of violence during pregnancy	Risk factors of violence during pregnancy	Perpetrators of violence during pregnancy
Silverman et al, 2016	To determine prevalence of non-violent, gender-based forms of maltreatment of women by husband and in-laws during pregnancy and post-partum period	Cross sectional study	1061 women aged 15-35 years seeking immunisation for their infants less than six months of age		10.9 per cent	No specific factors were highlighted	GBHM; Intimate partner, in-laws
Jain et al, 2017	To determine the prevalence and types of intimate partner violence during pregnancy, factors -linked with intimate partner violence and effects of intimate partner violence on maternal-foetal outcomes	Prospective observational study	400 women at 20-28 weeks of pregnancy attending the outpatient clinic	Violence assessment screen box, and study specific tool	Any violence 12.3 per cent, physical 10 per cent, sexual 1.8 per cent, psychological 10.7 per cent	desire for a son, low socioeconomic status, low education level of intimate partner, partner addiction	Intimate partner

Author(s) and Year	Study aims and objectives	Study design and sampling technique	Sample characteristics	Measurement tools used	Prevalence of violence during pregnancy	Risk factors of violence during pregnancy	Perpetrators of violence during pregnancy
Ramalingappa et al, 2018	To determine the prevalence of violence during pregnancy and adverse maternal and perinatal outcomes	Cross-sectional	800 pregnant women above 34 weeks of gestation (third trimester) interviewed in labour ward of hospital	Abuse assessment screen including types of physical, sexual, and emotional violence	Any violence 52.8 per cent, physical 30.8 per cent, Sexual 23.8 per cent, psychological 46 per cent	Presence of medical and obstetric complications, presence of risk factors	Intimate partner, marital/cohabiting partner, parents, siblings, acquaintances
Garg et al, 2019	Magnitude of domestic violence and its various subtypes, experienced by pregnant women in Delhi and associated socio-demographic factors.	Cross-sectional, hospital-based study	A consecutive sampling method was used in a sample of 1500	Pre-tested semi-structured interview schedule, administered by trained staff	Any violence 29.7 per cent, physical 26.9 per cent, sexual violence, 33.2 per cent, psychological violence 79.1 per cent	Caste, Hindu religion, no education of women, husband unemployment	Husband
Arora et al, 2019	To assess the effectiveness of a counselling intervention in antenatal care settings for pregnant women who report domestic violence.	Pre-experimental study with pre-test, post-test design. Hospital based study	2778 pregnant women accessing antenatal care were approached; 2515 women consented		Any violence during pregnancy 16.2 per cent	No specific factors highlighted	Husband

Author(s) and Year	Study aims and objectives	Study design and sampling technique	Sample characteristics	Measurement tools used	Prevalence of violence during pregnancy	Risk factors of violence during pregnancy	Perpetrators of violence during pregnancy
Priya Aditya et al, 2019	To explore association with socio-demographic and pregnancy related attributes among antenatal females of an urbanized village of Delhi.	Cross-sectional	165 pregnant women	HITS scale	23 per cent of women had experienced violence during pregnancy	Educational status of head of the family and husband, substance abuse by husband, history of previous abortions.	Husband
Jungari and Chinchore, 2022	To examine the perception, prevalence and factors affecting violence during pregnancy in Pune Slums	Cross sectional community-based study, Simple random sampling	500 recently delivered women from slum communities of Pune city has been recruited for this study.	WHO multi-country questionnaire	Any violence 15.6 per cent, physical 9.2 per cent, sexual 1.8 per cent, psychological 11.2 per cent	Husband alcohol use, justification of violence, history of violence, education women, husband education, 3 or more children	Intimate partner

Source: Authors

Table 4: Different types of violence against women during pregnancy and their prevalence as reported by different studies

Author(s) and year	Type of abuse reported			
	Physical	Sexual	Psychological	Any violence
Peedicayil et al, 2004	-	-	-	13.0
Khosla et al, 2005	-	-	-	28.4
Mahapatro et al, 2011	26.0	22.0	63.0	-
Koski et al, 2011	22.8	-	-	22.8
Raj et al, 2011	-	-	-	44.7
Babu and Kar, 2012	7.1	10.4	30.6	34.7
Das et al, 2013	12.0	2.0	8.0	15.0
Salvi et al, 2014	-	-	-	9.15
Supraja et al, 2016	-	-	-	6.9
Silverman et al, 2016	-	-	-	10.9
Jain et al, 2016	10.0	1.8	10.7	12.3
Ramalingappa et al, 2018	30.8	23.8	46.0	52.8
Garg, et al, 2019	26.9	33.2	79.1	29.7
Arora et al, 2019	-	-	-	16.2
Priya Aditya et al, 2019	-	-	-	23.0
Jungari and Chinchore, 2022	9.2	1.8	11.2	15.6

Source: Authors

Out of the 16 studies, nine were conducted in hospital settings with sample size ranging from 400 to 836 (Khosla et al, 2005; Raj et al, 2011; Das et al, 2013; Salvi et al, 2014; Supraja et al, 2016; Silverman et al, 2016; Jain et al, 2017; Ramalingappa et al, 2018; Arora et al, 2019) while seven used household survey with sample size ranging from 1525 to 83397. Most of the studies were conducted in urban settings. They do not provide useful insights into the prevalence of violence against women during pregnancy in the rural areas. The summary results of the 16 studies are presented in Table 2.

### Prevalence of violence during pregnancy

The prevalence of any type of violence against women during pregnancy is found to range from 6.9 per cent (Supraja et al, 2016) to 52.8 per cent (Ramalingappa et al, 2018). Seven studies have reported that the prevalence of violence against women during pregnancy is less than 15 per cent. The prevalence of physical violence ranges from 7.1 per cent (Babu and Kar, 2012) to 30.2 per cent (Ramalingappa et al, 2018). Most of the studies have reported the prevalence of physical violence is more than 10 per cent. Prevalence of sexual violence ranged from 1.8 per cent (Jungari and Chinchore, 2022) to 33.2 per cent (Garg et al, 2019) with four studies reporting prevalence of more than 10 per cent. Psychological violence ranged from 8.0 per cent (Das et al, 2013) to 79.1 per cent (Garg et al, 2019) but majority of the studies reported prevalence of more than 20 per cent. All studies except one (Mahapatro et al, 2011) reported violence against women during pregnancy. Seven studies reported three specific types of violence against women during pregnancy (Mahapatro et al, 2011; Babu and Kar, 2012;



Das et al, 2013; Jain et al 2016; Ramlingappa et al, 2018; Garg, et al, 2019; Jungari and Chinchore, 2022). Details about different types of violence against women during pregnancy reported by different studies are provided in table 3.

### Risk factors of violence during pregnancy

The low educational status of women has been found to be a significant risk factor in the violence against women during pregnancy (Peedicayil et al, 2004; Khosla et al, 2005; Jain et al, 2017; Priya Aditya et al, 2019; Jungari and Chinchore, 2022). Women from the lower social class – Scheduled Castes and Scheduled Tribes and women not earning an income faced higher odds of violence against them during pregnancy as compared to other women (Garg, et al, 2019). Most of the studies have reported that use of alcohol by their husband (or partner) was the major risk factor in violence against them during pregnancy (Peedicayil et al, 2004; Khosla et al, 2005; Bontha and Kar, 2012; Das et al, 2013; Salvi et al, 2014; Jain et al, 2017; Priya Aditya et al, 2019; Jungari and Chinchore, 2022). Two studies have reported that women having three or more children faced higher risk of violence during pregnancy compared to women having less than three children (Peedicayil et al, 2004; Jungari and Chinchore, 2022). On the other hand, two others have reported that son preference was the main reason (Mahapatro et al, 2011; Jain et al, 2017). Women with a history of miscarriage or abortion (Das et al, 2013; Priya Aditya et al, 2019), pregnancy complications (Ramalingappa et al, 2018); and those married for a short period (Salvi et al, 2014) were also at higher risk of violence during pregnancy. Other risk factors that have been reported in the studies reviewed include higher maternal age (Bontha and Kar, 2012) and low social support (Peedicayil et al, 2004; Khosla et al, 2005). On the other hand, five studies did not report any specific risk factor attributed to violence against women during pregnancy.

## Discussion

This literature review is, to our knowledge, the first to focus upon the violence against women during pregnancy in India. There are many literature reviews that have focused on the broad topic of violence against women (Kalokhe et al, 2017; Halim et al, 2018; Jungari et al, 2022). Studies that have focused on the violence against women during pregnancy have indicated that violence against women during pregnancy in India is a reality and a challenging reproductive health issue. The presented study has attempted to compile and collate the evidence on the prevalence of violence against women during pregnancy and factors that contribute to the reported violence.

Estimates of the prevalence of violence against women during pregnancy, as revealed from different studies reviewed, has been found to vary widely presumably because of the differences in the definition of the violence against women during pregnancy and variation in the study design. Physical abuse has been reported to be the most frequently reported form of violence against women during pregnancy. The findings of this review are in consonance with reviews of violence in the developing

countries (Hill et al, 2016; Orpin et al, 2017; Jamieson, 2020). This review provides the compelling evidence that violence against women during pregnancy is a reality in India and there is a need of immediate action by the Government and all stakeholders to prevent this form of violence against women.

The key risk factor of the violence against women during pregnancy appears to be the use of alcohol by the husband. Other studies conducted in other parts of the world have also reported similar findings (Jeyaseelan et al, 2007; Wagman et al, 2018; Jungari and Chinchore, 2022). Lack of education or low education levels of either woman or her husband or both, irregular or no income, and son preference are also risk factors that increase the risk of violence against women during pregnancy.

The role of healthcare personnel in helping the victims of violence, particularly during pregnancy, has been the subject of debate (García-Moreno et al, 2015). Healthcare providers have first-hand opportunity to attend the victims of violence to provide treatment and to prevent further violence. However, many healthcare providers are not aware of how to deal with the victims of violence. The studies included in this review also highlight the lack of focus on the role of healthcare providers in responding to the needs of the victims of violence.

Most studies included in this review—nine out of sixteen—were conducted in a hospital setting. Their findings, though significant, may not necessarily be representative of the larger population and hence there is a need for more studies in non-hospital settings to fully understand the extent and nature of violence experienced by women during their pregnancy. There is an urgent need to conduct community-based studies in varied social, economic, and cultural settings - rural, urban, peri-urban, tribal and remote – to understand the context of violence against women during pregnancy. This is necessary because the behaviour of the people is very likely to be different in different settings which may significantly affect the nature and extent of violence inflicted on women during pregnancy.

The present review calls for innovative programmes and interventions for preventing violence against women during their pregnancy. Good practices to prevent violence against women during pregnancy that are being followed in other countries may be assessed for adaptation to the Indian context. It is also suggested that such interventions should be first implemented on a pilot basis to test their operational feasibility in the Indian context and only then should be scaled up to cover the entire country. There is also a need to institutionalise programmes and activities with children as targets to instil gender egalitarian attitudes at an early age. Such programmes and activities can ride on different community mobilisation schemes that are being implemented in the country. Educating partners about the importance of proper care and support during pregnancy and raising awareness about pregnancy-related complications are also some of the actions that have been found to have the potential to reduce episodes of violence against women during pregnancy if not eliminate them completely. Continuous monitoring of the condition of the victims of violence and creating a data base of women who experience violence during pregnancy

may help in designing and refining prevention strategies. Real-time data will be of immense value for policy makers, law enforcement officials, programme managers and service providers.

Research is also needed to understand factors that contribute to violence against women during pregnancy. Studies, in this direction should adopt diverse methodologies, including mixed-method approaches. Community-based studies may help in gaining valuable insights into the underlying causes of violence against women during pregnancy. Longitudinal studies may also be required to understand how violence against women during pregnancy begins and how it progresses with the progress of pregnancy. It is also important to analyse the consequences of the violence during pregnancy after delivery, during post-partum. The focus of these studies should be on the rural areas as most of the existing studies on the violence against women during pregnancy are confined to urban areas.

## Conclusion

The present review provides ample evidence to conclude that violence against women during pregnancy is a compelling issue in India that requires appropriate attention to address. The review also identifies different types of violence and their predictors. The review suggests that physical, and psychological violence is more common as compared to the sexual violence. Main risk factors of violence against women during pregnancy are alcohol use by the husband, lack or low level of education, son preference, and lack of social support for women. History of abortion has also been found to be an important factor. Continuous monitoring of the condition of the victims of the violence and creating a data base of women who have suffered from violence during pregnancy will help in the designing and refining prevention and mitigation strategies. The present review calls for an innovative approach of planning and programming for preventing and mitigating the violence against women during pregnancy. Good practices being followed in other countries may be assessed for adaptation to the Indian context. It is also suggested that such interventions should first be implemented on a pilot basis to test their operational feasibility in the prevailing social, economic, and cultural context and only then they should be scaled up to cover the entire country. Real-time data on the violence against women during pregnancy would be of immense value for policy makers, law enforcement officials, programme managers and service providers. Immediate efforts are required from the government and the non-government organisations in this direction.

## Limitations

This review does not cover studies that have been published in languages other than English. It is possible that some important studies, which are not published in English are, therefore, missed. Another notable limitation is that only quantitative

studies have been considered and, therefore, qualitative studies highlighting underlying causes of violence against women during pregnancy are excluded.

Studies reviewed here have adopted different definitions, measurement methods and reference periods leading to lack of uniformity in reporting results and associated discussions. Studies reviewed here cover selected areas only and have adopted cross-sectional study design because of which it is not possible to understand in which trimester of the pregnancy, the woman is at the highest risk of violence.

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## Book Review

# Decline and Prosper! Changing Global Birth Rates and the Advantages of Fewer Children by V Skirbekk

Frank Götmark

A recently published book by the productive demographer Vegard Skirbekk has the commendable title “*Decline and Prosper!*” (Skirbekk, 2022). It is a valuable resource, presenting much research on fertility around the world. The book also raises questions about how to deal with high fertility and population growth in many countries.

The book has the sub-title “*Changing global birth rates and the advantages of fewer children.*” It is refreshing to see such a title after several alarmistic, one-sided books on the subject, like “Empty planet: the shock of global population decline” (Bricker et al, 2020). On the last page of *Decline and Prosper!*, Skirbekk concludes, “It is my view that countries should accept – if not embrace – low fertility and focus on how to make the most of a world with fewer children.”

The focus of the book is on fertility (children per woman, birth rate) rather than population growth. The book reads partly like a textbook on demography, and the title is thus a bit misleading. However, Skirbekk makes clear that the literature on fertility per se is huge. The reference list runs over 139 pages. I have marked 124 references that I would like to check or read.

The book contains 20 chapters including an introduction. Each chapter is short but substantive and concludes with a sort of summary and list of references cited in the chapter. The book covers a range of issues related with fertility as is reflected through chapter headings:

- Chapter 2: Measuring fertility
- Chapter 3: How many children can humans have biologically?
- Chapter 4: Fertility from the dawn of humanity to the nineteenth century
- Chapter 5: Demographic transition: fewer deaths and eventually fewer births
- Chapter 6: Contemporary global fertility
- Chapter 7: The new have-nots: childlessness in the twenty-first century
- Chapter 8: More education: fewer children
- Chapter 9: An era of choice: childbearing has become more planned
- Chapter 10: Fertility preferences: how many children do people want?
- Chapter 11: Delaying parenthood, for better and for worse
- Chapter 12: Finding a mate: contemporary partnership and conception

- Chapter 13: Money matters: economics of fertility
- Chapter 14: Fertility in the aftermath of disaster
- Chapter 15: New times, old beliefs: religion and contemporary fertility
- Chapter 16: Contemporary fertility from an evolutionary perspective: are the fittest still surviving?
- Chapter 17: How low will it go? Projecting future fertility
- Chapter 18: Fertility, population growth, and population composition
- Chapter 19: Fertility policies: past, present, and future directions
- Chapter 20: Low – but not too low – fertility is a good thing

Skirbekk starts by introducing basic concepts and tools for measuring fertility that are needed to grasp the research. I, however, miss the concept of population momentum which, combined with high fertility, helps explain strong population growth in many countries, although this mechanism is dealt with briefly on page 333.

Overall, the book is quite focused on “the West” and low fertility. The book does not focus on high-fertility countries, although chapter 19 treats issues related to high fertility under the heading “What countries should be doing.” However, problems of high fertility get a third of a page while low fertility occupies almost two pages. Skirbekk repeatedly emphasises the tension between the “West” and the “South”, religion-linked population growth, and other global factors.

The author stresses that “The increase in education is probably the main reason why global fertility has decreased” and that “it appears to be the most effective way to reduce fertility without resorting to coercion.” This argument and its evidence are elaborated in chapter 8 where Skirbekk presents fertility-education relationships as causal. This is backed up by results from the so-called natural experiments. However, several recent studies are not cited here. A review on the role of education in low- and middle-income countries has concluded that the effect of education on fertility is weak (Psaki et al, 2019). Another study has examined both education levels and the strength of family planning programmes in shaping fertility in Sub-Saharan Africa and showed that family planning programmes had great influence on contraceptive use, combined with education of women (Bongaarts and Hardee, 2019). The findings of a model published in 2020 are also consistent with a strong role of family planning programmes in deciding the level of fertility (de Silva and Tenreyro, 2017).

The international family planning revolution took place over about 35 years (1960-1995) and several researchers have concluded that family planning programmes were important for the decrease in fertility in many developing countries (Robinson and Ross, 2007). A separate chapter covering family planning programmes and the impact of these programmes on fertility decline, therefore, would have been motivated. The book mentions family planning and its history only briefly in different chapters.

There is no doubt that education, especially secondary and tertiary education, helps reducing fertility, and there is evidence for this, but the key question is: “Is education the main factor in fertility decline?” The content of education may be critical, but as far as I know there exist no comprehensive quantitative study on this aspect.

There are many issues that should have been discussed while emphasizing the role of education in fertility decline. Is sex education included in the school curriculum? Does the school curriculum include aspects of gender roles and family size? Has teaching contraception been included in the curriculum, especial in developing and other countries? Where such teaching does exist, it has very rarely been linked to environmental aspects, even in a developed country like Sweden. I presume that voluntary family planning programmes, where they are successful, have included these and other related aspects.

Fertility and migration are discussed but this aspect deserves a separate chapter. There are many chapters in the book, where many interesting studies are mentioned, such as increase in migration-related conflicts, and influence of migration on elections in many countries. Moreover, in pre-modern societies, 27 per cent of newborns died in their first year of life, and 48 per cent died before attaining puberty (Page 41). As Christianity spread, monogamy replaced polygamy; pre- and extra-marital sex faced harsh penalties, even imprisonment (Page 44). Marriage and its social conditions, and early forms of contraception, contributed to reducing human fertility.

An interesting graph on page 92 illustrates how replacement fertility (a pre-condition to zero population growth) is related to the life expectancy at birth. When the life expectancy at birth is 30 years, the replacement fertility is 5 live births per woman of reproductive age; when life expectancy at birth is 50 years, the replacement fertility is 3 live births per woman of reproductive age; and when life expectancy at birth is 80 years, it is 2.1 live births per woman of reproductive age. Clearly, mortality is critical, and will remain so. In Europe, childlessness was common, even more common a hundred years ago than today as 20-30 per cent of women remained childless (Page 109). Between 1940 and 1979, childlessness increased from a low level, especially among the least educated men. Few people prefer to remain childless. This proportion is the highest, about 10 per cent, in (East) Germany, Austria and the Netherlands (Page 123). In most of the developing countries, this proportion is less than 5 per cent.

The complexities of finding a partner in the West, especially for women, received much attention in the book. Can the Internet offer help and affect fertility? In the United States, during 1999-2007, regions that got such access earlier had stronger decline in adolescent fertility, which was confirmed in Germany too, but, in addition, childbearing also increased among women aged 25 years and older in this country (Page 167). Women in Europe want more children than men do, while in poor countries the opposite is the case, according to surveys presented in the book. Television may be helpful in reducing fertility. The show *Shuga*, addressing safe sex and unwanted pregnancies, reached 40 African countries and up to 550 million viewers (Page 183). Many other interesting examples are given.

Chapter 13 discusses the role of economy in influencing fertility, and financial costs and benefits of having children. Skirbekk notes that the “dollar models” of Becker and other economists are partly unrealistic as 40 per cent of global pregnancies are unplanned. However, a subheading “It’s still the economy, stupid” in the chapter makes it clear that economy matters – people, and their fertility respond to changes in the

economy, and its implications. The dramatic drop in fertility in Eastern European countries after falling apart the Soviet Union could have been added as an example.

Skirbekk and colleagues have done important work in quantifying the association between religious affiliation and fertility levels. The findings reveal that globally, between 2010 and 2015, the average fertility of unaffiliated women was 1.7 births per woman of reproductive age while the average fertility for women affiliated with any religion was 2.6 births per woman of reproductive age (Pew Research Center, 2016). Moreover, average fertility was 1.6 births per woman for Buddhists; 2.4 for Hindus and Jews; 2.7 for Christians; and the highest (3.1 births per woman of reproductive age) for Muslims. In Sub-Saharan Africa, fertility is higher in Muslims than in Christians, according to a recent review (Turner, 2021). Across European countries, fertility in Muslims is 47 per cent higher than the national average, and the consequences are discussed and dealt with in several chapters.

Skirbekk emphasises that “low – but not too low – fertility is good” and mentions the environment in support of his argument. Ecosystems and wild nature do not get much attention, although the author describes the threat of population growth to biodiversity, natural environment, and climate conditions. This section could have been expanded, since ecosystems are critical for humans, not the least for food. Environmental ethics and the purpose of our lives could also have been discussed. Demographers often neglect environmental matters, but it is good to see that Skirbekk includes the threats and the need to “bend curves.”

Returning to family planning programmes in the nineteenth chapter of the book, Skirbekk describes their remarkable success in East Asia (Pages 359-63) and in Iran (Page 368). He states that historians have concluded that family planning also had an intention by the rich countries to reduce and control foreign populations. These delusions of historians, especially the influential professor Matthew Connelly who argues that “the West” (mainly the United States) conspired to force population control on the Third World are misleading (see Götmark, 2021). The demographer John Cleland (2008) has described Connelly’s book “Fatal Misconception” (Connelly, 2008) as “bizarre and fundamentally flawed” and remarked “To equate efforts to reduce population growth with coercion is to ignore the fact that most poor countries pursued clear demographic goals by entirely voluntary means.” We know of exceptions, especially coercion in China, which should be condemned.

Although human fertility is the focus of this book one must not forget the global population increase, which, according to 2022 projections prepared by the United Nations Population Division (United Nations, 2022), is likely to continue up to 2086 under the assumed decline in global fertility. Unfortunately, the 2030 Sustainable Development Agenda of the United Nations lacks a goal “Dampen Population Growth” which could have been valuable in realising the goals United Nations has set under its Agenda towards a more sustainable world. At present, population of only about 30 of the 200 large countries are decreasing (beside Japan, and European countries). The decrease in the population of Japan began in 2011 and its population has now decreased from 128 million in 2011 to 125 million today according to United Nations.

This means that there is no apparent problem for the economy or the environment of the country. Actually, some recent reviews argue that “ageing countries” and population decline are, overall, favourable for societies and for biodiversity (Götmark et al, 2022). In this context, I would have liked to see research on “optimal population” to be presented in Skirbekk’s book. What is the size of a global human population that can be supported sustainably without degrading the ecosystem on which the humanity depends? Assuming that all people had the standard of an average European, one study has calculated the optimal population of the world at 3.1 billion, less than half of the present 7.9 billion (Lianos and Pseiridis, 2016). A recent study, by the economist Partha Dasgupta (2019) also arrived at low estimates, ranging from 0.5 to 5 billion people that the Earth can sustain, depending on the standards of living and average income.

The book lacks an Index, making it hard to search for a subject or an author. References are listed after each chapter, which also makes it time-consuming to search for specific references (the e-book may therefore be better to buy). The text contains lot of data (numbers are given in the text). More data could have been provided in figures and in tables. The book contains 29 figures but no Tables.

There are very few typos in the book. It is well written, and easy to read. I recommend it to anyone interested in human fertility and demography.

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