Women Empowerment in India – A Perspective

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ABSTRACT

Background: The study presents an index of women empowerment based on a statistical technique of data reduction viz. factor analysis and provides an in depth analysis of states in India with respect to the National Family Health Survey-4 (NFHS-4) dataset.

Methods: The dataset on several indicators of women well being are selected from the dataset obtained from the Open Government Data platform (ODG) India. The items are statistically grouped to form component indices and subsequently the aggregative index of women empowerment. Positions of states are analyzed according to the scale of indices. Relationships between the components are also measured using correlation analysis.

Results: The factor analytic model identifies grouping in the data and also explains the variation among the indicators or the heterogeneity among the population to a great extent (73%). Women empowerment is divided into six factors or groups namely knowledge & education, general health & social status, family planning, fertility & access to health care services, economic independence & decision making, violence against women and addiction. The scores attached to each of the components are evaluated and presented for each state.

Conclusions: The study explains the importance of women empowerment in the light of the recently adopted sustainable development goals for 2030. The current scenario of Indian states in various socio economic, demographic and health indicators of well being of women will be useful in constructing strategies and plans regarding development.

Keywords: Women Empowerment**,** NFHS-4, sustainable development goals, aggregative index, factor analysis, correlation analysis

INTRODUCTION

Sustainable development goals (SDGs) were set in replacement of the millennium development goals ending its term in 2015. SDGs consists of 17 goals with 169 targets planned to address issues of social development all over the world[1,2].The goals cover a wide range of action areas which are barriers in global progress such as poverty, hunger, health, education, gender equality, water and sanitation etc. India is amongst the 193 countries of the UN General Assembly who adopted the development agenda titled "Transforming our world: the 2030 Agenda for Sustainable development" towards a sustainable nation. Policies recognizing the importance of SDGs to be implemented in simple and robust manner and strategic decisions for all inclusive achievement of targets are being taken in the national level.

Though SDGs have 17 distinct goals, they are inter-related as the overall progress of a nation is a cumulative impact of the development in all aspects of human life. Again the societal well being is determined by the social, economic, educational and nutritional status of women. The sustainable de-

velopment goal 5 is designed and dedicated towards the agenda viz. "Achieve gender equality and empower all women and girls". The goal 5 - "Gender Equality" has the targets for elimination of discrimination, violence, harmful practices against all women, recognizing unpaid care and domestic work, ensuring participation in decision making in political, economic and public life, ensuring access to sexual and reproductive health, inclusion of women in financial and technological resources, adoption of strong policies for gender equality in all levels.

The National Family Health Survey - 4[3] (NFHS-4) provides several indicators of women health and welfare. There are 114 different indicators encompassing broad spectrum of areas such as household profile, marriage and fertility, mortality, nutritional status, women empowerment etc. Present study includes a few important indicators of the total listing and creates an aggregative index which reflects the scenario of women development in India across different states. Indicators included in the study are synchronized with the targets which were adopted in UN Sustainable Development Summit 2015 by the world leaders for 2030. Importance of women empowerment in all aspect and relevance of the study are also discussed in Indian context. The study reflects the overall present situation of women in India and provides the future direction in achieving a sustainable nation.

MATERIALS AND METHODS

For a better understanding of the position of women in India, 30 developmental indicators are chosen from various fields in NFHS-4 questionnaire which are relevant to the targets set for women empowerment in sustainable development goals. The indicators are then grouped into five broad subgroups to ensure representativeness of the chosen items. Subgroups are identified in accordance with the agenda of sustainable development goal 5. Table 1 lists the indicators and also mentions the subgroups attached to it.

Table 1 shows indicators of women development included in the study (annexure 1).

The dataset contains the information on each indicator for each State/UTs of India (sample size = 37 for 37 states). All the indicators are made in the same direction, so that 'large' values are 'good', through replacement of the indicators taking values in opposite direction by [maximum of indicator value - indicator value]. Items reflecting percentage of experiencing violence, percentages of hypertensive and diabetic women, tobacco use etc are variables which are of opposite direction (i.e. 'small' values are 'good').The subgroups of variables are identified by the statistical technique of factor analysis[4]. The screen plots (Figure 1) of factors indicate that a 6-factor model will be sufficient (p-value < 0.05) for the provided information. Around 73% of the total variation among the variables is explained by six factors. Therefore, a six factor model identifying six subgroups is fitted to the data set where the number of subjects is 37 and the number of variables (items) is 30.
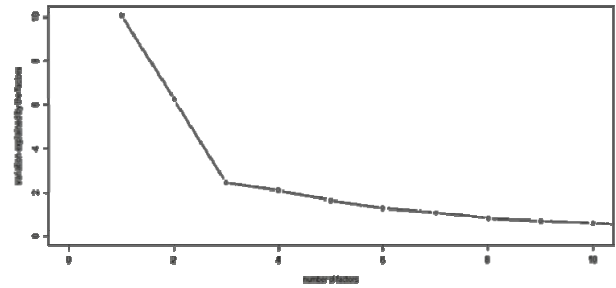
Fig 1: Score Plot showing the number of factors vs variation explained
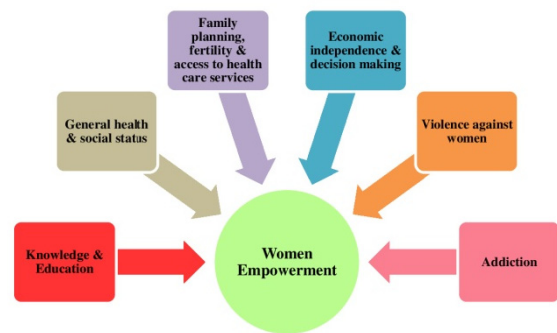
Figure 2: Subgroups of indicators for assessing women empowerment

A graphical display of the subgroups identified and the items belonging to the subgroups is shown in Figure 2. An aggregative index which reflects the current situation of women in all aspect mentioned in the Figure 2 is established by the following formula.

Standardization of observed values of each indicator = (Value – mean)/Standard deviation

Subgroup Index = Simple factor score = sum of standardized observed values with the signs of loadings of each variable on the factor.

The subgroups where number of indicators are less than 3, a simple aggregative index is calculated for them. If the observed standardized values of 30 indicators are denoted by X_1, X_2, ..., X_{30}, the calculation of indices in each subgroup for the data is as follows:

Index of Knowledge & Education=$X_1+X_4+X_5+X_{20}$

Index of General health & social status=X_2-X_3+X_6+ X_4- X_{15}+ X_{17}- X_{18}- X_{19}

Index of Family planning, fertility & access to health care services =X_7-X_8+X_9+X_{10}+X_{11}+X_{12}+X_{13}+ X_{14} + X_{28}

Index of Economic independence & decision making = X_{21} - X_{22}- X_{25} + X_{26} + X_{27}

Index of Violence against women= X_{23} + X_{24}

Index of addiction = X_{29} + X_{30}

Finally, the aggregative index of women empowerment is the average of all the segmented indices. Table 2 shows the indices values for different subgroups.

Table 2 shows components of women empowerment (annexure 2)

RESULTS

The indicators in a factor or subgroup are considered together as they are highly correlated to each other. Even there are some relationships between the subgroup of indices themselves. Index of Knowledge & Education and the index of Economic independence & decision making are highly correlated (correlation coefficient = 0.7). It is evident that economic independence of women and their participation in household decision making gets better if they are educated more. Also there is moderately high correlation (0.64) among the index of economic independence & decision making and index of Violence against women. It nullifies the common myth that economically dependent women who have no voice for any decision making in the household are only susceptible to violence against women.

The aggregative index of women empowerment is obtained for India and its states/UTs. It takes values within the range of approximately (-7, 8). Large positive values of the subgroup indices (and hence the aggregative index) indicates better situation of women in the respective field in that particular state/UT. Table 3 provides the positions of states

according to the components of women empowerment.

Based on the values of the aggregative index of women empowerment, India is segmented in low, moderate and high zone. Figure 3 illustrates the comparative position of states in this regard. Kerala, Goa, Mizoram exhibit maximum empowerment of women with respect to the index (5 standard deviations above the mean); whereas the minimum (5 standard deviations below the mean) is attained by Bihar and Rajasthan.

A closer look on the under developed states reveals (Figure 4) that Knowledge & Education plays a significant role in low women development in these states. Most of the components of women empowerment take values lower than the mean except for addiction. However, most of the states unveil a positive (equal or above the mean) standpoint with respect to women, an indispensable part of the population of India. Moreover, women in Bihar are significantly lacking in practicing family planning and seeking health care facilities.
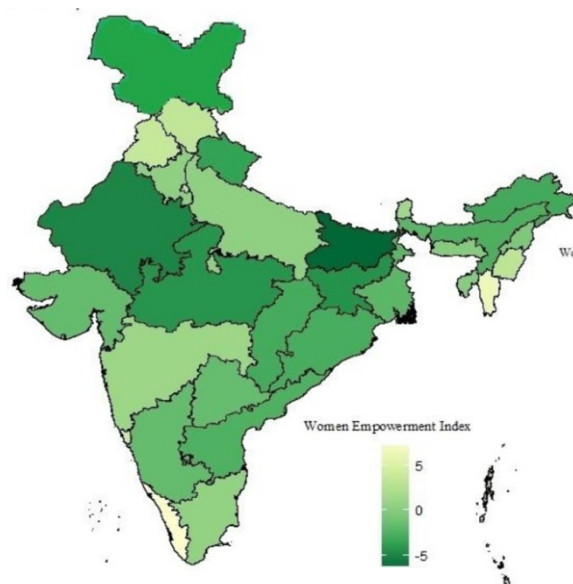
Fig 3: Women Empowerment Index in India

Table 3: Position of states according to the components of women empowerment (Large value is considered to be good)

Index components	Minimum	Maximum
Knowledge & Education	Bihar	Kerala
Index of General health & social status	Daman & Diu	Lakshadweep
Index of Family planning, fertility & access to health care services	Nagaland	Andhra Pradesh
Index of Economic independence & decision making	Bihar	Himachal Pradesh
Index of violence against women	Telangana	Sikkim
Index of addiction	Arunachal Pradesh	Punjab
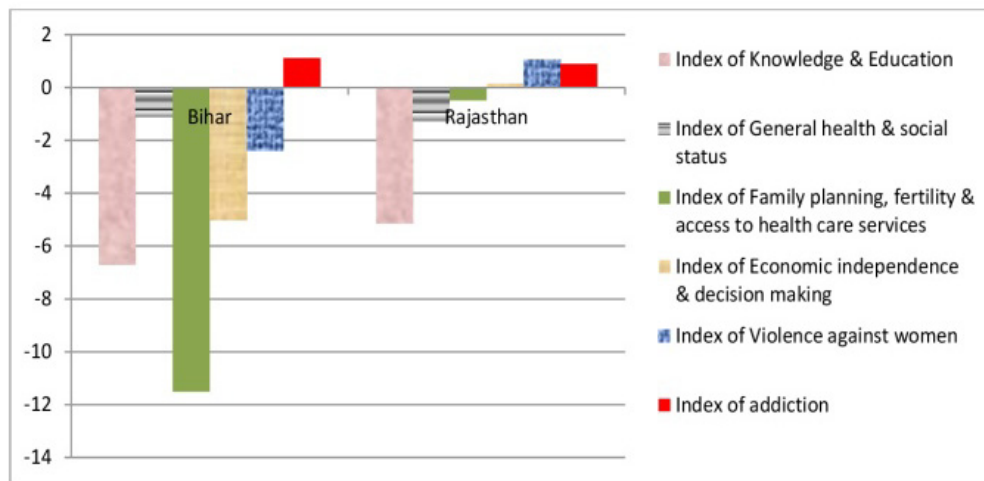
Fig 4: Components of Women Empowerment Index in Bihar & Rajasthan

DISCUSSION

The present study uses an innovative method of constructing index of women empowerment using a powerful technique of factor analysis; perhaps makes the index different from other composite indices in practice. The tool is very important in identifying unseen relationships in the data. The factor scores of individual states give a manifestation of a somewhat abstract idea of women empowerment. The indices, being measurable on a standardized scale, are easy to interpret and also capture the heterogeneity of the data to a great extent. That reflects the sufficiency of the indices to reflect the current situation of women. Factor analysis for identifying latent structure from the observed variables is generally suitable for large sample sizes. But it can also be a suitable tool for grouping items (states in this case) where the sample size is small[4]. The study attempts to address one of the most relevant issue of social development in connection with the SDGs adopted by the global leaders by using statistically well-built indices. The application of statistics in narration of the social issues and barriers involved in empowerment of women in India makes the study more robust.

India is a socio-economically and culturally diverse country and thus any developmental impact is also significantly different in the regions of the country. The recently adopted Sustainable Development Goals set target for global welfare in all aspect by 2030. Participation of India in this endeavour with several policies and schemes has been remarkable so far. Particularly, for gender based discrimination and inequality has been a focus area in the plans and strategies made in the policy level. Constitution of India recognizes the need for equality and rights of women in its preamble. After the advocacy of SDGs, one of the major steps towards the goal of gender equality is building the 'National

Policy for Women 2016- Articulating a vision for Empowerment of Women' by the Government of India[5]. It creates a framework for implementation of policies with identified priority areas health, education, economy, decision making, violence against women and environment. The present study analyses the welfare of women in these broad categories of priority post-SDG period[6] and also envisages the future well being of women in the states of India. Predominance of moderate to higher value of Women Empowerment Index is an indicator of enhancement in social and economic sphere of women life. The analysis of each component area for enrichment of women also provides an in depth knowledge into the matter.

Elementary education plays a pivotal role in the process of development in a nation. Implementation of Right to Education Act, 2009[7] ensures proper schooling and primary education to all children promoting an all inclusive cognitive development of a girl child in the adolescent level. Ensuring participation of girl children in seeking education will address the issues of illiteracy of women in India. Female friendly and less discriminatory attitude and environment of schools may have a positive impact on promoting growth in women. To ensure physical health of women, strategies and interventions regarding health care facilities are being implemented in district level. It is very important to make the beneficiaries aware of the health care system[8]. Empowerment also involves a hundred percent inclusion of all women in the reproductive age and all pregnant women in the health care delivery system irrespective of the social status of women. Uses of contraceptives in the family planning practice to control births (both spacing and limiting) are also being key factors for betterment of women. Another perspective of women empowerment is economic well being and participation in house-

hold decision making. Financial inclusion of women has been tremendous as 53% of women (NFHS - 4) are currently holding a bank account (compared to 15.1% in NFHS 3), nearly 40% of decadal growth. Status of a woman in her household can be measured by women participation in decision making, which is quite high in India being 84%. One of the most serious impediments to progress of women is violence against women[9]. Violence involved in marriage or fertility enforces women to inferior position compared with men. Sensitivity of the issue of violence against women is recognized as an important factor of creating barriers in development. Substance abuse in women is also considered in the index of women empowerment in the study. Though consumption of tobacco (6.8%) and alcohol (1.2%) is less in comparison with men, it can be one of the key constraints in women development[10,11] if remains uncontrolled.

Being on the second year of implementing sustainable development goals, there is a long pathway ahead of us towards the goal of making a prosperous nation by 2030. If togetherness is committed to make plans into actions, it is not too far to achieve the targets set by the nation in all respect including gender equality.

Limitations of the study and future research

The study only focuses on the National Family Health Survey- 4 (NFHS-4) data on different states of India and selects indicators for accomplishment of statistical segregation of women empowerment from the same. It may be possible to include developmental indicators selected from other surveys of national importance. The States may further be decomposed into districts and may be looked upon piecewise. It must be kept in mind that the factor analysis is only suitable when the number of variables is less than the sample size. Another potential research area would be forecasting of the indices values for the future decade. The impact of policies and strategies implemented in post-SDG period can only be identified after passing few years. The future prediction would also provide a manifestation of the 2030 agenda towards betterment in women condition in society. The authors will take up the work in future.

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Annexure 1: Table 1: Indicators of women development included in the study

Indicators	Subgroup
Population (female) age 6 years and above who ever attended school (%)	Knowledge &Education
Sex ratio of the total population (females per 1000 males)	General health & social status
Sex ratio at birth for children born in the last five years (females per 1000 males)	General health & social status
Women who are literate (%) (age 15-49)	Knowledge & Education
Women with 10 or more years of schooling (%) (age 15-49)	Knowledge & Education
Women age 20-24 years married before age 18 years (%)	General health and social status
Total fertility rate (TFR) (children per woman)	Family planning, fertility & access to health care services
Women age 15-19 years who were already mothers or pregnant at the time of the survey (%)	Family planning, fertility & access to health care services
Current Use of Family Planning Methods (currently married women age 15–49 years) - Any method (%)	Family planning, fertility & access to health care services
Any modern method (%)	Family planning, fertility & access to health care services
Total unmet need (%)	Family planning, fertility & access to health care services
Unmet need for spacing (%)	Family planning, fertility & access to health care services
Maternity Care (for last birth in the 5 years before the survey) - Mothers who had full ante-natal care (%)	Family planning, fertility & access to health care services
Delivery Care (for births in the 5 years before the survey) - Institutional births (%)	Family planning, fertility & access to health care services
Women whose Body Mass Index (BMI) is below normal (BMI < 18.5 kg/m2) (%)	General health & social status
Women who are overweight or obese (BMI >= 25.0 kg/m2) (%)	General health & social status
All women age 15-49 years who are anaemic (%)	General health & social status
Women - Blood sugar level - high (>140 mg/dl) (%)	General health & social status
Women - Hypertension - Moderately high (Systolic 160-179 mm of Hg and/or Diastolic 100-109 mm of Hg) (%)	General health & social status
Women who have comprehensive knowledge of HIV/AIDS (%)	Knowledge & Education
Currently married women who usually participate in household decisions (%)	Economic independence & decision making
Women who worked in the last 12 months who were paid in cash (%)	Economic independence & decision making
Ever-married women who have ever experienced spousal violence (%)	Violence against women
Ever-married women who have experienced violence during any pregnancy (%)	Violence against women
Women owning a house and/or land (alone or jointly with others) (%)	Economic independence & decision making
Women having a bank or savings account that they themselves use (%)	Economic independence & decision making
Women having a mobile phone that they themselves use (%)	Economic independence & decision making
Women age 15-24 years who use hygienic methods of protection during their menstrual period (%)	Family planning, fertility & access to health care services
Women who use any kind of tobacco (%)	Addiction
Women who consume alcohol (%)	Addiction

Annexure 2: Table 2 Components of women empowerment

India/States/UTs	Index of Knowledge &Education	Index of General health & social status	Index of Family planning, fertility access to health care services	Index of Economic independence & decision making	Index of Violence against women	Index of Addiction
India	-1.94929	-0.40412	-0.1493	-1.34154	-0.33955	0.664395
Andhra Pradesh	-2.56445	-1.29816	9.101229	-4.24539	-2.37899	1.116442
Assam	-2.70247	2.920711	-1.33468	-1.43152	0.698384	-1.23101
Bihar	-6.68427	-1.12197	-11.5166	-5.02358	-2.37899	1.117056
Chattisgarh	-2.98374	1.223584	-0.77232	-2.05201	-1.88649	-1.02805
Gujarat	-1.64821	-0.32126	-0.47106	-1.19429	1.236122	0.781286
Haryana	0.431386	-2.51357	3.45137	-1.69521	-1.49018	1.217656
Jharkhand	-4.51571	-0.77264	-5.93172	-3.0612	-0.49169	0.223189
Karnataka	-1.65026	1.093944	3.580449	-2.87724	-1.40975	0.879429
Kerala	7.995394	-1.09485	4.753947	4.336974	2.058641	1.009004
Madhya Pradesh	-4.41834	-0.63515	-1.89989	-4.84759	-0.68526	0.344995
Maharashtra	1.200369	-1.20305	5.232457	-1.32673	0.515154	0.909553
Odisha	-2.88622	2.522534	0.252309	-3.44721	-0.81519	-0.27305
Punjab	3.758882	-0.27417	7.68501	2.017203	0.924507	1.321408
Rajasthan	-5.14045	-1.25637	-0.48784	0.154232	1.036835	0.892569
Tamil Nadu	0.637669	-0.75687	5.903077	0.933318	-2.93784	1.123359
Telangana	-1.60706	0.75708	6.842818	-4.58198	-2.97348	-0.39646
Uttar Pradesh	-3.68156	0.419434	-7.2565	-0.87952	-1.55302	0.785052
West Bengal	-2.09202	-1.55658	6.332333	-0.10139	-1.61322	0.603373
Arunachal Pradesh	-3.13422	0.354375	-7.74225	0.029984	0.5175	-4.5069
Delhi	3.036181	-1.75394	2.404872	-0.05902	-0.21806	1.098229
Goa	4.368913	1.829892	0.15812	5.170861	1.954378	0.475344
Himachal Pradesh	3.467445	1.193413	1.811168	5.639253	2.600192	1.258543
Jammu & Kashmir	-2.26927	0.128254	0.632147	1.61323	2.416229	1.134655
Manipur	3.233719	2.360639	-9.58708	-3.90819	-2.43566	-3.103
Meghalaya	-0.03583	-1.70961	-11.1252	-1.6095	1.289061	-1.25777
Mizoram	6.623841	3.584838	-2.79184	3.721723	1.33078	-3.62875
Nagaland	-0.51109	5.122096	-11.9136	1.899239	2.02682	-1.13696
Sikkim	1.506261	3.948284	1.35502	5.014669	3.4898	-3.20679
Tripura	0.066355	-0.10317	3.203073	-1.36861	0.35612	-2.41771
Uttarakhand	0.474555	2.338918	-1.8351	2.391159	2.082397	1.09254
Andaman and Nicobar Islands	2.77437	-0.24683	4.173395	4.60845	0.609811	-0.83016
Chandigarh	4.351104	-6.46982	7.768519	4.718045	0.088937	1.230261
Dadra and Nagar Haveli	-3.39435	-6.29019	-2.90768	-2.12438	-1.48021	1.200672
Daman and Diu	2.20847	-6.86204	-3.02903	2.162864	-2.03526	1.064953
Lakshadweep	4.676631	5.274984	-1.91852	1.115853	3.425424	0.308409
Puducherry	3.057266	1.571369	8.028871	1.64905	-1.53425	1.164245