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Evidence on burden and economic impact on Indian households

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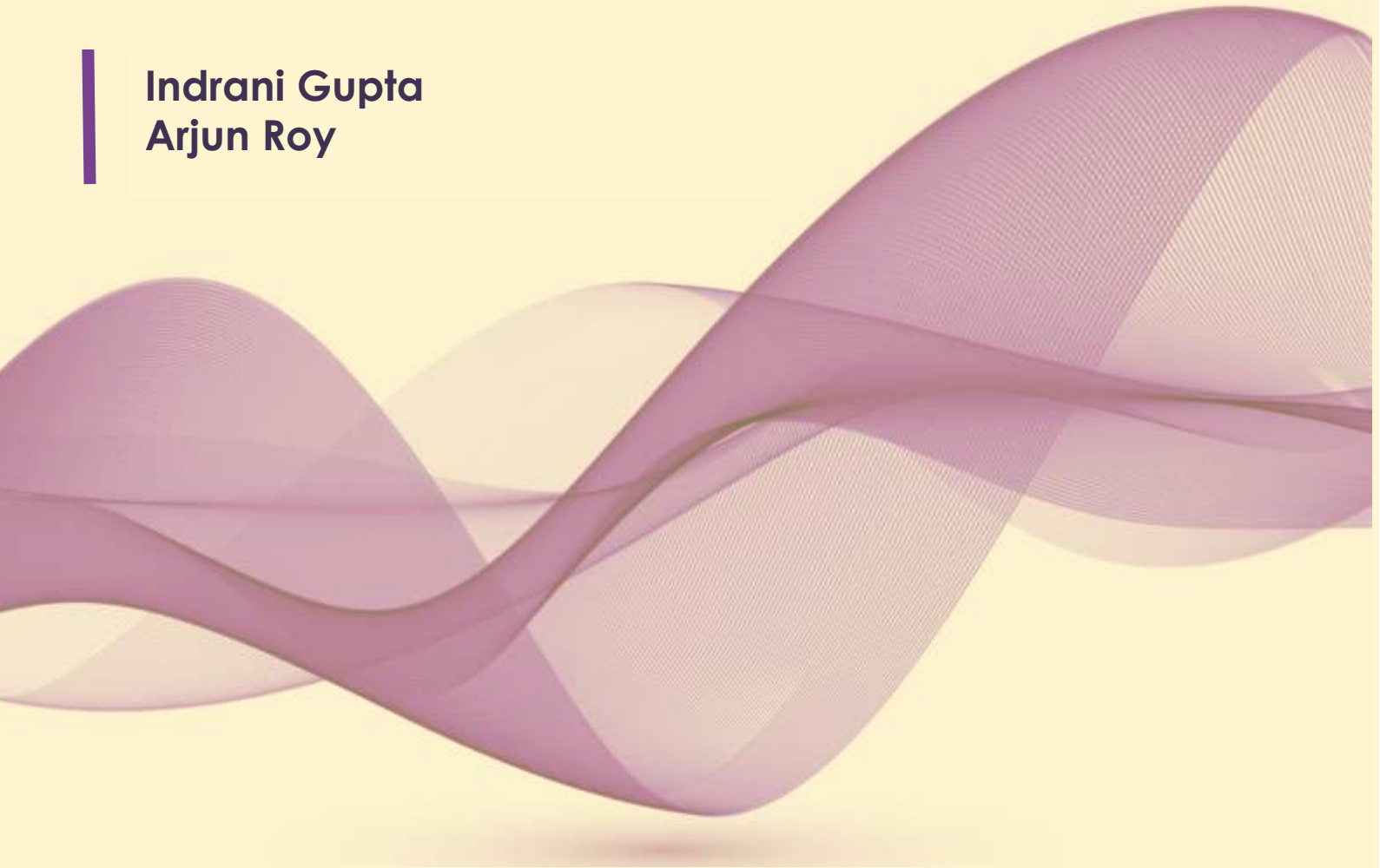

2021

IEG Working Paper No. 432

June 2021

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Abstract

Morbidity due to Musculoskeletal Diseases (MSDs) has been rising steadily both globally and in India - fuelled primarily by lifestyle/behavioural factors and occupational risks. In India, MSDs are yet to find a place in discussions around non-communicable diseases. This exploratory study was an attempt to fill this gap. It used the 75th round of the National Sample Survey data to look at the occurrence of MSDs across socio-economic, demographic and geographic groups in India. It analysed the treatment-seeking behaviour of individuals with MSDs, choice of providers, out-of-pocket expenditures and catastrophic expenditures due to MSDs, for poor and non-poor households. Self-reported occurrence for MSD was 0.8%, 64% being females. About 3% of all households had at least one member with MSD, with 66% of the cases from rural households. Care for MSD was sought mostly at private facilities, both for hospitalization and OPD visits. In rural areas, 53% of BPL-households having at least one case of MSD incurred catastrophic health expenditures whereas the analogous proportion for non-BPL households was 45%. MSDs are now prevalent across all socio-economic groups and major age categories and is observed more among less educated individuals and women, with a majority of the patients reporting their MSD condition as chronic. The analysis indicates that MSDs are now quite prevalent across socio-economic and demographic categories and may impose a catastrophic burden on households, especially BPL households and rural areas, comparable with other non-communicable diseases like CVD. MSDs need to be included in priority diseases requiring policy focus.

Keywords: Catastrophic Health Expenditure, Economic burden, Musculoskeletal disorders, Non-communicable diseases

1. Background

Musculoskeletal diseases (MSDs) together, including Osteoarthritis (OA), ranked first among the top causes of global years lived with disability[1], registering a 66% increase from 1990 to 2017 in MSD-related Years lost to Disability (YLDs)[2]. MSDs on average accounted for about 16% of all global YLDs per GBD 2017 data[2]; this figure, however, is expected to be much higher when combined with fractures and soft tissue injuries which are closely associated with the onset on MSD[3].

Low back pain has remained the top cause of YLDs globally from 1990 to 2017 [3,4], being the most prevalent musculoskeletal condition, affecting nearly everyone at some point in time, with lifetime prevalence of about 58–84% [5]. Neck pain and "Other MSDs" also featured prominently in the top ten causes of morbidity among both men and women in India as per GBD 2017 data [4].

MSDs also contribute to high health expenditure in many high-income and middle-income countries [3], and in one cost-of-illness study, it represented about a quarter of total cost of illness, emanating mostly from indirect costs related to morbidity and disability [5].

The indirect costs of musculoskeletal conditions (loss of productivity and wages) were much greater than the direct costs, corresponding to 1.3% - 2.4% of Gross National Product (GNP) [5].

Despite this scenario, MSDs do not feature in most discussions on burden of non-communicable diseases. While this could be attributed partly to the perception that OA and other MSDs are inevitable byproducts of aging [2], there may also be other socioeconomic and cultural correlates of MSD that make findings on MSDs less amenable to easy interpretation.

While most of the findings come from the developed world, the impact could be more severe for households in developing countries such as India. However, much less is known about MSDs in

India and compared to other NCDs like CVD and diabetes, far less research has been done in the country, especially of the economic burden of MSDs.

This exploratory work seeks to understand the burden of MSDs and its economic impact across socio-economic, demographic and geographic groups in India using a household database. Particularly, the analysis focuses on the treatment seeking behavior of individuals, the possible economic consequences suffered by those affected by MSD, and the potential impact on household budgets due to out-of-pocket expenditure and catastrophic health spending precipitated by MSDs.

2. MSDs in India: Overview

In India, estimates of prevalence of MSDs vary widely. Epidemiological studies indicate a community-based prevalence of about 20% [6] and occupation-specific prevalence of as high as 90% in various studies [6]. Prevalence estimates carried out in 3 northern states in 2012 by the Indian Council for Medical Research (ICMR) indicates a prevalence between 7.08% - 11.5% [7].

Community survey data from rural and urban areas of India show the prevalence of osteoarthritis to be in the range of 17% to 60.6% [8,9]. The prevalence of osteoarthritis amongst elderly in rural areas of Amritsar was 60.6% [8], while it was 17% amongst the elderly of rural areas of Wardha [9]. In Aligarh the prevalence of osteo-arthritis was 30.2% [10].

A WHO-ILAR COPCORD (World Health Organization- International League of Associations for Rheumatology Community Oriented Programme for Control of Rheumatic Diseases) study carried out in Bhigwan (1996-2014) near Pune, demonstrated that musculoskeletal (MSK) pain was the most common form of self-reported ailment in the community [11]. A three-year study based on the COPCORD model conducted in Lucknow found a high prevalence of knee osteoarthritis (OA),

backache and fibromyalgia[12]. Another COPCORD based study done on MSK pain in Kerala reported a prevalence of 26.08%, with 8% having to stop work and 4% suffering chronic depression[13]. Bone and Joint Decade India also conducted several standardized and uniform surveys (2004-2010) which found significant presence of a variety of conditions under MSD[11].

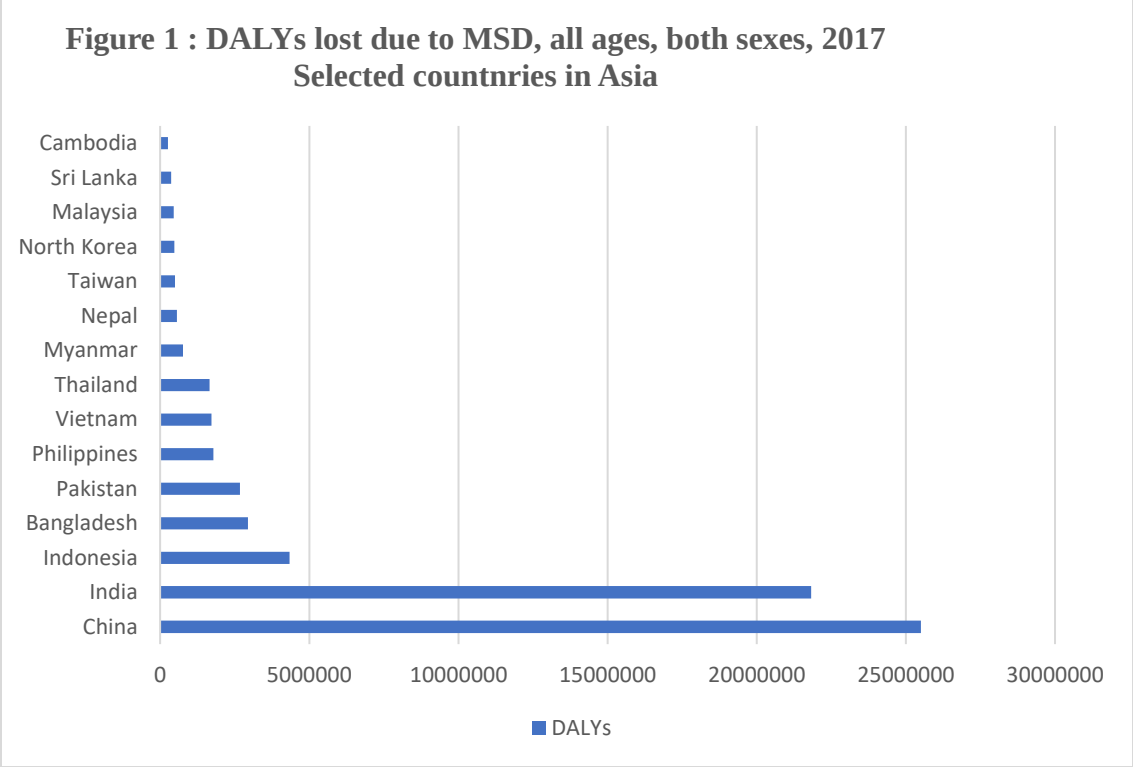
Factors consistently observed to be significant in the associations between work-related stressors and doctor-diagnosed or symptom-based arthritis were being female, obesity (BMI≥30 kg/m2), lower income and educational attainment, and being married/cohabiting [14].

Higher occurrence among women for many of these conditions have been confirmed by other studies as well [15, 16,17,18]. Women are more likely to suffer from MSDs due to physiological as well as socioeconomic reasons [5,19,20]. DALYs lost per 100,000 by women across India were 35.8% percent higher compared to men in 2017 as per GBD 2017 data [2].

MSD was the single largest cause of work-related illness, accounting for over 33.8% [21,22] of all newly reported work-related musculoskeletal diseases, and approximately 77% in construction workers [21,22].

GBD 2017 data [2] estimates indicate that India has moved up in rank to the top from second position in 2007 when considering aggregate DALYs lost, and is currently found to have the highest number of aggregate DALYs lost in the primary productive age group of 15-49 years.

Within Asia, DALYs per 100,000 due to MSD are very similar in India and Malaysia, Cambodia and Indonesia; however, in terms of aggregate DALYs across all ages, India outstrips other countries globally, coming in a close second after China [Figure 1]. India comes 13th on the overall list for DALYs per 100,000 [2].



Source: GBD data[2]

Risk factors have been grouped into metabolic, environmental and behavioral (tobacco use, alcohol consumption etc.) factors[2]; the last of which, for the specific case of MSDs in India, has been the chief contributor over the years.

Uttar Pradesh followed by Maharashtra have the highest number of DALYs lost due to MSD across India. Goa, closely followed by Kerala and Punjab, was at the top in terms of DALYs lost per 100000[2].

Overall, the review indicates a significant burden of MSD in India which has been steadily increasing over the years, with a distinct tilt towards women.

3. Material and Methods

Unit data from the 75th round of the National Sample Survey (NSS) was used for this study [23]. The NSS data pertain to 2017-18, and comprised a total of 113,823 households and 557,889 individuals (including deceased). The survey collected information on direct medical and non-medical expenditure on all individuals in the household, for each episode of hospitalization in the reference period of one year, and each spell of ailment treated as outpatient in a 15-day reference period.

Data pertaining to costs for inpatient episodes, as well as for non-hospitalized (including outpatient care) spells of ailment, was available at the episode/visit level.

Elementary statistical methods like univariate and bivariate analyses were used to understand occurrence of MSD among different groups. To estimate catastrophic health expenditure (CHE) due to MSD, we considered CHE as the proportion of households with OOP payments for health care equaling or exceeding 10% of the household consumption expenditure, consistent with previous studies [24, 25,26,27,28,29].

The impact of treatment related expenditure on the economically weakest households was analyzed by taking the per capita consumption expenditure (MPCE) of the bottom 3 deciles as the poverty cut off line, and suitable comparisons were made with those above the poverty line (NBPL).

All statistics were arrived at using the NSS weights given in the database.

4. Results

a. Occurrence of MSD in the sample

In the sample, there were 3350 reported cases – including multiple cases of the same individual - of non-hospitalized illnesses due to MSD, and 3333 individuals who reported at least one non-hospitalized MSD illness.

Among all persons hospitalized due to any illness, approximately 2.9% were hospitalized due to MSD; since multiple episodes were few, the number was almost the same as for individuals.

Overall, the self-reported occurrence of MSD, for those who reported an episode either in for OPD or IPD, was 0.8% in the population of which approximately 64% (62% rural and 69% urban) were females. As for households, 3.1% had at least one member who reported having an MSD, of which 66% were rural households.

In 76% of MSD episodes involving non-hospitalized treatment in the sample, the patient self-reported the MSD condition as chronic.

b. Socio-economic and demographic profile of those with MSD

Overall, females reported considerably higher occurrence (1.02%) compared to men (0.53%), and the occurrence was also higher in rural areas compared to urban areas.

A majority of the cases (36%) were among those who were 45-59 years old, followed by the group aged 60-69 (25%) and 15-44 (20%) respectively. Thus close to 56% of all MSD cases were in adults below the age of 60, indicating a significant burden exists within the working population.

As for social group, a little more than $1/4^{th}$ of the individuals who reported an MSD were from the Scheduled Castes/Scheduled Tribes (SC/ST) category. About 43% of all individuals reporting

MSD were from the category “other backward castes” (OBCs), followed by the general category of respondents.

As for education categories, less educated individuals comprised the bulk of the cases of MSD, with the category ‘not literate’ contributing almost half of the total cases. This was more pronounced for the rural areas (not shown here).

Distribution across expenditure quintiles shows that for the country as a whole, the cases are roughly equally distributed, but for rural areas the relatively better off individuals show slightly higher reported cases, relative to their urban counterparts.

Of all those who had some form of MSD, 70% did not have any health coverage. For those that did have any coverage, the majority had coverage from government-funded insurance programmes like the Rastriya Swasthya Bima Yojna, Central Government Health Scheme etc.

If one looks at the type of household in terms of economic engagement, about half (46%) of those who reported MSD were self-employed, with 24% being casual labor and 19% in salaried or regular employment.

c. Treatment seeking behavior

While almost all individuals affected by MSD took allopathic treatment for hospitalization, there was more non-allopathic care sought for non-hospitalized care in both, rural and urban sectors, respectively.

Most of the care for MSD was sought at private facilities for hospitalization episodes – 59% for rural and 68% for urban sector respectively. This percentage was similar for OPD – 61% and 70% respectively for rural and urban areas. A relatively small percentage of individuals visit the lower tiers like PHCs etc. for treatment.

These numbers are generally consistent with overall public-private split in treatment-seeking behavior in India and also for other NCDs like CVD and diabetes.

There was some out-of-state care seeking – about 5% for hospitalizations; for OPD care, this was less than 1%.

d. Costs of treatment and Catastrophic Health Expenditure

Table 1 reports the mean cost of OPD visit and hospitalization for rural and urban areas respectively, for both MSD and overall OPD visits for comparison.

Table 1: Mean cost per person (in US $) of OPD and IPD for MSD & for all conditions

Sector	OPD - MSD	IPD - MSD	OPD - all	IPD - all
Rural	11.34	474.15	10.94	230.75
Urban	15.24	762.41	12.84	403.29
Total	12.68	573.20	11.65	285.70

Note: Exchange rate used (2018) USD 1 = INR 68.39 from https://data.oecd.org/conversion/exchange-rates.htm

About 62% of all visits to IPD were in private hospitals. The mean cost of treatment in private sector hospitals was about seven times of that of public sector hospitals in rural areas and about six times higher in urban areas.

Overall, 1.4% of all households incurred catastrophic health expenditure (CHE) due to MSD at the 10% threshold, and there was not much difference between the rural and urban areas.

These calculations do not consider other illnesses, and therefore helps us understand the economic impact of MSD alone on a household.

e. Characteristics of household with Catastrophic Health Expenditure (CHE) due to MSD

Of all households which incurred CHE due to MSD expenditure, 68% were in the rural sector; 21% of such households across sectors were below the poverty line (BPL).

Also, 45% of non-BPL households which had at least one case of MSD incurred CHE whereas the analogous proportion for BPL households was 53%, a marked difference, indicating the higher burden on BPL households from MSD expenditure in rural areas. For urban areas, there was no noticeable difference between BPL (42%) and NBPL (44%) households in percentage incurring CHE.

f. MSD and other illnesses

How does MSD compare with other major NCDs and communicable diseases on key parameters? This comparison will help situate the MSD issue in the overall analysis of economic burden from treatment. We limit the comparison to 5 diseases with similar occurrence in the population. Table 2 lists these diseases in column 1, share of individuals and households with specific illnesses in columns 2 and 3, respectively, and share of BPL households with a specific illness in column 4.

Table 2: Comparison of occurrence of MSD with other similar diseases

Disease Category **(1)**	**Individuals with a specific illness in the population (%)** **(2)**	**Households with a specific illness in the population (%)** **(3)**	**Households with a specific illness that are BPL (%)** **(4)**
Endocrine, Metabolic or Nutritional disease (EMND)	1.2	4.66	12.37
Cardiovascular disease (CVD)	1.45	5.54	14.67
Respiratory disease	0.89	3.39	24.60
Gastro-intestinal (GI)	0.57	2.44	24.44
Musculo-skeletal disease (MSD)	0.77	3.10	19.18

While the overall occurrence of each of these 5 conditions seem to be similar (0.57-1.45%) this is not so if looked across disease categories. Gastro-intestinal diseases (GI) occurs in 2.4% of households, cardiovascular disease occurs in 5.5% of all households. This number was 3.1% for MSD.

When we look at the share of BPL households in each of these illnesses, the differences are even more stark; of all the households that saw a respiratory illness occur, 25% were BPL households. This number was much less for the groups of diseases that fall under the category Endocrine, metabolic and Nutritional diseases (EMND), including diabetes. For MSD about 19% of the cases occurred among BPL households, placing it somewhere in-between.

Figure 2 : Catastrophic health expenditure for major NCD categories

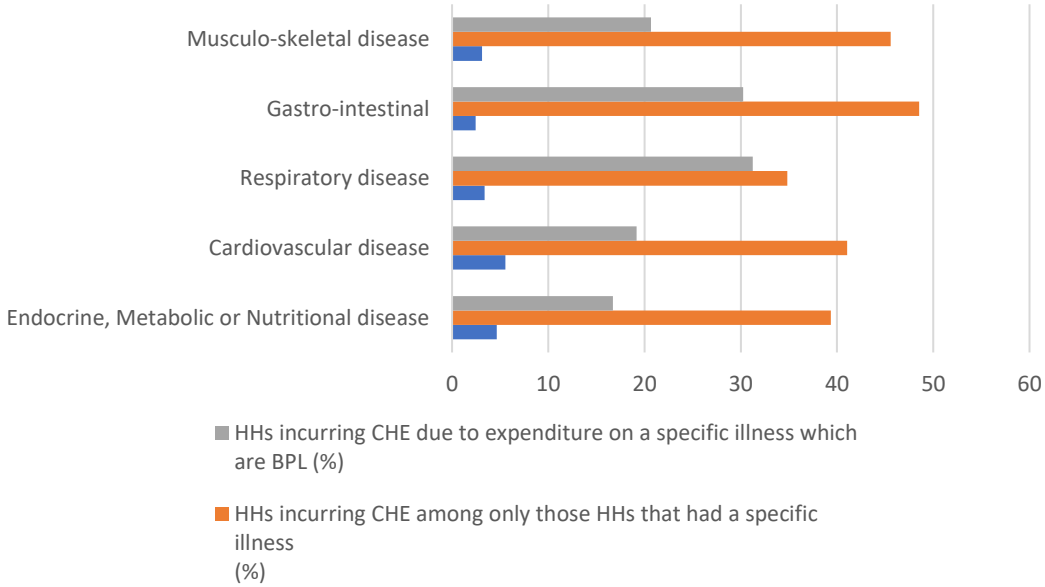


Figure 2 shows percentage of households with catastrophic health expenditures (CHE) due to various NCDs; it indicates the share of households with a specific illness, share of households with

a specific illness that incurred CHE, and share of households with a specific illness and CHE that were BPL.

A substantial number of households with each of these illnesses do incur CHE, the highest being for GI illnesses. MSD leads to CHE in 46% of households. Figure 2 shows the share of BPL households among those that incurred CHE. While 21% of BPL households incurred CHE for MSD, this number is higher for respiratory illnesses at 31%. However, MSD seems to impose more of a burden of CHE on BPL population compared to the other illnesses mentioned in the table.

As for costs of treatment per person, CVD is the most costly to treat (USD 639) followed by MSD (USD 573), which is higher than the expenditure for treating a condition under GI, EMND group or respiratory disease – USD 353, USD 336 and USD 277, respectively. As expected, treatment is much more expensive in private facilities usually by a factor ranging between 5-7 for the five disease discussed above.

5. Discussion and implications

There continues to be a vacuum in India around MSD – both in terms of research papers and inclusion in health policies on non-communicable diseases. This paper took an exploratory look at the available secondary evidence and also analyzed household level data from India's NSS for the 2017-18 health round to understand whether and how MSDs may be impacting households in the country.

The evidence from the literature review as well as the analysis of the NSS data indicate that MSDs are quite prevalent, present across all socio-economic groups, with a slightly higher occurrence among women, individuals with less education, and those living in rural areas. The analysis also indicates that the expenditure on MSD may impose a catastrophic burden on households,

especially BPL households, comparable with other non-communicable diseases like CVD. Also MSD seems to be occurring across all major age categories, potentially leading to significant productivity losses as well. Rural areas are relatively more vulnerable to catastrophic expenditure. Given the still largely private sector treatment of this and other diseases, and lack of any significant health coverage, these findings should be a cause of worry.

India has a number of programmes[30] under the broad category of non-communicable disease programme. The most prominent among these is the programme for prevention and control of cancer, diabetes, cardiovascular diseases and stroke (NPCDCS). It also has programmes on blindness, deafness and mental illness. However, there is no mention of MSD. The programme for the healthcare of the elderly might include interventions on MSD to an extent, but there is no standalone programme targeting MSDs specifically. The chronic nature of these conditions imply long term and continuous need for care and treatment, which is not currently available in India. Also, the presence of alternative systems of medicine in MSD treatment observed in the analysis indicates both a lack of alternatives in modern medicine and a need to understand the types, quality and efficacy of treatment offered under different alternative systems of medicines.

Given the current low level government spending on health in India, it is doubtful whether MSDs would be getting separate attention, but research such as this can be a tool for advocating for higher share of resources to the health sector.

Additionally, in light of the COVID-19 pandemic, numerous international studies have reported symptomatic patients displaying a host of musculoskeletal (MSK) symptoms ranging from fatigue, myalgias /arthralgias to acute cerebrovascular disease [31]. These symptoms can result in long term rehabilitation requirement [32]. While the long term effects of MSK symptoms are not well known, it is of concern that there is a high prevalence of these symptoms in the middle aged and the elderly, who have typically used a variety of anti-inflammatory medications which indicates that

COVID-19 has overcome the effect of such drugs[32]. MSK symptoms are only anecdotally attributed to indirect effects, mainly arising from inflammatory and/or immune response; other hypotheses suggest that the virus could damage the nervous system too[32]. These findings indicate that MSK problems are likely to worsen both in the short and long term[33], exacerbated by the lack of access to care facilities and adequate physical activity brought about by COVID-19.

An important future area of research is the impact of MSD on women; given their low treatment-seeking behavior, there needs to be more evidence collected on quality of life of people – especially women – with chronic MSDs.

In sum, since the causes of MSDs differ widely, policies of prevention and treatment need to be nuanced and based on evidence – epidemiological and clinical as well as socioeconomic correlates of MSDs. This can happen only if MSDs are included in the group of priority NCDs in the country by policymakers, based on available current evidence on prevalence and impact.

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