**Comparative analysis of prevalence of Diabetes in USA and INDIA**

**Aim: -**

This study aimed to calculate and compare the prevalence of diabetes in the USA and India in year 2023 and 2024 based on age 45 and above, with attention to gender distribution.

**Methods: -**

Data on population size of 2023 were collected from Un population division (The Population Division of the Department of Economic and Social Affairs UN) for India and USA. This data is segmented by age and gender. The Sex ratio of study populations calculated by dividing Male over female in terms percentage. To estimate, the prevalence of study populations, individuals aged 45 and above are analyzed, based on data incidence/mortality rate from literature, mortality rate, incidence rate, total number diabetic case is calculated. Following methodology is used: -

* The number diabetic cases: - Diabetic Males (diab\_m) \*0.159, Diabetic Females (diab\_f) \*0.086
* Mortality rates among diabetic: - diab\_m\*0.009 among males, diab\_f\*0.0045 among females.
* Incidence rate among population: - M\*0.012 among males, F\*0.007 for females
* Total Cases: - diabatic case + incidence case - mortal cases (respectively for both gender).
* Prevalence: - total No of cases / total population (for both genders respectively)
* Variation in population: - (prevalence 2024 – prevalence 2023)/prevalence 2023 % for both genders respectively

(\*= multiplication)

All analyses are conducted using Microsoft Excel, with sex ratio, prevalence, and variation expressed as percentages.

**Results: -**

The sex ratio distributions in both populations show distinct trends. In the U.S., the sex ratio is nearly balanced in younger age groups, slightly favoring males. However, it decreases with age, showing a higher proportion of females in older age groups due to higher male mortality rates, a common trend in developed countries. After age 85, the male population declines rapidly relative to females, creating a more pronounced gender imbalance. While sharp increase in sex ratio at the age 100, is due to all the people age above 100 are summed into it. Fig 1

**Figure 1. Sex Ratio in USA 2023**

For India, Figure 2, show distribution by age and gender, though with a larger youth population compared to the USA. Sex Ratio India remains higher in early age groups, reflecting a male-biased sex ratio at birth. However, like in the USA, the ratio starts to decline as age increases, though this decline is less steep until around age 60. The ratio remains close to parity longer in India, up to around age 40, after which it gradually declines, though not as sharply as in the USA.

**Figure 2. Sex Ratio in India 2023**

While comparing Both, India has a larger youth population compared to the USA, indicated by the broader base of the population pyramid. This reflects the higher birth rate and younger demographic structure in India. Sex Ratio at birth India shows a more pronounced male-biased sex ratio in early age groups, which gradually reduces with age but is initially more skewed than in the USA. The USA has a higher proportion of older individuals (70+), resulting in a steeper decline in the sex ratio at advanced ages due to higher male mortality. India's sex ratio remains closer to parity longer, likely due to lower overall life expectancy and a smaller elderly population.

**Table 1. Age Categorization**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **USA** | | | **INDIA** | | |
| **Age** | **Male** | **Female** | **Sex Ratio** | **Male** | **Female** | **Sex Ratio** |
| 0-14 | 30580767 | 29202868 | 105% | 187882029 | 172455965 | 109% |
| 15-29 | 33529691 | 32241717 | 104% | 199945554 | 181550082 | 110% |
| 30-49 | 43926253 | 43403609 | 101% | 212150600 | 197264753 | 108% |
| 50-64 | 30962905 | 31885884 | 97% | 94623425 | 92656266 | 102% |
| 65-84 | 24111175 | 28123428 | 86% | 44822770 | 48744415 | 92% |
| 85+ | 2263475 | 3855957 | 59% | 2458888 | 3514852 | 70% |
| **Total** | **165374267** | **168713464** | **98%** | **741883264** | **696186332** | **107%** |

Table 1, Shows, The USA a more balanced age distribution, while the second has a younger population with fewer older individuals. The USA has a longer average lifespan, while the India has a shorter one.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Table 2 Prevalence of Diabetes** | | |  |
|  | **USA** | | **India** | |
|  | **Males** | **Females** | **Males** | **Female** |
| **prevalence 2023 (x100)** | 15.9 | 8.6 | 9.2 | 7.1 |
| **incidence (x1000)** | 12 | 7 | 7 | 5 |
| **mortality (x1000)** | 9 | 4.5 | 13 | 7 |
| **prevalence 2024\*(100)** | 17% | 9.3% | 9.8% | 7.6% |
| **difference** | 1.1% | 0.7% | 0.6% | 0.5% |
| **% variation** | 6.6% | 7.7% | 6.3% | 6.3% |

There increase in diabetes prevalence among individuals aged 45 and above in both genders in the USA and India from 2023 to 2024. In the USA, prevalence rose from 15.9% to 17% for males and 8.6% to 9.3% for females, while in India, it increased from 9.2% to 9.8% for males and 7.1% to 7.6% for females. The increase was slightly higher for males in the USA (1.1%) compared to India (0.6%), with smaller increases observed for females in both countries. Additionally, variation in prevalence was higher among females in the USA (7.7%) than in males (6.6%), suggesting greater heterogeneity within female subgroups in the USA, while in India variation remained uniform indicating homogeneity in subgroups i.e. a 6.3% variation in prevalence among both males and females. This identical variation (6.3% for both genders) suggests homogeneity within the population in India. Table 2

**Conclusion: -**

This study concludes an increase in diabetes prevalence among individuals aged 45 and above for both genders in the USA and India, that increase is higher in males than females. Comparatively, Prevalence of diabetes is a bit higher in USA with greater heterogeneity within female population than India. It suggests diabetes is becoming increasingly prevalent among older males, highlighting a potentially greater need for targeted interventions for this group.