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Beyond Age Cutoffs: A Household-Disruption Framework for Premature Mortality in India

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Beyond Age Cutoffs: A Household-Disruption Framework for Premature Mortality in India

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Abstract

Mortality risk varies systematically with age, yet conventional definitions of premature mortality rely on fixed chronological cutoffs that overlook the social and economic heterogeneity of death's impact within households. This study proposes a dynamic, characteristics-based conceptualisation of premature mortality that incorporates the intensity of household disruptions caused by death. Drawing on nationally representative Indian data from NFHS-5 and PLFS 2019–20, we imputed multiple dimensions of mortality-induced household disruption, including premature assumption of roles, parental loss, early widowhood, and loss of sole earner. Logistic regression and probabilistic modelling generated composite disruption scores, revealing marked socioeconomic gradients in timing and magnitude. Disruptions peak earlier and more severely among poorer households, particularly in case of males, while females exhibit later and less pronounced differentials. Age equivalence analyses quantify accelerated disruption exposures in disadvantaged groups, underscoring cumulative disadvantage. This redefinition moves beyond static age thresholds by anchoring premature mortality in implied adversity on the household, thus accommodating real-world vulnerabilities. The findings highlight critical windows for targeted social protection and enrich conceptual frameworks for valuing mortality impacts in stratified societies such as India.

Keywords: Premature mortality, Household disruption, Socioeconomic inequality, Mortality valuation

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Introduction

The force of mortality, defined as the age-specific risk of death, is a central concept in demography (Preston et al., 2001). It reflects how mortality risk varies with age, typically exhibiting a J-shaped pattern with high risks in infancy, lower risks in young adulthood, and rising risks in older ages (Wilmoth & Horiuchi, 1999). Globally and in India, the mortality transition has shifted many deaths from younger ages to older age groups, yet significant regional and socioeconomic disparities persist (AROKIASAMY & YADAV, 2014). These patterns form the demographic backdrop against which the concept of premature mortality is conventionally framed.

With the decline in infant mortality, scholarly and policy attention shifted towards adult mortality, giving rise to discourses on ‘avoidable mortality’ and ‘premature mortality’ (Preston & Paul, 1994). Avoidable mortality refers to deaths that could have been averted through timely and effective medical interventions or through modifications in individual health-related behaviours. Premature mortality, in contrast, denotes deaths that occur prior to the attainment of the prevailing average life expectancy. Traditional definitions of premature mortality generally rely on fixed chronological age thresholds, often set at 65 or 70 years (Norheim et al., 2015; Sørheim et al., 2024). Deaths occurring before this age are categorised as premature, carrying implicit assumptions about ‘early’ death and loss of potential life. Such measures have been extensively used in public health to quantify avoidable mortality and guide interventions (Preston et al., 2001). However, these static cutoffs do not account for variations in social role, economic contribution, or household context that influence the actual impact of mortality events. They consider all deaths prior to the designated threshold as equivalent, ignoring the significant heterogeneity in consequences for surviving family members.

Mortality within a household reverberates far beyond the immediate absence of the deceased, profoundly altering the family’s social, economic, and emotional fabric. The long-standing societal ideal envisions deaths as occurring in an orderly sequence across generations, with older members passing before younger ones. However, disruptions to this expected mortality sequence, particularly deaths that occur “off time” or prematurely, carry especially potent effects for surviving family members (Alburez-Gutierrez et al., 2022). The relational position and household structure surrounding the deceased critically mediate these effects. For instance, the death of a male household head leaving behind a wife and child signals a different set of social and economic challenges in comparison to a death in a larger extended family with

siblings and parents being present. This diversity in relational context underscores the necessity of frameworks that can recognise the heterogeneous consequences of mortality within households.

When a death as an event is imagined as disrupting a household, the essential considerations amount to reshaping identities and power dynamics among surviving members. The void left by a deceased household head, for example, might be filled by a widow or a younger male kin, reshuffling household authority and responsibilities. Such role transitions can have enduring implications for household decision-making, economic stability, and caregiving arrangements (Umberson et al., 2017). The death of a family member is therefore associated with experience of multiple adversities in well-being of survivors that is conditioned by the age of the deceased that defines the scale of such adversities. Early death creates a rupture in expected life trajectories, often exacerbating emotional distress and socio-economic hardship (Maier & Lachman, 2000; Stroebe et al., 2007).

Widowhood, parental loss, and the death of economic providers have been associated with increased vulnerability in surviving family members. For example, the early death of a spouse often leads to declines in household income, reduced labour force participation among survivors, and disruptions in child-rearing arrangements (Uhlenberg, 1980). Similarly, the death of a parent or elder can remove critical caregiving and social support, increasing isolation and care burdens for remaining adults.

Given these multidimensional impacts, it is imperative to conceptualise mortality not merely as an individual event but as one embedded in the complex web of family relations and household structures. Mortality reshapes household dynamics by redefining roles, redistributing resources, and altering social support mechanisms. Understanding these relational and functional consequences of death is critical in assessing the overall burden of mortality, and moreover in defining prematurity of each and every event of death.

Rationale

The rationale for this study stems from the need to move beyond the conventional, static approach to defining premature mortality, which typically relies solely on chronological age thresholds such as the age 70 cut-off used by the WHO. While this age-based definition provides a simple metric, it fails to account for the considerable variability in the social and economic consequences of death at the same chronological age. Deaths occurring at identical ages can have varying impacts on households depending on the deceased's social roles,

economic contributions, and familial responsibilities. Thus, a more nuanced and dynamic approach is necessary, one that incorporates the characteristics of the deceased and their relational and functional positioning within the household.

This study addresses this gap by proposing a characteristics-based conceptualisation of premature mortality, emphasising the differential household-level disruptions caused by deaths at various ages. It recognises age not only as a measure of the duration lived but also as a sociological marker indicating an individual's role, their probable social and economic dependencies, and the cascading effects of their loss on household functioning (Johfre & Saperstein, 2023). By anchoring the definition of premature mortality around the intensity of household disruption, the study introduces a disruption-sensitive framework that respects how mortality events can differentially affect family structure, economic stability, and social responsibilities within households.

The approach includes standardising death counts to reflect weighted impacts based on characteristics such as the deceased's age, household composition, and kinship relationships, generating a more contextually meaningful metric of premature mortality. This method moves beyond simplistic mortality counts toward a metric that differentiates each death accounting for its implication on the survivors within a household environment.

The major research questions driving this study are: Should deaths at particular ages be valued differently over the life course? And how can premature mortality be dynamically defined based on the deceased's characteristics and household implications rather than as a typical chronological measure? By answering these questions, the study seeks to establish a refined, socially grounded framework for valuing mortality based on the degree of ill-being and disruption experienced within households, emphasising on the place and social context where the death occurs rather than population-level health assessment.

Data & Methods

Data

This study utilised nationally representative microdata from two major Indian surveys. The primary source was the fifth round of the National Family Health Survey (NFHS-5, 2019–21), conducted by the International Institute for Population Sciences (IIPS) as the nodal agency on behalf of the Ministry of Health and Family Welfare, Government of India, in collaboration with ORC Macro (International Institute for Population Sciences & ICF, 2021). NFHS-5

followed a systematic, stratified, multi-stage sampling design based on the 2011 Indian Population and Housing Census. The sampling framework encompassed the selection of primary sampling units (villages in rural areas and census enumeration blocks in urban areas) with probability proportional to size, followed by random sampling of households within each unit. The survey covered 707 districts, collected data from approximately 610,000 households, and interviewed over 724,000 women of reproductive age, providing robust estimates of demographic, health, and nutrition indicators at the district level. Mortality information was obtained through the household schedule (head's report) and through birth histories provided by eligible women. Additional information on household employment structure and the mean number of earners was sourced from the Periodic Labour Force Survey (PLFS) 2019–2020, conducted by the National Statistical Office (NSO) (Ministry of Statistics and Programme Implementation (MoSPI), 2021). PLFS is an annual, nationally representative survey covering over 100,000 households and more than 418,000 individuals, providing estimates for key labour market indicators, including employment and wage characteristics, for rural and urban populations.

For this analysis, NFHS-5 data were used to capture mortality events and detailed household composition, while PLFS 2019–2020 provided supplementary information on economic roles and average household earners to facilitate disruption imputation.

Imputation of Household Disruptions Following Mortality

A rigorous approach was adopted to identify and impute household disruptions occurring as a consequence of mortality events. Several dimensions of disruption relevant to household functioning and social roles were constructed using variables available directly in NFHS-5 or imputed using available information:

Premature Maturity:

Premature maturity was conceptualised as the early assumption of adult roles and responsibilities (e.g., household headship, financial and caregiving burdens) following the death of a parent, spouse, or close kin¹. In this study, individuals who became household heads

¹ The authors imputed the relationship of the deceased to the surviving individuals in the households indirectly from NFHS household data.

at an age younger than the mean age of headship among those experiencing recent kin loss (parental or spousal) were operationalised as having undergone premature maturity.

Minors Losing Parents:

The experience of losing one or both parents during childhood is considered a significant disruption. Individuals under the age of 18 who had recently lost a parent were classified as having experienced this disruption.

Break in the Sequential Order of Death:

Disruptions in the expected sequence of familial deaths can have profound social and psychological impacts. Households where the deceased was not the oldest member at the time of death were considered to have experienced a break in the typical sequential order of mortality.

Early Widow(er)hood:

Early onset of widowhood was identified as a disruption where widowhood occurred at an age younger than the mean age of widow(er)hood, stratified by social group and region.

Unmarried Offspring Left Behind:

The study also identified households where a parent's death resulted in the presence of unmarried offspring, based on the recognised social emphasis on fulfilling marital responsibilities in the Indian context.

Death of the Sole earner of the household:

The mean number of sole earners in households was estimated using data on economic activity and employment status available from the Periodic Labour Force Survey (PLFS) 2019–2020. Using PLFS, which provides detailed employment and wage characteristics for individuals across wealth quintiles and demographic strata, we calculated the average number of sole earners per household by socio-economic group (identifiers to the dead data were the rural-urban status, social group and age at death). This measure serves as an important input representing household earning capacity.

To incorporate the mortality impact, these sole earner estimates were triangulated with death data. Linking information on deaths within households with the distribution of household earners allowed us to assess the probability that a household's sole earner was deceased,

thereby estimating the functional disruption caused by premature death. To model uncertainty and variation in this disruption, a Bernoulli simulation was performed using the predicted probabilities of sole earner loss at the household level (Ibe, 2014). Multiple simulation runs (100 iterations) generated stochastic estimates of household disruption outcomes. The mean values derived from these simulations were then used as robust estimators for further analysis of the economic impact of mortality within households, acknowledging inherent data variability and uncertainty.

While the above dimensions do not exhaust all possible forms of mortality-linked household disruption, they provide a structured approach to quantifying and initiating discourse on the household impact of mortality in the Indian context. Disruptions were imputed using both direct measures and derived classifications based on household composition and event timing.

Methodology

For each disruption dimension, such as premature maturity, minors losing parents, breaks in the sequential order of deaths, early widowhood, and unmarried offspring left behind, deceased individuals and affected households were identified. Each disruption was coded as a binary (dichotomous) outcome variable, indicating the presence or absence of that particular disruption for an observation.

Subsequently, logistic regression models were estimated separately for each disruption dimension. These regressions controlled for key covariates, including social group (e.g., caste or demographic classification), age at death of the deceased, and sex of the deceased individual. Formally, the model structure was:

$$\begin{aligned} \log \left(\frac{P(D_i = 1)}{(1 - P(D_i = 1))} \right) \\ = \beta_0 + \beta_1 * SocialGroup_i + \beta_2 * AgeAtDeath_i + \beta_3 * Sex_i + \varepsilon_i \end{aligned}$$

Where, $P(D_i = 1)$ = Probability of disruption for observation i

From these models, predicted probabilities of each disruption were computed for all observations, providing individual-level risk estimates. To capture the overall magnitude of household disruption, the individual predicted probabilities of different disruptions were combined multiplicatively, yielding a measure of total disruption probability as:

$$P_{total|i} = \prod_j P(D_{ij} = 1)$$

Where:

$P_{total|i}$ = Combined probability of household disruption for individual i

$P(D_{ij} = 1)$ = Predicted probability of disruption type j for individual i

Finally, the combined probabilities were normalised by dividing by the global (sample-wide) mean disruption probability, ensuring comparability across groups and facilitating interpretation.

This predictive and composite probabilistic approach enabled nuanced estimation and imputation of mortality-induced household functional disruptions, accounting for heterogeneity in social, demographic, and mortality characteristics.

Redefinition of Premature Mortality and Threshold Estimation

The threshold for premature mortality in this study was derived from the age-specific distribution of household disruption, which reflects the magnitude of social and economic impacts associated with deaths at different ages. Specifically, the disruption by age curve was analysed to identify the peak disruption value and corresponding peak age—the age at which mortality causes the greatest household functional disruption.

To establish a meaningful cut-off, the threshold age was defined as the age after the peak at which the disruption intensity declines to 20% of the peak value. This threshold thus marks the boundary between deaths causing substantial disruption and those with comparatively lesser impact on household functioning.

Premature mortality was then redefined as those deaths occurring before this threshold age. This redefinition recognises that mortality at younger ages below the threshold age imposes disproportionately higher disruptions on households, often entailing unexpected social roles and economic vulnerabilities.

This approach offers a data-driven, disruption-sensitive measure of premature death, moving beyond conventional chronological definitions, and focuses on the timing of deaths relative to their household-level consequences.

Age Equivalence approach

The equivalent age metric, which is used in population health to estimate the age at which an average person has similar levels of disease burden as of someone from the reference population (Chang et al., 2019; Skirbekk et al., 2025). Here, the age equivalence method is employed in a comparative approach that translates disruption levels experienced by one socio-economic group at a particular age into the age at which another group experiences an equivalent disruption. This method effectively quantifies the "prematurity" or acceleration of disruption impacts in disadvantaged groups relative to more privileged ones. The age equivalence method involves taking the disruption score experienced by the richest group at a reference age x and determining the age y^* in the poorest group at which the disruption score matches this level. This comparison reveals how much earlier the poorest face the same level of disruption as the richest do at age x , illustrating the premature maturity or accelerated disruption burden in the poorest segment.

$$y^* = y_a + \frac{[D_{poorest}(y_b) - D_{poorest}(y_a)]}{[D_{richest}(x) - D_{poorest}(y_a)]} \times (y_b - y_a)$$

Where:

y^* = equivalent age in the poorest group corresponding to disruption $D_{richest}(x)$

y_a, y_b = consecutive ages in the poorest group surrounding $D_{richest}(x)$

$D_{richest}(x)$ = disruption at age x in the richest group

$D_{poorest}(y_a), D_{poorest}(y_b)$ = disruption scores at ages y_a and y_b in the poorest group

Results

Household Disruptions by age at death

To account for the fact that deaths occurring at the same chronological age may not necessarily bear identical implications, given their differential consequences for surviving household members, we computed average household disruption scores by sex across wealth groups. Among males, the mean disruption score due to mortality exhibits a clear and consistent gradient across the five wealth quintiles, as illustrated in Figure 1.a. The disruption score

increases with age, reaching its maximum value substantially earlier among those in the poorest wealth group compared to their wealthier counterparts. Specifically, the poorest males experience the peak disruption at age 37, while the richest reach their corresponding peak at age 41. Furthermore, the magnitude of the peak disruption score is notably higher for the poorest, and this pronounced socioeconomic disparity persists throughout the early and middle adulthood stages. After the respective peaks, disruption scores for all groups decline with advancing age and converge in later life, indicating diminishing wealth-related differences in disruption related to mortality among older males.

A similar, though less pronounced, pattern is observed among females (Figure 1.b). The disruption score curve rises with age, peaking later than in males across all quintiles. For the poorest females, the highest disruption is observed at age 51, in contrast to age 55 for the richest group. While the overall levels of disruption are lower for females than males, the socioeconomic gradient remains: poorer women consistently demonstrate higher disruption scores across the life course. As observed for males, disruption scores decrease and converge with increasing age beyond the fifth decade of life, indicating reduced wealth-based differentials in older age groups.

Collectively, these results demonstrate that the household impact of mortality is greatest for the poorest groups and occurs at younger ages, with this effect particularly pronounced among males. The distinct differences in both the timing and magnitude of peak disruption by wealth quintile underscore how mortality exacerbates pre-existing socioeconomic inequalities, especially during the working and middle adult years. These findings emphasize the need for policies that address the heightened household vulnerability to mortality shock among socioeconomically disadvantaged groups at critical ages.

Disruption Score Gaps

The analysis highlights the age-specific gaps between disruption scores for the richest and poorest households following mortality, analysed separately for males and females (see Figure 2.). For males, the gap emerges in early adulthood and rises rapidly, peaking between ages 30 and 35 at approximately 0.25 to 0.3. This indicates that the relative disadvantage faced by the poorest households, compared to the richest, is most pronounced during the prime working years for men. The size of the gap then diminishes steadily and approaches zero by age 50, remaining negligible into older ages.

Among females, the gap between disruption scores remains close to zero during childhood and early adulthood, before rising gradually and peaking later—around ages 40 to 45—at a much smaller maximum value of approximately 0.013 to 0.015. After this peak, the difference decreases and stabilizes at minimal levels in older age groups. This delayed and attenuated peak in females likely reflects differences in the timing and economic consequences of mortality across sexes, as well as underlying societal and household role structures.

These findings demonstrate that the gap in mortality-related household disruption between the richest and poorest is both strongly age- and sex-dependent, with males experiencing a much larger and earlier peak. The pattern underscores the disproportionate vulnerability of poor households to mortality shocks at crucial life stages, particularly among working-age males, compared to wealthier counterparts.

Age Equivalence of Disruption

The Figure 3. presents the concept of equivalent age of disruption: for each reference age among the richest, it shows the younger age at which the poorest experience a comparable level of household disruption due to mortality. Separate trajectories are presented for females and males.

For females, the poorest experience the same level of household disruption at notably younger ages compared to the richest. For instance, while a richest female at age 40 faces a certain disruption score after a mortality event, a poorest female faces a comparable disruption at age 33. This pattern is consistent across the age range—at reference ages 20, 30, 40, 50, 60, and 70 for the richest, the equivalent ages for the poorest are 14, 24, 33, 43, 51, and 58 respectively. The gap, which is about 6–8 years, is especially pronounced at younger and middle ages, demonstrating an accelerated risk exposure for the poorest.

For males, a similar but even more distinct pattern emerges. At every reference age, the poorest males reach the same level of disruption several years earlier than their richest counterparts. For example, a richest male's disruption level at age 40 is matched by a poorest male at age 33; at age 60, the difference narrows but remains, with poorest at 46 versus richest at 60. The absolute gap is slightly larger at younger and middle reference ages (about 7–10 years), highlighting the steeper social gradient in household disruption from mortality among males.

These findings underscore a significant wealth- and gender-based acceleration in risk: the poorest experience equivalent disruption scores years earlier than the richest. This age-

equivalence quantifies the gradient in mortality-related household vulnerability and vividly illustrates the cumulative disadvantage borne by poorer households, especially at key working and middle ages. Importantly, the gender comparison shows that while both the poorest females and males are vulnerable at younger equivalent ages relative to the richest, this effect is somewhat more pronounced in males across the lifespan.

Overarching age range of Disruptions

The overarching age range refers to the span of ages within each wealth group during which a mortality event results in greater household disruption than that experienced at the peak disruption age of the richest group (See Figure 4.). This perspective provides a comparative framework to assess how mortality impacts vary not just in magnitude but also in timing across socioeconomic strata.

For females, the poorest households experience significant disruption due to mortality over an extended range between ages 45 and 60, which begins earlier and lasts longer compared to richer females whose disruption peaks later and spans narrower age intervals, such as ages 52 to 59. This indicates that mortality in poorer female households triggers more profound and sustained economic and social disruptions starting from relatively younger ages.

In males, this pattern is more prominent and occurs earlier in life. The poorest males face heightened household disruption from mortality between ages 32 and 45, while the richest males experience peak disruption around 44 to 45 years of age. This earlier and more concentrated age range among poorer males points to increased vulnerability during critical working years when the economic consequences of death are especially severe.

Premature Mortality Threshold

The results in Figure 5. reveal clear differences in these threshold ages by sex and wealth. For females, threshold ages range narrowly between 75 and 79 across wealth quintiles, indicating that female mortality tends to cause substantial disruption well into older ages, with relatively minor variation by socioeconomic status. Conversely, for males, thresholds are markedly lower and vary from 60 years in the poorest group to 64 years among the richest. This suggests that premature mortality among males, particularly in poorer households, occurs at substantially younger ages and carries significant household consequences.

This redefinition moves beyond conventional, arbitrary age cutoffs by anchoring premature mortality in its actual functional impact on households. It highlights the interplay of gender and

socioeconomic status in shaping not only mortality risks but also the timing of mortality events with substantial social and economic costs. These findings have important implications for prioritizing health interventions and social protections targeted at younger males in poorer groups, while recognizing extended vulnerability among females across older ages. The threshold ages provided here offer a disruption-sensitive, contextually relevant benchmark for measuring and addressing premature mortality in population health research.

Does the pattern prevail in Sole-earner loss as well?

Among males (see Figure 6.a), the age-specific probability that the deceased was the household's sole earner rises steeply from young adulthood, peaking between ages 35 and 45, and then declines gradually through older ages. The normalised probabilities for all wealth quintiles follow a similar trajectory, yet subtle wealth-based differentials are visible. Notably, the poorest males tend to have a slightly higher probability of being sole earners in prime working ages, especially at the peak, compared to their richer counterparts. This pattern reflects the heightened economic centrality and vulnerability of male earners in poorer households, where alternative income sources or diversification are less common. The generally elevated probabilities in the critical working age range further emphasise the disproportionate impact of male mortality for households at lower rungs of the wealth ladder.

For females (see Figure 6.b), the probability that a deceased woman was the sole earner remains much lower across all ages, with a maximum normalised probability below 0.10. The age pattern for females also rises to a peak around 40 years and then declines, but the differences by wealth quintile are marginal and do not display a distinct socioeconomic gradient. The low and relatively uniform probabilities across wealth groups suggest that sole female earnership is rare and does not vary meaningfully with household economic status. Collectively, these findings reinforce the critical economic role of males as primary earners, particularly in poorer households, while illustrating the comparatively limited (and less stratified) incidence of sole earner status among females. This triangulated evidence, drawn from additional datasets, underscores the gendered and wealth-based patterns in household economic vulnerability related to the loss of an adult member.

Discussion and Conclusion

This study has offered a novel, characteristics-based conceptualisation of premature mortality grounded in the household-level disruptions caused by death. The findings clearly demonstrate that conventional fixed chronological age cut-offs is inadequate in recognising the

heterogeneous social and economic impacts of mortality. By anchoring premature mortality definitions based on the intensity and timing of household disruptions, this research enhances our understanding of mortality's differential consequences across age, sex, and socioeconomic groups. The observed patterns of peak disruption occurring earlier and more intensely among poorer households, especially among males, highlight the compounding vulnerabilities faced by disadvantaged families, for whom mortality shocks threaten critical working-age contributors. Such disruptions extend beyond the biological loss to affect household roles, economic stability, caregiving arrangements, and social support systems, illustrating the multifaceted repercussions mortality imposes on families.

The results from disruption score analyses and age equivalence methods reveal accelerated mortality burden and premature household impacts in lower wealth quintiles, echoing prior demographic and social science literature on cumulative disadvantage and 'weathering' among socioeconomically marginalised groups (Geronimus et al., 2011; Umberson, 2017). The sex-specific differences, with disruption on account of female death peaking at older ages with less pronounced wealth differentials, underscore the gendered nature of social roles and economic participation in Indian households. The overarching age ranges further indicate that mortality-induced household disruption begins earlier and lasts longer among poorer males than any other group, emphasising the need for social protection policies attuned to life course and socioeconomic realities.

The redefinition of premature mortality based on disruption thresholds justifies the need for a conceptual revision beyond static chronological limits to a dynamic, functionally meaningful measure. The threshold ages identified, lower among the poorest males and higher among females, offer pragmatic benchmarks reflecting where mortality gives rise to substantial household consequences. This disruption-sensitive reading aligns with calls in the global health literature to integrate social determinants and functional outcomes in mortality assessments (Murray et al., 2005). Moreover, the triangulation with sole earner loss probability confirms that male mortality in poorer households disproportionately endangers livelihood, endangering household economic resilience.

While the study advances understanding by integrating mortality characteristics and household context, several limitations merit consideration. The imputation of household disruptions here relies on proxies constructed from available survey data, which may not fully encapsulate the breadth and depth of all possible mortality-induced household challenges. The dimensions

modelled include major known disruptions, but nuances, such as psychological impacts, extended kin support variations, or informal economic shifts, remain underexplored. This research intends to initiate a discourse on the significance of incorporating household-level implications into premature mortality valuation. Future studies with richer longitudinal and qualitative data can very well expand and refine disruption measures to better capture mortality's multifaceted effects within families and communities.

In conclusion, this study's findings reinforce the need for a shift in premature mortality assessment towards a characteristics-based, household disruption-sensitive framework. Such an approach better comprehends the lived realities of mortality consequences, particularly within socioeconomically stratified contexts like India. It encourages policies and interventions that recognise heterogeneity in the timing and impact of death, promoting social and economic supports tailored to the life course, gender, and socioeconomic vulnerabilities of affected households.

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Figures

Figure 1.a: Disruption Scores by age and wealth quintiles for males

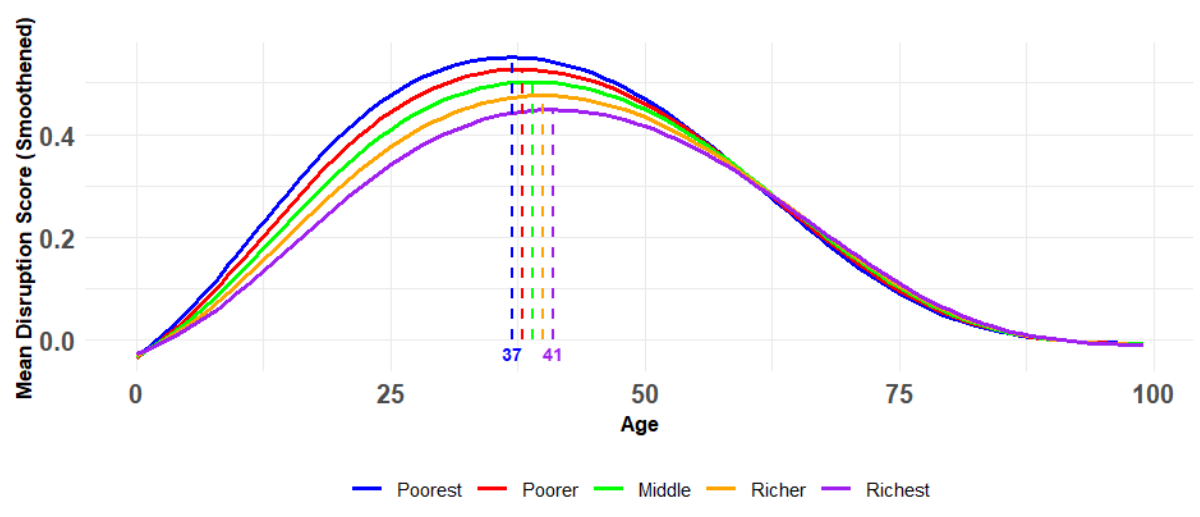


Figure 1.b: Disruption Scores by age and wealth quintiles for females

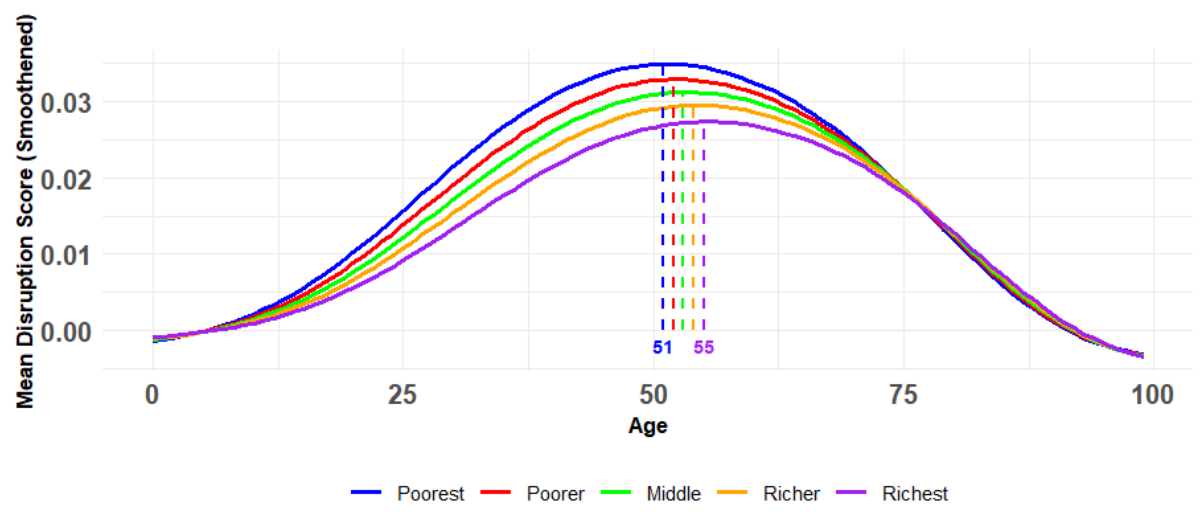


Figure 2: Disruption Score Gap between the Richest and the Poorest

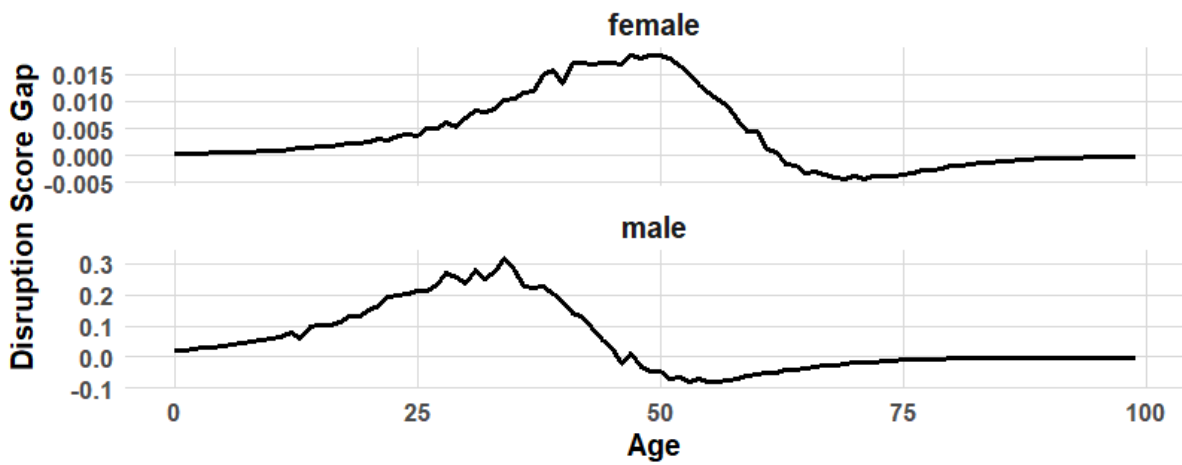
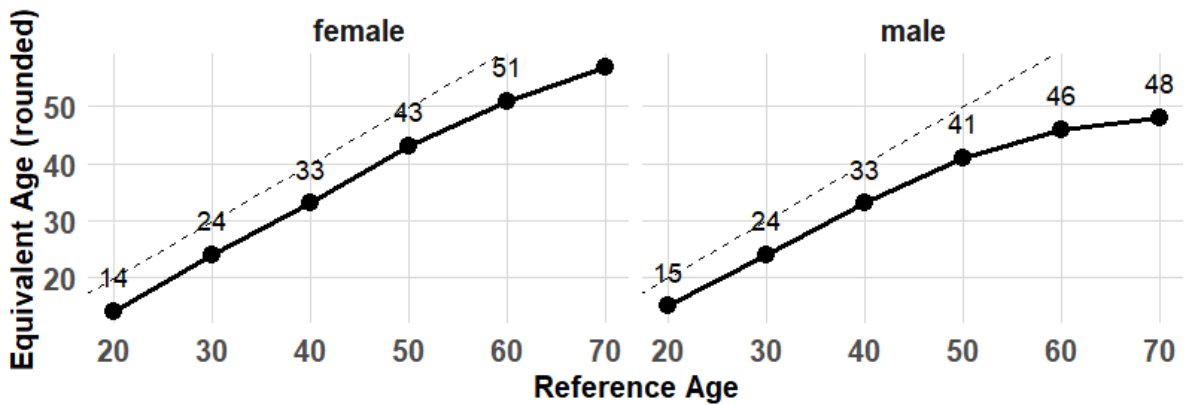
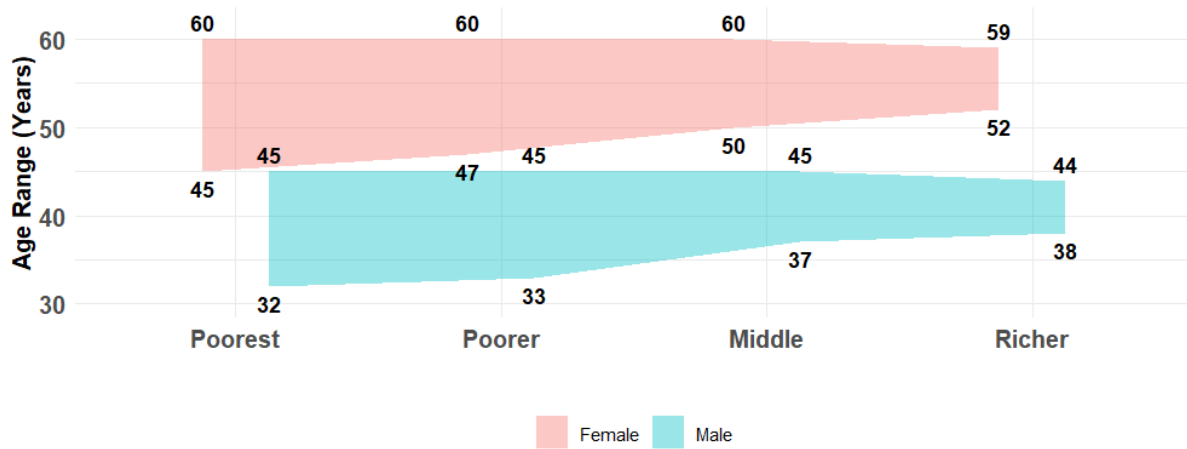


Figure 3.: Equivalent age of disruptions



Reference age is the age of the richest and equivalent age is the age at which the poorest has a similar level of household disruption due to mortality.

Table 4.: Overarching Age ranges of disruptions w.r.t. the richest



Age at which the richest experience peak disruption: 55 years for females and 42 years for males.

Table 5.: Threshold Age for Premature Mortality

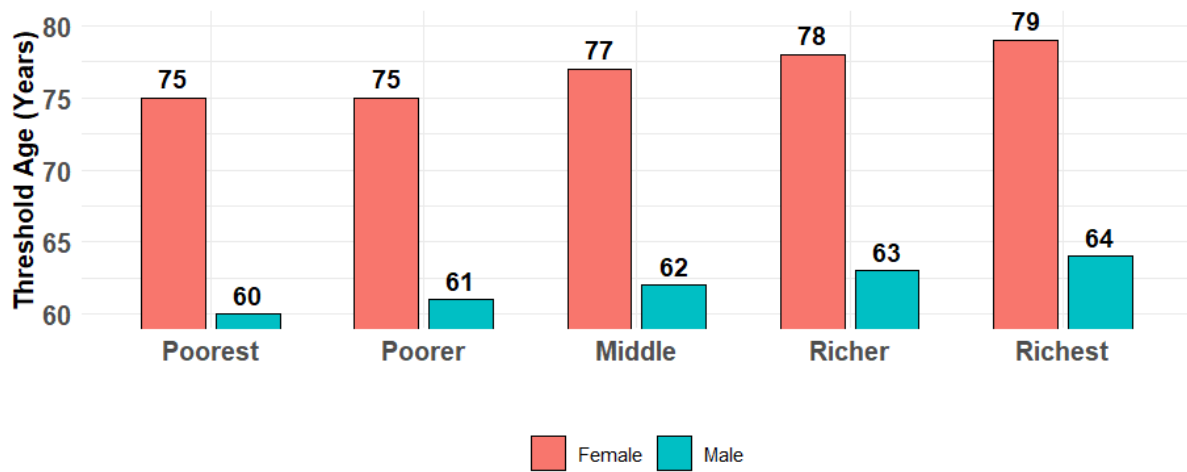


Table 6.a: The Probability that the deceased can be the sole earner for males



Table 6.b: The Probability that the deceased can be the sole earner for females

