SUPPLEMENTAL MATERIAL
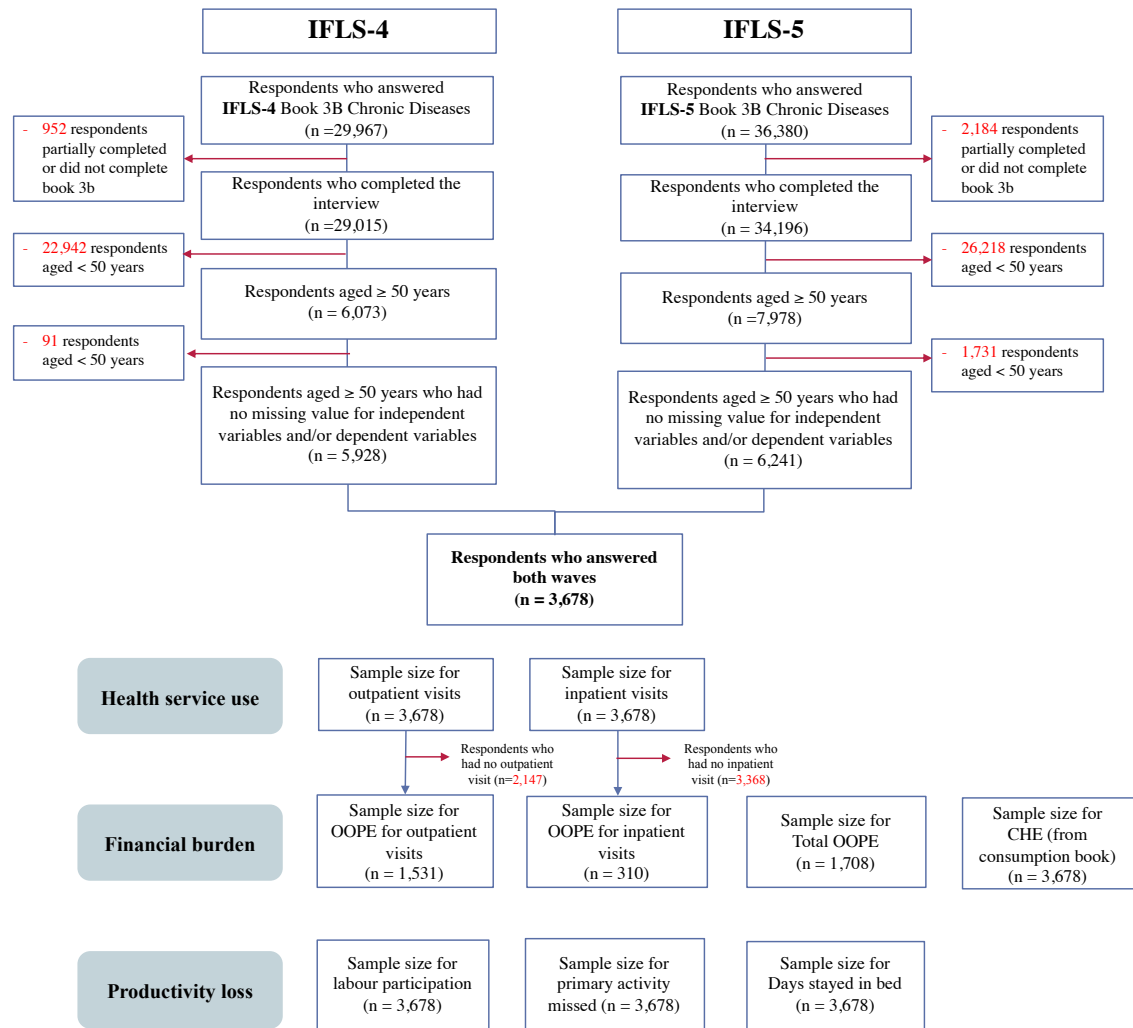
Figure S1. Sample flowchart
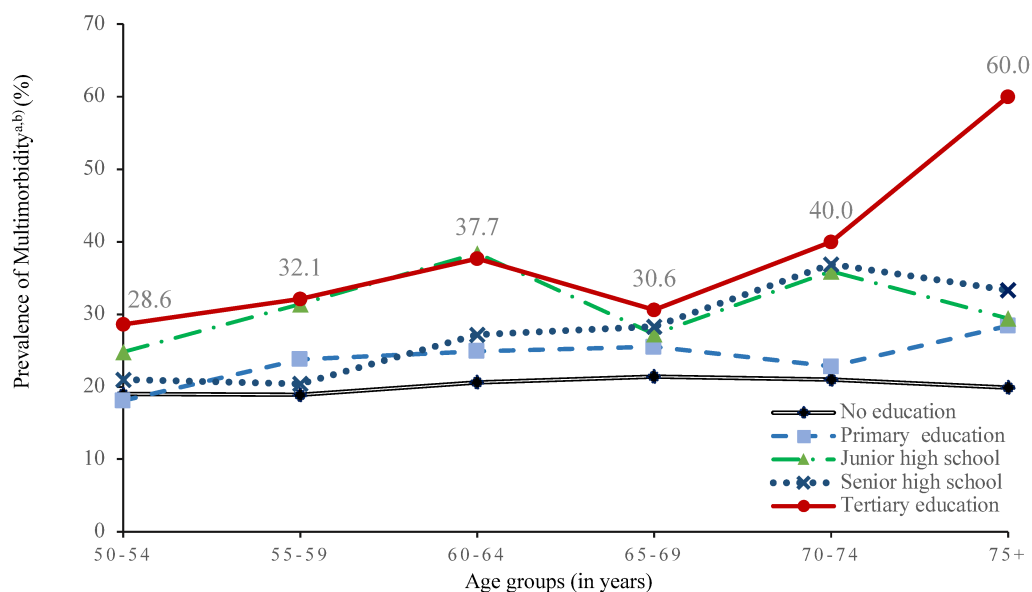
Table S1. List of variables for 2007 & 2014 IFLS analysis

Variables	Type	Measurement	Source of measurement
Dependent variables:			
1) Health service use			
Outpatient care	Binary	0. No 1. Yes	RJ00: In the last 4 weeks have you visited a public hospital-*puskesmas*-private hospital-clinic-health worker or doctor's practice or been visited by a health worker or doctor?
	Numerical	Number of days	RJ02: How many times did you visit / been visited by [...] during the last 4 weeks?
Inpatient care	Binary	0. No 1. Yes	RN00: During the past 12 months have you ever received patient care at a hospital-*puskesmas*-clinic-or other?
	Numerical	Number of days	RN02: How many times have you received inpatient care at […] during the past 12 months?
2) Productivity loss			
Labour participation	Binary	0. No 1. Yes	TK06a: Did you work/try to work/help to earn income for pay for at least 1 hour during the past week?
	Numerical	Number of days	
Activity missed due to poor health	Numerical	Number of days	KK02a: During the last 4 weeks-how many days of your primary daily activities did you miss due to poor health?
Stayed in bed	Numerical	Number of days	KK02b: In the last 4 weeks-how many days have you stayed in bed due to poor health?
3) Financial burden			
OOPE of outpatient care	Numerical	International Dollars	RJ02b: How much did you pay out of pocket for outpatient care at […] during the past 4 weeks?
OOPE of inpatient care	Numerical	International Dollars	RN02b: How much did you pay out of pocket for inpatient care at […] during the past 12 months?
Annual Total OOPE	Numerical	International Dollars	Annual total OOPE for outpatient and inpatient visits
Catastrophic health expenditure	Binary	0. No 1. Yes	Book KS: "How much money spent by all household members for medical costs during the past year?"
Main independent variable			
Number of NCDs	Numerical	Total number of chronic conditions related to NCDs	Book IIIB: CD06a – CD06r: Have a doctor/paramedic/nurse/ midwife ever told you that you had [list of chronic diseases]
	Categorical ordinal	2. No 3. 1 NCD 4. 2 NCDs	

Variables	Type	Measurement	Source of measurement
Multimorbidity	Binary	5. 3+ NCDs 0. No 1. Yes (had 2 or more chronic conditions related to NCDs)	Book IIIB: CD06a – CD06r: Have a doctor/paramedic/nurse/ midwife ever told you that you had [list of chronic diseases]

List of chronic diseases included in the main analysis:
Hypertension, diabetes, asthma, heart attack/coronary heart diseases, liver disease, stroke, cancer, arthritis/rheumatism, hypercholesterolemia, and depression/mental illness.

List of chronic diseases in 2007 IFLS (Wave 4): Hypertension, diabetes, asthma, heart attack/coronary heart diseases, liver disease, stroke, cancer, arthritis/rheumatism, hypercholesterolemia, and depression/mental illness.

List of chronic diseases in 2014 IFLS (Wave 5): Hypertension, diabetes, asthma, heart attack/coronary heart diseases, liver disease, stroke, cancer, arthritis/rheumatism, hypercholesterolemia, mental illness, prostate diseases, kidney diseases (excluding malignancy), digestive diseases, and memory-related diseases.

Covariates

Variables	Type	Measurement	Source of measurement
Age (in years)	Categorical ordinal	0. 40-49 years 1. 50-59 years 2. 60-69 years 3. 70-79 years 4. 80+	Book IIIA: Age: How old are you?
Sex	Binary	0. Male 1. Female	Book IIIA: Sex: (identified by interviewers)
Ethnicity	Categorical nominal	0. Javanese 1. Sundanese 2. Others	
Marital status	Binary	0. Unmarried/Divorce 1. Married or living together	Book IIIA HR00b: Are you currently married?
Education	Categorical ordinal	0. None 1. Elementary school 2. Junior high school 3. High school 4. Tertiary	Book IIIA: DL06: What is the highest education level attended? DL07: What is the highest grade completed at school.
Occupation	Categorical nominal	0. None 1. Casual worker 2. Self-employed 3. Government/private worker	Book IIIA: TK06a: Did you work/try to work/help to earn income for pay for at least 1 hour during the past week? TK15: Which category best describes the work you did in your last job?
Health insurance status	Binary	0. Uninsured (Not covered by any insurance) 1. Insured	Book IIIB: AK01: Are you the policy holder/primary beneficiary of health benefits-health insurance?
Per capita expenditure	Categorical ordinal	0. Q1 (lowest) 1. Q2 2. Q3 3. Q4 4. Q5 (highest)	Book KS
Residency	Binary	0. Rural 1. Urban	Book T-2: SC06: (identified by interviewers)
Region	Categorical nominal	0. Java-Bali 1. Sumatra 2. Nusa Tenggara 3. Kalimantan 4. Sulawesi	Book T-2: SC01: province (identified by interviewers)

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Table S2. Sample characteristics by number of NCDs

Characteristics	2007 (n=3,678)			2014 (n=3,678)		
	Zero NCD (n=1,272)	One NCD (n=1,605)	Multimorbidity (n=801)	Zero NCD (n=1,052)	One NCD (n=1,751)	Multimorbidity (n=875)
Sex						
Male	44.2 (41.5–46.9)	41.7 (39.1–44.5)	14.1 (12.3–16.1)	34.7 (32.1–37.3)	45.9 (43.2–48.7)	19.3 (17.3–21.6)
Female	28.9 (26.7–31.3)	44.2 (41.7–46.7)	26.9 (24.8–29.2)	24.6 (22.5–26.8)	51.1 (48.6–53.6)	24.3 (22.3–26.4)
Age						
50 – 60 years	39.9 (37.55–42.2)	40.3 (38.0–42.6)	19.9 (18.1–21.8)	36.4 (33.0–39.9)	40.1 (36.6–43.7)	23.5 (20.7–26.7)
61 – 70 years	32.3 (29.1–35.6)	45.9 (42.5–49.3)	21.9 (19.2–24.8)	30.2 (27.7–32.9)	48.2 (45.4–51.0)	21.6 (19.4–23.9)
71+ years	23.9 (19.2–29.3)	50.9 (45.2–56.6)	25.2 (20.6–30.4)	22.0 (19.4–25.0)	56.6 (53.2–59.8)	21.4 (18.8–24.2)
Marital status						
Not currently married	25.6 (22.5–29.0)	48.3 (44.6–52.0)	26.1 (23.0–29.4)	23.8 (21.2–26.5)	52.9 (49.9–56.0)	23.3 (20.9–25.9)
Currently married	39.5 (37.4–41.6)	41.2 (39.1–43.4)	19.3 (17.7–21.1)	32.4 (30.2–34.6)	46.3 (44.0–48.7)	21.3 (19.5–23.2)
Educational level						
No education	24.8 (32.5–37.2)	44.8 (42.3–47.2)	20.4 (18.5–22.5)	29.6 (27.4–31.9)	52.4 (50.0–54.8)	18.0 (16.2–19.8)
Primary	40.5 (36.9–44.2)	39.8 (36.2–46/3)	19.7 (17.0–22.7)	28.6 (25.3–32.1)	47.5 (43.7–51.3)	24.0 (20.9–27.3)
Junior high school	34.4 (28.3–41.1)	39.6 (33.4–46.3)	25.9 (20.5–32.3)	31.6 (25.6–38.3)	32.1 (26.1–38.7)	36.3 (30.2–43.0)
Senior high school	35.9 (30.2–42.1)	43.6 (37.5–49.8)	20.5 (15.8–25.9)	28.9 (23.4–35.0)	41.6 (35.6–48.0)	29.5 (24.1–35.5)
Tertiary	23.7 (16.2–33.2)	41.9 (32.1–52.4)	34.4 (25.2–44.8)	23.0 (15.8–32.2)	35.7 (27.0–45.5)	41.2 (31.6–51.6)
Ethnicity						
Javanese	37.0 (34.5–39.6)	43.6 (41.0–46.2)	19.4 (17.4–21.5)	29.7 (27.4–32.1)	50.6 (48.1–53.2)	19.7 (17.8–21.8)
Sundanese	30.4 (25.9–35.2)	40.5 (35.7–45.5)	29.1 (24.8–33.9)	23.5 (19.6–27.9)	49.3 (44.3–54.2)	27.3 (23.1–31.8)
Others	37.0 (34.2–39.9)	43.4 (40.5–46.3)	19.6 (17,4–22.0)	31.7 (29.0–34.7)	44.6 (41.6–47.7)	23.6 (21.2–26.2)
Insurance coverage						
No	36.5 (34.4–38.6)	43.2 (41.1–45.4)	20.3 (18.6–22.1)	31.1 (28.9–33.5)	50.2 (47.7–52.7)	18.7 (16.9–20.7)
Yes	34.2 (30.9–37.7)	42.5 (39.1–46.0)	23.2 (20.4–26.4)	26.7 (24.3–29.2)	46.8 (44.1–49.6)	26.4 (24.2–28.9)
Type of work						
Unemployed	22.5 (19.6–25.6)	46.2 (42.6–49.8)	31.4 (28.1–34.9)	19.6 (17.4–22.1)	50.4 (47.5–53.3)	29.9 (27.4–32.6)
Casual	41.8 (37.6–46.1)	41.3 (37.2–45.6)	16.9 (13.9–20.4)	36.5 (31.6–41.6)	49.7 (44.6–54.8)	13.8 (10.7–17.6)
Self-employed	41.1 (38.4–43.9)	42.1 (39.4–44.8)	16.8 (14.9–18.9)	34.2 (31.5–37.0)	48.4 (45.4–51.3)	17.4 (15.4–19.7)
Government/private	34.8 (29.8–40.2)	43.0 (37.7–48.4)	22.2 (18.0–27.1)	39.6 (33.0–46.5)	39.4 (32.9–46.3)	21.0 (15.8–27.4)
Household expenditure						
Q1 (the lowest)	39.9 (36.0–43.9)	44.1 (40.1–48.1)	15.8 (13.0–18.9)	30.9 (27.5–34.6)	55.6 (51.8–59.3)	13.5 (11.1–16.2)
Q2	39.6 (35.7–43.6)	42.4 (38.6–46.4)	17.9 (15.1–21.2)	31.6 (27.9–35.5)	49.5 (45.4–53.6)	18.9 (15.9–22.3)
Q3	36.4 (32.5–40.5)	43.1(39.1–47.2)	20.5 (17.4–24.0)	31.4 (27.7–35.3)	46.5 (42.5–50.6)	22.1 (18.9–25.7)
Q4	31.7 (27.9–35.7)	44.6 (40.5–48.7)	23.6 (20.3–27.3)	27.0 (23.3–31.1)	47.8 (43.4–52.1)	25.3 (21.9–29.0)
Q5 (the highest)	28.8 (24.9–33.0)	40.5 (36.3–44.9)	30.4 (26.5–34.7)	23.1 (19.6–27.0)	40.7 (36.5–45.0)	36.2 (32.2–40.5)
Residency						
Rural	38.7 (36.3–41.1)	43.2 (40.8–45.7)	18.1 (16.3–20.1)	31.0 (28.6–33.5)	52.1 (49.4–54.7)	16.9 (15.1–19.0)
Urban	31.2 (28.7–33.7)	42.7 (40.1–45.4)	26.1 (23.8–28.6)	27.3 (25.1–29.6)	45.0 (42.5–47.5)	27.7 (25.5–30.0)
Island						
Java-Bali	36.5 (34.4–38.7)	41.9 (39.7–44.1)	21.6 (19.9–23.5)	29.7 (27.7–31.7)	49.3 (47.1–51.5)	21.1 (19.3–22.9)
Sumatra	34.6 (31.0–38.4)	45.9 (42.0–49.8)	19.6 (16.7–22.8)	27.9 (24.6–31.6)	45.4 (41.6–49.4)	26.6 (23.3–30.2)
Nusa Tenggara	44.0 (37.7–50.5)	41.6 (35.3–48.1)	14.5 (10.6–19.5)	31.4 (25.7–37.7)	54.1 (47.6–60.5)	14.5 (10.5–19.6)
Kalimantan	25.2 (19.2–32.4)	56.9 (49.0–64.4)	17.9 (12.7–24.5)	23.4 (17.6–30.6)	42.4 (35.0–50.1)	34.2 (27.4–41.7)
Sulawesi	30.0 (23.3–37.6)	50.4 (42.6–58.2)	19.6 (14.1–26.6)	26.7 (20,3–34.2)	49.7 (41.8–57.5)	23.7 (17.6–31.0)
Overall (N, %)	1,272 (35.9)	1,605 (43.0)	801 (21.0)	1,052 (29.2)	1,751 (48.7)	875 (22.0)

Figure S2. Prevalence of multimorbidity by age group and level of education

a) respondents who reported that they had 2 or more chronic conditions related to noncommunicable diseases (NCDs). b) Pooled sample of Wave 4 and Wave 5.

Table S3. Intraclass correlation coefficients (ICC) on multimorbidity, health service use and labour participation

	Multimorbidity	Any outpatient visit	Any inpatient visit	10% of total household expenditure	25% of total household expenditure	40% of non-food expenditure	Labour participation
Individual							
Variance (SE)	1.09 (0.25)	0.10 (0.18)	0.57 (0.74)	0 (0)	0 (0)	0 (0)	1.22 (0.30)
ICC (SE)	0.34 (0.03)	0.14 (0.03)	0.25 (0.12)	0.25 (0.03)	0.48 (0.04)	0.69 (0.04)	0.48 (0.03)
Household							
Variance (SE)	0.64 (0.20)	0.43 (0.14)	0.54 (0.57)	1.13 (0.20)	3.08 (0.55)	7.29 (1.3)	1.70 (0.28)
ICC (SE)	0.13 (0.40)	0.11 (0.04)	0.12 (0.12)	0.25 (0.03)	0.48 (0.04)	0.69 (0.04)	0.28 (0.04)
District							
Variance (SE)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.07 (0.04)
ICC (SE)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.01 (0.01)

Note:
All models are controlled for study variables, including sex, age, marital status, education, ethnicity, insurance coverage, type of work, per capita expenditure (PCE), residency, and region. SE: standard error. ICC: intraclass correlation

Table S4. Robustness check: descriptive summary and factors associated with multimorbidity (cross-sectional analysis of 2014 IFLS)

Characteristics	Weighted % Of sample	Zero NCD (%, 95% CI)	One NCD (%, 95% CI)	Two NCDs (%, 95% CI)	Three or more NCDs (%, 95% CI)	Multimorbidity[b] (%, 95% CI)	aOR (95% CI)
Sex							
Female	51.9	24.8 (22.3, 26.3)	46.1 (44.4, 47.8)	18.8 (17.5, 20.1)	10.3 (9.3, 11.4)	29.1 (27.6, 30.6)	1
Male	48.1	36.5 (34.7, 38.3)	42.0 (40.2, 43.9)	14.0 (12.8, 15.4)	7.4 (6.5, 8.4)	21.5 (20.0, 23.0)	0.68*** (0.59–0.78)
Age							
50 – 60 years	56.2	35.3 (33.7, 37.1)	41.0 (39.3, 42.7)	15.2 (14.0, 16.5)	8.5 (7.6, 9.5)	23.7 (22.8, 25.2)	1
61 – 70 years	25.6	26.5 (24.4, 28.8)	45.4 (42.9, 47.9)	17.7 (15.9, 19.6)	10.4 (9.0, 11.9)	28.1 (25.6, 30.3)	1.23*** (1.10–1.42)
71+ years	18.2	20.8 (18.6, 23.3)	52.2 (49.4, 55.1)	18.8 (16.7, 21.0)	8.2 (6.8, 9.8)	26.9 (24.6, 29.5)	1.85 (0.99–1.42)
Marital status							
Not currently married	28.2	24.7 (22.7, 26.8)	46.9 (44.6, 49.2)	19.3 (17.5, 21.2)	9.1 (8.0, 10.5)	28.4 (26.4, 30.5)	1
Currently married	71.8	32.7 (31.3, 34.1)	43.1 (41.6, 44.6)	15.4 (14.4, 16.5)	8.8 (8.0, 9.7)	24.2 (23.0, 25.5)	1.05 (0.89–1.21)
Educational level							
No education	53.3	31.3 (29.7, 33.0)	47.7 (45.9, 49.4)	14.1 (13.0, 15.4)	6.9 (6.1, 7.8)	21.0 (19.7, 22.4)	1
Primary	23.8	30.0 (27.6, 32.4)	42.8 (40.2, 45.4)	18.2 (16.3, 20.3)	9.0 (7.7, 10.6)	27.2 (25.0, 29.6)	1.35*** (1.16–1.57)
Junior high school	7.8	30.9 (27.0, 35.1)	34.8 (30.7, 39.1)	20.2 (16.9, 23.9)	14.2 (11.4, 17.5)	34.4 (30.3, 38.6)	1.66*** (1.33–2.06)
Senior high school	10.0	30.4 (26.9, 34.1)	38.7 (35.0, 42.6)	18.0 (15.3, 21.1)	12.8 (10.4, 15.7)	30.9 (27.4, 34.5)	1.23 (0.99–1.53)
Tertiary	5.1	22.8 (18.5, 27.8)	38.7 (33.5, 44.2)	24.4 (20.0, 29.4)	14.1 (10.6, 18.4)	38.4 (33.3, 43.9)	1.77*** (1.33–2.36)
Ethnicity							
Javanese	56.3	31.3 (29.7, 33.0)	45.7 (44.0, 47.5)	15.2 (14.0, 16.5)	7.7 (6.8, 8.6)	22.9 (21.5, 24.4)	1
Sundanese	15.5	22.9 (20.1 25.9)	43.4 (40.0, 46.8)	21.1 (18.4, 24.0)	12. (10.6, 15.1)	33.7 (30.6, 37.0)	1.53*** (1.28–1.83)
Others	28.2	32.7 (30.8, 34.7)	41.5 (39.4, 43.5)	16.5 (15.1, 18.0)	9.3 (8.2, 10.6)	25.8 (24.1, 27.6)	1.04 (0.89–1.22)
Had any health insurance							
No	53.9	32.4 (30.8, 34.1)	46.2 (44.4, 47.9)	14.3 (13.1, 15.5)	7.1 (6.3, 8.1)	21.4 (20.1, 22.9)	1
Yes	46.1	28.1 (26.5, 29.8)	41.8 (40.0, 43.6)	19.0 (17.7, 20.5)	11.0 (9.9, 12.2)	30.0 (28.4, 31.7)	1.22*** (1.23–1.57)
Type of work							
Unemployed	30.6	19.8 (18.1, 21.7)	44.2 (42.0, 46.4)	21.3 (19.6, 23.2)	14.6 (13.2, 16.3)	36.0 (33.9, 38.1)	1
Casual	15.6	36.1 (33.0, 39.4)	45.5 (42.2, 48.7)	13.3 (11.3, 15.7)	5.0 (3.8, 6.6)	18.4 (16.0, 21.0)	0.50*** (0.41–0.62)
Self-employed	39.8	34.6 (32.7, 36.6)	44.4 (42.4, 46.4)	14.5 (13.2, 16.0)	6.4 (5.5, 7.5)	21.0 (19.4, 22.7)	0.57*** (0.49–0.66)
Government/private	14.0	35.2 (32.0, 38.6)	41.9 (38.6, 45.4)	15.0 (12.8, 17.5)	7.8 (6.2, 9.9)	22.8 (20.1, 25.8)	0.50*** (0.40–0.62)
Household expenditure							
Q1 (the lowest)	21.3	33.2 (30.7, 35.9)	49.3 (46.5, 52.1)	12.7 (11.0, 14.6)	4.8 (3.7, 6.1)	17.5 (15.5, 19.6)	1
Q2	20.9	33.5 (30.8, 36.2)	45.0 (42.3, 47.9)	15.6 (13.7, 17.7)	5.8 (4.6, 7.3)	21.5 (19.2, 23.8)	1.28** (1.05–1.58)
Q3	19.8	31.7 (29.1, 34.4)	43.7 (41.0, 46.5)	6.0 (14.0, 18.1)	8.6 (7.2, 10.3)	24.6 (22.2, 17.1)	1.46*** (1.19–1.78)
Q4	19.5	28.8 (26.3, 31.5)	41.5 (38.7, 44.3)	18.8 (16.7, 21.1)	10.9 (9.3, 12.7)	19.7 (27.2, 32.3)	1.80*** (1.47–2.20)
Q5 (the highest)	18.5	24.0 (21.7, 26.5)	40.5 (37.8, 43.3)	19.9 (17.8, 22.2)	15.5 (13.5, 17.6)	35.4 (32.8, 38.1)	2.03*** (1.65–2.50)
Residency							
Rural	48.9	33.3 (31.5, 35.1)	46.4 (44.5, 48.3)	14.2 (12.9, 15.5)	6.1 (52.5, 7.0)	20.3 (18.8, 21.8)	1
Urban	51.3	27.7 (26.2, 29.2)	42.0 (40.3, 43.7)	19.0 (17.4, 20.0)	11.6 (10.6, 12.7)	30.3 (28.8, 31.9)	1.37*** (1.19–1.56)
Island							
Java-Bali	78.6	30.3 (28.9, 31.7)	44.7 (43.2, 16.2)	16.0 (15.0, 17.1)	9.0 (8.2, 9.9)	25.1 (23.8, 26.4)	1
Sumatra	14.0	30.6 (28.2, 33.1)	41.1 (38.5, 43.7)	19.1 (17.1, 21.2)	9.2 (7.8, 10.8)	28.3 (26.0, 30.7)	1.34*** (1.14–1.58)
Nusa Tenggara	2.4	37.2 (32.9, 41.7)	47.2 (42.7, 51.7)	13.3 (10.5, 16.6)	2.3 (12.8, 4.1)	15.6 (12.6, 19.1)	0.62*** (0.46–0.83)
Kalimantan	2.4	24.3 (19.7, 29.5)	41.5 (36.1, 47.2)	22.9 (18.6, 27.9)	11.3 (8.2, 15.3)	34.2 (29.1, 39.7)	2.02*** (1.53–2.67)
Sulawesi	2.6	33.6 (28.7, 38.9)	44.7 (39.4, 50.0)	14.2 (10.9, 18.4)	7.5 (5.2, 10.6)	21.7 (17.7, 26.4)	0.87 (0.64–1.18)
Overall Sample	100	30.4 (29.3, 31.6)	44.1 (42.9, 45.4)	16.5 (15.6, 17.4)	8.9 (8.2, 9.6)	25.4 (24.3, 26.5)	

[a] Weighted sample size

[b] We defined multimorbidity if the respondents reported that they had 2 or more chronic conditions related to NCDs. Chronic diseases in IFLS5 included hypertension, diabetes mellitus, asthma, chronic heart diseases, mental health issue, stroke, liver diseases, cancer/malignancies, liver, arthritis, high cholesterol, prostate illness kidney diseases, digestive system diseases.

aOR: adjusted odds ratio

*** p<0.01, ** p<0.05

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Table S5. Robustness check: The effect of multimorbidity on health service use (cross-sectional analysis of 2014 IFLS)

Variables	Health service use			
	Outpatient		Inpatient	
	Any visit	Number of visits	Any visit	Number of visits
	aOR (95% CI)	IRR (95% CI)	aOR (95% CI)	IRR (95% CI)
Number of NCDs (ref. no NCD)				
Single NCD	1.54*** (1.30–1.82)	1.50*** (1.24–1.81)	1.73** (1.17–2.56)	2.03*** (1.36–3.03)
Two NCDs	2.77*** (2.29–3.36)	2.68*** (2.15–3.34)	3.47*** (2.31–5.21)	4.03*** (2.66–6.08)
Three or more NCDs	4.51*** (3.61–5.63)	3.85*** (3.06–4.84)	6.85***(4.45–10.52)	8.78*** (5.73–13.45)
Sex (ref. Male)				
Female	1.26***(1.09–1.45)	1.18**(1.02–1.35)	0.93 (0.72–1.22)	0.81 (0.62–1.07)
Age (ref. 50 – 60 years)				
61 – 70 years	1.01 (0.87–1.18)	0.93 (0.80–1.08)	1.23 (0.91–1.65)	1.23 (0.88–1.72)
71+ years	1.03 (0.85–1.25)	1.01 (0.84–1.21)	1.42 (1.02–2.00)	1.53** (1.01–2.32)
Marital status (ref. Not married)				
Currently married	1.09 (0.93–1.27)	1.04 (0.90–1.21)	1.07 (0.80–1.41)	0.93 (0.70–1.25)
Educational level (ref. No education)				
Primary	0.94 (0.80–1.10)	0.87* (0.74–1.01)	1.02 (0.75–1.39)	0.96 (0.69–1.35)
Junior high school	1.02 (0.80–1.31)	1.07 (0.76–1.52)	0.72 (0.45–1.14)	0.82 (0.47–1.44)
Senior high school	0.87 (0.68–1.10)	0.80* (0.64–1.00)	0.69 (0.44–1.08)	0.63* (0.39–1.00)
Tertiary	0.99 (0.73–1.33)	0.79 (0.55–1.13)	0.58* (0.33–1.02)	0.55* (0.30–1.00)
Ethnicity (ref. Javanese)				
Sundanese	0.93 (0.77–1.13)	0.97 (0.81–1.17)	1.17 (0.84–1.63)	1.21 (0.82–1.79)
Others	1.06 (0.89–1.25)	0.99 (0.84–1.17)	0.78 (0.56–1.08)	0.87 (0.62–1.22)
Insurance coverage (ref. No)				
Yes	1.20*** (1.06–1.37)	1.25*** (1.10–1.44)	2.28*** (1.77–2.95)	2.19*** (1.66–2.89)
Type of work (ref. Unemployed)				
Casual	0.73*** (0.59–0.90)	0.73*** (0.60–0.89)	0.41*** (0.25–0.67)	0.35*** (0.22–0.55)
Self-employed	0.77*** (0.66–0.90)	0.77*** (0.66–0.90)	0.64*** (0.47–0.87)	0.64*** (0.46–0.90)
Government/private	0.70*** (0.56–0.88)	0.75*** (0.60–0.93)	0.43*** (0.28–0.66)	0.53** (0.30–0.94)
Per capita expenditure (ref. Q1)				
Q2	1.36*** (1.10–1.68)	1.40*** (1.14–1.73)	0.86 (0.57–1.31)	0.76 (0.48–1.18)
Q3	1.50*** (1.21–1.85)	1.71*** (1.35–2.17)	1.16 (0.78–1.72)	1.29 (0.80–2.05)
Q4	1.93*** (1.56–2.38)	1.75*** (1.44–2.14)	1.24 (0.83–1.85)	1.35 (0.87–2.08)
Q5	1.87*** (1.50–2.33)	2.02*** (1.63–2.51)	2.06*** (1.38–3.06)	1.98*** (1.32–2.96)
Residency (ref. Rural)				
Urban	0.94 (0.82–1.08)	0.98 (0.86–1.13)	0.93 (0.71–1.21)	1.03 (0.79–1.34)
Region (ref. Java-Bali)				
Sumatra	0.72*** (0.60–0.86)	0.86 (0.72–1.03)	1.32 (0.96–1.82)	1.46** (1.04–2.06)
Nusa Tenggara	0.84 (0.63–1.12)	0.84 (0.63–1.12)	1.83** (1.09–3.06)	1.87** (1.08–3.25)
Kalimantan	0.81 (0.59–1.11)	0.85 (0.62–1.14)	1.46 (0.82–2.58)	1.4 (0.81–2.42)
Sulawesi	0.54*** (0.39–0.75)	0.53*** (0.39–0.71)	1.45 (0.81-2.60)	1.59 (0.85–2.98)

Chronic diseases in IFLS5 included hypertension-diabetes mellitus-asthma-chronic heart diseases-mental health issue-stroke-liver diseases-cancer/malignancies-liver-arthritis-high cholesterol-prostate illness kidney diseases-digestive system diseases.
aOR: adjusted odds ratio, IRR: incidence rate ratio, NCD: noncommunicable disease
*** p<0.01, ** p<0.05

Table S6. Robustness check: The effect of multimorbidity on catastrophic health expenditure (cross-sectional analysis of 2014 IFLS)

Variables	Catastrophic health expenditure		
	10% of total household expenditure	25% of total household expenditure	40% of non-food expenditure
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Number of NCDs (ref. no NCD)			
Single NCD	1.25 (0.94–1.66)	1.18 (0.67–2.09)	1.58 (0.98–2.57)
Two NCDs	2.03*** (1.48–2.79)	2.10** (1.12–3.93)	2.39*** (1.38–4.14)
Three or more NCDs	2.24*** (1.57–3.20)	2.09** (1.06–4.12)	2.17** (1.18–4.01)
Sex (ref. Male)			
Female	0.87 (0.68–1.12)	0.74 (0.43–1.27)	0.90 (0.59–1.37)
Age (ref. 50 – 60 years)			
61 – 70 years	1.24 (0.96–1.60)	1.34 (0.82–2.20)	1.42 (0.94–2.14)
71+ years	1.32 (0.96–1.81)	1.06 (0.53–2.13)	1.48 (0.88–2.51)
Marital status (ref. Not married)			
Currently married	1.44** (1.08–1.91)	1.69* (0.91–3.17)	1.94*** (1.20–3.14)
Educational level (ref. No education)			
Primary	1.14 (0.88–1.48)	1.31 (0.79–2.17)	1.46 (0.98–2.18)
Junior high school	1.11 (0.76–1.63)	1.28 (0.67–2.46)	1.12 (0.63–1.98)
Senior high school	0.73 (0.49–1.08)	0.52 (0.22–1.23)	0.45** (0.21–0.97)
Tertiary	0.74 (0.43–1.27)	0.22 (0.05–1.01)	0.12** (0.02–0.66)
Ethnicity (ref. Javanese)			
Sundanese	0.87 (0.64–1.18)	1.09 (0.62–1.89)	0.83 (0.51–1.35)
Others	0.79 (0.60–1.04)	0.65 (0.36–1.18)	0.47*** (0.28–0.78)
Insurance coverage (ref. No)			
Yes	1 (0.81–1.25)	1.07 (0.71–1.61)	1.02 (0.72–1.44)
Type of work (ref. Unemployed)			
Casual	0.66** (0.46–0.95)	0.56 (0.27–1.16)	0.56 (0.31–1.04)
Self-employed	0.70*** (0.53–0.91)	0.44*** (0.24–0.79)	0.54*** (0.34–0.85)
Government/private	0.57*** (0.39–0.83)	0.41** (0.19–0.88)	0.46** (0.23–0.91)
Per capita expenditure (ref. Q1)			
Q2	0.96 (0.65–1.43)	1.05 (0.47–2.35)	1.24 (0.67–2.33)
Q3	1.42 (0.99–2.02)	1 (0.46–2.17)	1.08 (0.58–2.01)
Q4	1.59** (1.11–2.27)	2.37** (1.15–4.86)	2.18*** (1.21–3.92)
Q5	2.53*** (1.76–3.62)	2.44** (1.18–5.05)	2.75*** (1.51–5.02)
Residency (ref. Rural)			
Urban	1.01 (0.80–1.26)	0.87 (0.56–1.37)	0.94 (0.65–1.35)
Region (ref. Java-Bali)			
Sumatra	0.94 (0.71–1.24)	0.94 (0.55–1.60)	1.36 (0.88–2.09)
Nusa Tenggara	0.81 (0.48–1.37)	1.49 (0.59–3.76)	1.57 (0.68–3.66)
Kalimantan	1.13 (0.69–1.84)	1.5 (0.59–3.83)	1.56 (0.71–3.47)
Sulawesi	1.02 (0.60–1.73)	0.4 (0.08–2.07)	1.18 (0.45–3.10)

Chronic diseases in IFLS5 included hypertension-diabetes mellitus-asthma-chronic heart diseases-mental health issue-stroke-liver diseases-cancer/malignancies-liver-arthritis-high cholesterol-prostate illness kidney diseases-digestive system diseases.
aOR: adjusted odds ratio, IRR: incidence rate ratio, NCD: noncommunicable disease
*** p<0.01, ** p<0.05

Table S7. Robustness check: The effect of multimorbidity on productivity loss (cross-sectional analysis of 2014 IFLS)

	Productivity loss		
Variables	**Labour participation**	**Days primary activity missed**	**Days stayed in bed**
	aOR (95% CI)	IRR (95% CI)	IRR (95% CI)
Number of NCDs (ref. no NCD)			
Single NCD	0.76*** (0.65–0.89)	1.48*** (1.29–1.70)	1.32** (1.01–1.72)
Two NCDs	0.54*** (0.45–0.65)	2.42*** (2.09–2.80)	2.18*** (1.60–2.97)
Three or more NCDs	0.32*** (0.26–0.40)	3.29*** (2.79–3.87)	2.80*** (2.02–3.88)
Sex (ref. Male)			
Female	0.31***(0.27–0.35)	1.05 (0.94–1.18)	1.22 (0.97–1.54)
Age (ref. 50 – 60 years)			
61 – 70 years	0.40*** (0.34–0.46)	0.97 (0.86–1.10)	0.93 (0.72–1.21)
71+ years	0.15*** (0.13–0.18)	1.19** (1.03–1.37)	1.78*** (1.33–2.36)
Marital status (ref. Not married)			
Currently married	1.22*** (1.05–1.41)	1.07 (0.95–1.20)	0.93 (0.72–1.21)
Primary	1.08 (0.92–1.26)	1.02 (0.90–1.17)	1.03 (0.81–1.32)
Junior high school	0.64*** (0.51–0.81)	1.02 (0.85–1.22)	1.01 (0.64–1.61)
Senior high school	0.61*** (0.49–0.76)	0.73*** (0.60–0.89)	0.73 (0.46–1.15)
Tertiary	1.09 (0.79–1.48)	0.59*** (0.43–0.83)	0.37*** (0.19–0.71)
Ethnicity (ref. Javanese)			
Sundanese	0.69*** (0.57–0.83)	1.25*** (1.10–1.43)	1.70*** (1.29–2.24)
Others	0.72*** (0.61–0.86)	0.93 (0.81–1.07)	1.34** (1.01–1.77)
Insurance coverage (ref. No)			
Yes	0.91 (0.80–1.04)	1.02 (0.92–1.13)	0.87 (0.71–1.06)
Type of work (ref. Unemployed)			
Casual		0.51*** (0.43–0.60)	0.28*** (0.20–0.39)
Self-employed	n/a	0.55*** (0.49–0.63)	0.33*** (0.26–0.42)
Government/private		0.44*** (0.37–0.54)	0.22*** (0.14–0.33)
Per capita expenditure (ref. Q1)			
Q2	1.25** (1.03–1.52)	1.02 (0.88–1.19)	1.11 (0.82–1.51)
Q3	1.17 (0.96–1.43)	1.12 (0.95–1.32)	0.8 (0.59–1.09)
Q4	0.96 (0.79–1.17)	0.95 (0.81–1.12)	0.89 (0.66–1.21)
Q5	1.07 (0.86–1.32)	1.02 (0.86–1.20)	0.83 (0.61–1.14)
Residency (ref. Rural)			
Urban	0.57*** (0.50–0.65)	1 (0.90–1.12)	0.88 (0.72–1.09)
Region (ref. Java-Bali)			
Sumatra	1.04 (0.87–1.23)	1.12 (0.97–1.29)	1.03 (0.78–1.36)
Nusa Tenggara	1.17 (0.89–1.54)	1.14 (0.92–1.42)	0.91 (0.59–1.40)
Kalimantan	1.42** (1.02–1.99)	1.16 (0.91–1.48)	0.73 (0.48–1.10)
Sulawesi	0.59*** (0.43–0.79)	1.39** (1.07–1.81)	1.05 (0.70–1.59)

Chronic diseases in IFLS5 included hypertension-diabetes mellitus-asthma-chronic heart diseases-mental health issue-stroke-liver diseases-cancer/malignancies-liver-arthritis-high cholesterol-prostate illness kidney diseases-digestive system diseases.
aOR: adjusted odds ratio, IRR: incidence rate ratio, NCD: noncommunicable disease
*** p<0.01, ** p<0.05

Table S8. Sensitivity analysis: the effect of multimorbidity on health service use

Obesity (BMI ≥25 kg/m2 as obese) is included in the clustering of multimorbidity

Variables	Health service use							
	Outpatient				Inpatient			
	Any visit[a]		Number of visits[b]		Any visit[a]		Number of visits[b]	
	aOR (95% CI)	p values	IRR (95% CI)	p values	aOR (95% CI)	p values	IRR (95% CI)	p values
Number of NCDs (ref. no NCD)								
Single NCD	1.18 (0.98–1.43)	0.086	1.24 (1.04–1.50)	0.020	1.16 (0.79–1.70)	0.451	1.16 (0.79–1.70)	0.488
Two NCDs	1.82 (1.47–2.25)	0.000	1.83 (1.50–2.25)	0.000	1.78 (1.18–2.69)	0.006	1.78 (1.18–2.69)	0.002
Three or more NCDs	3.27 (2.55–4.19)	0.000	2.85 (2.26–3.60)	0.000	2.73 (1.76–4.25)	0.000	2.73 (1.76–4.25)	0.000
Period (ref.2007)								
2014	1.33 (1.15–1.53)	0.000	1.29 (1.12–1.49)	0.000	1.72 (1.29–2.29)	0.000	1.72 (1.29–2.29)	0.000
Sex (ref. Male)								
Female	1.19 (1.00–1.41)	0.049	1.13 (0.96–1.33)	0.139	0.91 (0.67–1.24)	0.537	0.91 (0.67–1.24)	0.413
Age (ref. 50 – 60 years)								
61 – 70 years	1.06 (0.90–1.26)	0.475	1.05 (0.89–1.23)	0.588	1.09 (0.79–1.50)	0.603	1.09 (0.79–1.50)	0.332
71+ years	1.20 (0.96–1.50)	0.109	1.15 (0.93–1.41)	0.187	1.58 (1.07–2.33)	0.020	1.58 (1.07–2.33)	0.020
Marital status (ref. Not married)								
Currently married	1.09 (0.92–1.31)	0.323	1.15 (0.97–1.36)	0.105	1.05 (0.77–1.44)	0.742	1.05 (0.77–1.44)	0.962
Educational level (ref. No education)								
Primary	1.06 (0.88–1.27)	0.556	0.97 (0.82–1.16)	0.760	1.09 (0.78–1.51)	0.630	1.09 (0.78–1.51)	0.796
Junior high school	1.04 (0.78–1.40)	0.777	1.11 (0.85–1.46)	0.441	1.18 (0.73–1.92)	0.498	1.18 (0.73–1.92)	0.105
Senior high school	1.01 (0.76–1.35)	0.954	0.94 (0.72–1.23)	0.636	0.78 (0.47–1.29)	0.335	0.78 (0.47–1.29)	0.147
Tertiary	1.18 (0.79–1.76)	0.427	0.84 (0.57–1.23)	0.371	0.94 (0.50–1.78)	0.858	0.94 (0.50–1.78)	0.495
Ethnicity (ref. Javanese)								
Sundanese	0.91 (0.72–1.16)	0.456	0.92 (0.74–1.15)	0.486	0.90 (0.59–1.37)	0.628	0.90 (0.59–1.37)	0.944
Others	1.02 (0.85–1.24)	0.802	0.92 (0.77–1.09)	0.313	0.91 (0.65–1.28)	0.603	0.91 (0.65–1.28)	0.557
Insurance coverage (ref. No)								
Yes	1.48 (1.27–1.73)	0.000	1.57 (1.36–1.81)	0.000	2.02 (1.52–2.69)	0.000	2.02 (1.52–2.69)	0.000
Type of work (ref. Unemployed)								
Casual	0.77 (0.61–0.97)	0.025	0.66 (0.53–0.82)	0.000	0.48 (0.30–0.79)	0.003	0.48 (0.30–0.79)	0.001
Self-employed	0.83 (0.70–0.99)	0.041	0.76 (0.64–0.89)	0.001	0.60 (0.43–0.83)	0.002	0.60 (0.43–0.83)	0.001
Government/private	0.74 (0.56–0.98)	0.034	0.67 (0.52–0.88)	0.004	0.61 (0.36–1.02)	0.061	0.61 (0.36–1.02)	0.242
Per capita household expenditure (ref. Q1)								
Q2	1.48 (1.17–1.86)	0.001	1.50 (1.20–1.87)	0.000	1.26 (0.80–2.01)	0.322	1.26 (0.80–2.01)	0.500
Q3	1.71 (1.35–2.15)	0.000	1.74 (1.39–2.17)	0.000	1.77 (1.14–2.76)	0.012	1.77 (1.14–2.76)	0.003
Q4	1.70 (1.34–2.16)	0.000	1.77 (1.41–2.22)	0.000	1.44 (0.90–2.31)	0.131	1.44 (0.90–2.31)	0.092
Q5	1.79 (1.39–2.31)	0.000	1.98 (1.56–2.51)	0.000	2.67 (1.68–4.26)	0.000	2.67 (1.68–4.26)	0.000
Residency (ref. Rural)								
Urban	0.87 (0.74–1.02)	0.093	0.92 (0.79–1.07)	0.258	0.96 (0.72–1.28)	0.775	0.96 (0.72–1.28)	0.689
Region (ref. Java-Bali)								
Sumatra	0.83 (0.67–1.03)	0.094	1.03 (0.85–1.26)	0.736	1.21 (0.84–1.75)	0.294	1.21 (0.84–1.75)	0.322
Nusa Tenggara	0.69 (0.48–0.99)	0.043	0.62 (0.44–0.87)	0.006	1.24 (0.69–2.22)	0.467	1.24 (0.69–2.22)	0.707
Kalimantan	1.04 (0.71–1.50)	0.851	1.31 (0.94–1.83)	0.115	0.99 (0.50–1.97)	0.982	0.99 (0.50–1.97)	0.764
Sulawesi	0.72 (0.48–1.07)	0.107	0.68 (0.47–0.99)	0.043	0.52 (0.22–1.22)	0.134	0.52 (0.22–1.22)	0.055

[a] Multilevel logistic regression model
[b] Multilevel negative binomial regression model
Obesity (BMI ≥25 kg/m2 as obese) is included in the clustering of multimorbidity
aOR: adjusted odds ratio, IRR: Incidence rate ratio, NCD: noncommunicable disease

Supplemental material

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Table S9. Sensitivity analysis: the effect of multimorbidity on catastrophic expenditure

Obesity (BMI ≥25 kg/m2 as obese) is included in the clustering of multimorbidity

Variables	Catastrophic health expenditure					
	10% of total household expenditure[a]		25% of total household expenditure[a]		40% of non-food expenditur[a]	
	aOR (95% CI)	p values	aOR (95% CI)	p values	aOR (95% CI)	p values
Number of NCDs (ref. no NCD)						
Single NCD	1.12 (0.84–1.51)	0.434	0.89 (0.54–1.47)	0.642	0.93 (0.62–1.41)	0.743
Two NCDs	1.23 (0.88–1.72)	0.235	1.27 (0.74–2.17)	0.382	1.22 (0.77–1.91)	0.396
Three or more NCDs	1.66 (1.12–2.45)	0.011	0.99 (0.50–1.94)	0.976	1.08 (0.63–1.88)	0.773
Period (ref.2007)						
2014	1.37 (1.09–1.74)	0.008	1.21 (0.81–1.81)	0.351	1.16 (0.84–1.62)	0.367
Sex (ref. Male)						
Female	0.92 (0.72–1.19)	0.528	1.00 (0.64–1.54)	0.991	1.01 (0.70–1.45)	0.949
Age (ref. 50 – 60 years)						
61 – 70 years	1.18 (0.91–1.53)	0.207	1.47 (0.95–2.29)	0.085	1.49 (1.03–2.16)	0.033
71+ years	1.08 (0.77–1.53)	0.651	0.87 (0.45–1.67)	0.672	1.37 (0.83–2.25)	0.218
Marital status (ref. Not married)						
Currently married	1.54 (1.15–2.05)	0.003	1.66 (1.01–2.71)	0.044	1.82 (1.21–2.72)	0.004
Educational level (ref. No education)						
Primary	0.93 (0.70–1.23)	0.607	0.87 (0.53–1.44)	0.596	0.88 (0.59–1.31)	0.530
Junior high school	0.88 (0.57–1.35)	0.555	1.04 (0.51–2.09)	0.921	0.67 (0.35–1.28)	0.227
Senior high school	0.85 (0.55–1.29)	0.442	1.05 (0.53–2.07)	0.885	0.82 (0.45–1.47)	0.500
Tertiary	0.39 (0.18–0.84)	0.016	0.13 (0.02–0.96)	0.045	0.18 (0.04–0.75)	0.018
Ethnicity (ref. Javanese)						
Sundanese	0.83 (0.57–1.21)	0.339	1.64 (0.91–2.95)	0.099	1.17 (0.71–1.94)	0.529
Others	0.75 (0.56–1.02)	0.069	0.96 (0.57–1.60)	0.872	0.72 (0.47–1.10)	0.129
Insurance coverage (ref. No)						
Yes	0.94 (0.74–1.20)	0.613	0.83 (0.54–1.27)	0.388	0.80 (0.56–1.15)	0.227
Type of work (ref. Unemployed)						
Casual	0.62 (0.42–0.91)	0.016	0.59 (0.31–1.14)	0.116	0.56 (0.33–0.95)	0.032
Self-employed	0.64 (0.47–0.87)	0.005	0.65 (0.41–1.03)	0.068	0.66 (0.45–0.97)	0.033
Government/private	0.61 (0.38–0.97)	0.038	0.77 (0.37–1.61)	0.488	0.63 (0.33–1.22)	0.169
Per capita household expenditure (ref. Q1)						
Q2	1.11 (0.74–1.65)	0.619	1.40 (0.66–2.94)	0.379	1.54 (0.85–2.77)	0.151
Q3	1.46 (0.99–2.15)	0.058	1.74 (0.85–3.58)	0.130	1.67 (0.93–2.99)	0.086
Q4	2.01 (1.34–3.01)	0.001	2.58 (1.27–5.26)	0.009	2.42 (1.36–4.31)	0.003
Q5	3.27 (2.10–5.11)	0.000	4.64 (2.29–9.38)	0.000	4.71 (2.66–8.34)	0.000
Residency (ref. Rural)						
Urban	0.99 (0.74–1.31)	0.936	0.85 (0.52–1.40)	0.526	0.88 (0.59–1.32)	0.550
Region (ref. Java-Bali)						
Sumatra	0.82 (0.58–1.16)	0.257	0.78 (0.43–1.41)	0.411	1.12 (0.70–1.78)	0.633
Nusa Tenggara	0.70 (0.37–1.35)	0.287	1.22 (0.39–3.77)	0.730	0.87 (0.33–2.29)	0.772
Kalimantan	0.86 (0.46–1.59)	0.632	0.77 (0.26–2.30)	0.637	0.96 (0.40–2.26)	0.918
Sulawesi	0.83 (0.43–1.61)	0.584	1.00 (0.36–2.79)	0.994	1.08 (0.44–2.63)	0.864

[a] Multilevel logistic regression model

Obesity (BMI ≥25 kg/m2 as obese) is included in the clustering of multimorbidity

aOR: adjusted odds ratio, NCD: noncommunicable disease

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Table S10. Sensitivity analysis: the effect of multimorbidity on productivity loss

Obesity (BMI ≥25 kg/m2 as obese) is included in the clustering of multimorbidity

Variables	Productivity loss					
	Labour participation[a]		Days primary activity missed[b]		Days stayed in bed[b]	
	aOR (95% CI)	p values	IRR (95% CI)	p values	IRR (95% CI)	p values
Number of NCDs (ref. no NCD)						
Single NCD	0.66 (0.54–0.82)	0.000	1.16 (0.99–1.36)	0.063	1.10 (0.82–1.48)	0.533
Two NCDs	0.45 (0.35–0.58)	0.000	1.70 (1.41–2.04)	0.000	1.37 (0.98–1.92)	0.065
Three or more NCDs	0.37 (0.27–0.49)	0.000	2.21 (1.76–2.76)	0.000	2.16 (1.44–3.25)	0.000
Period (ref. 2007)						
2014	0.76 (0.65–0.89)	0.001	1.54 (1.35–1.75)	0.000	1.44 (1.13–1.85)	0.004
Sex (ref. Male)						
Female	0.22 (0.17–0.27)	0.000	0.96 (0.83–1.11)	0.555	0.90 (0.68–1.20)	0.480
Age (ref. 50 – 60 years)						
61 – 70 years	0.36 (0.29–0.44)	0.000	1.02 (0.89–1.18)	0.758	1.15 (0.87–1.52)	0.336
71+ years	0.10 (0.08–0.13)	0.000	1.17 (0.97–1.41)	0.094	1.77 (1.24–2.52)	0.002
Marital status (ref. Not married)						
Currently married	1.49 (1.22–1.82)	<0.0001	1.18 (1.01–1.37)	0.032	0.96 (0.72–1.29)	0.809
Educational level (ref. No education)						
Primary	0.90 (0.72–1.13)	0.372	0.92 (0.79–1.07)	0.269	1.03 (0.77–1.38)	0.851
Junior high school	0.41 (0.29–0.58)	<0.0001	0.91 (0.71–1.16)	0.438	0.68 (0.42–1.10)	0.118
Senior high school	0.43 (0.30–0.61)	<0.0001	0.64 (0.50–0.83)	0.001	0.65 (0.40–1.04)	0.073
Tertiary	0.56 (0.34–0.92)	0.021	0.52 (0.36–0.75)	<0.0001	0.42 (0.20–0.88)	0.022
Ethnicity (ref. Javanese)						
Sundanese	0.48 (0.36–0.65)	<0.0001	1.39 (1.14–1.70)	0.001	1.51 (1.03–2.21)	0.035
Others	0.80 (0.63–1.01)	0.059	1.13 (0.97–1.33)	0.123	1.13 (0.84–1.53)	0.425
Insurance coverage (ref. No)						
Yes	0.82 (0.69–0.98)	0.032	1.13 (0.99–1.29)	0.077	1.13 (0.88–1.46)	0.329
Type of work (ref. Unemployed)						
Casual	N/A	N/A	0.69 (0.57–0.84)	<0.0001	0.41 (0.28–0.60)	<0.0001
Self-employed	N/A	N/A	0.68 (0.58–0.79)	<0.0001	0.51 (0.38–0.69)	<0.0001
Government/private	N/A	N/A	0.60 (0.47–0.76)	<0.0001	0.56 (0.35–0.90)	0.017
Per capita household expenditure (ref. Q1)						
Q2	1.36 (1.06–1.75)	0.016	1.03 (0.85–1.24)	0.769	0.97 (0.68–1.38)	0.848
Q3	1.27 (0.98–1.64)	0.071	1.17 (0.97–1.42)	0.095	1.11 (0.78–1.59)	0.557
Q4	1.13 (0.86–1.47)	0.383	1.05 (0.86–1.29)	0.602	0.99 (0.68–1.43)	0.944
Q5	1.35 (1.01–1.80)	0.043	1.26 (1.02–1.55)	0.032	0.89 (0.60–1.33)	0.577
Residency (ref. Rural)						
Urban	0.42 (0.34–0.52)	<0.0001	0.92 (0.80–1.06)	0.239	0.69 (0.52–0.90)	0.006
Region (ref. Java-Bali)						
Sumatra	0.91 (0.70–1.20)	0.519	1.14 (0.95–1.38)	0.162	1.10 (0.78–1.55)	0.573
Nusa Tenggara	0.68 (0.44–1.04)	0.077	0.86 (0.64–1.15)	0.309	1.15 (0.66–2.00)	0.629
Kalimantan	1.22 (0.75–1.99)	0.418	0.86 (0.63–1.17)	0.329	0.92 (0.51–1.67)	0.794
Sulawesi	0.34 (0.21–0.55)	<0.0001	1.05 (0.76–1.46)	0.754	1.07 (0.58–1.98)	0.826

[a] Multilevel logistic regression model
[b] Multilevel negative binomial regression model
aOR: adjusted odds ratio, IRR: incidence rate ratio, NCD: noncommunicable disease

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