Education Differential in Disability: A Global Perspective
And Population Projection

By

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Introduction

- Much of what we have learned about the relationship between **education** and **adult health** comes from Europe and North America

- There are some studies from other parts of the world suggest **a similar negative association** between education and adult mortality and disability

Objective

- We've attempted to do a comprehensive worldwide evaluation of this relationship using data from the 2002 World Health Survey
- We then add this relationship as another dimension of IIASA population projections to consider the impact of education on human capital under a few different scenarios
- In this presentation, we focus on three regions of the World where little is known about the relationship – South Asia, South-East Asia, and Sub-Saharan Africa

World Health Survey

- 70 countries - all regions covered
  - Under-representation of Gulf countries
- Cross-sectional data (2002-2004)
- Household and personal information
- Many aspects of health
- More than 200 thousand individuals
- 18 years of age and older population
- More women than men

Health Measure: ADL - Mobility

- "Overall in the last 30 days, how much difficulty did you have with moving around?"
- **Response (5)**:
  - None
  - Mild
  - *Moderate*
  - ***Severe***
  - ***Extreme/Cannot do***

Health Measure: ADL-Selfcare

- "Overall in the last 30 days, how much difficulty did you have with selfcare, such as washing or dressing yourself?"
- **Response (5)**:
  - None
  - Mild
  - *Moderate*
  - ***Severe***
  - ***Extreme/Cannot do***

Health Measure: ADL-indicator

- With ADL Disability: responses **_Moderate_**, **_Severe_** and **_Extreme/Cannot do_** in either Mobility or Selfcare

Health Measure: Other possiblities

- Also looked at other possibilities
  - Overall self-reported health
- There are other approaches including combining set of health indicator (ex. WHO)

Education

- Individual's education
  - The highest level of education completed
  - Years of education completed

- Tried 4 levels of education but problems at the ends of the distribution for some regions/countries

Age and Sex

- for males and females separately
- Tried single age but problems due to age-misreporting, therefore, used five year age group
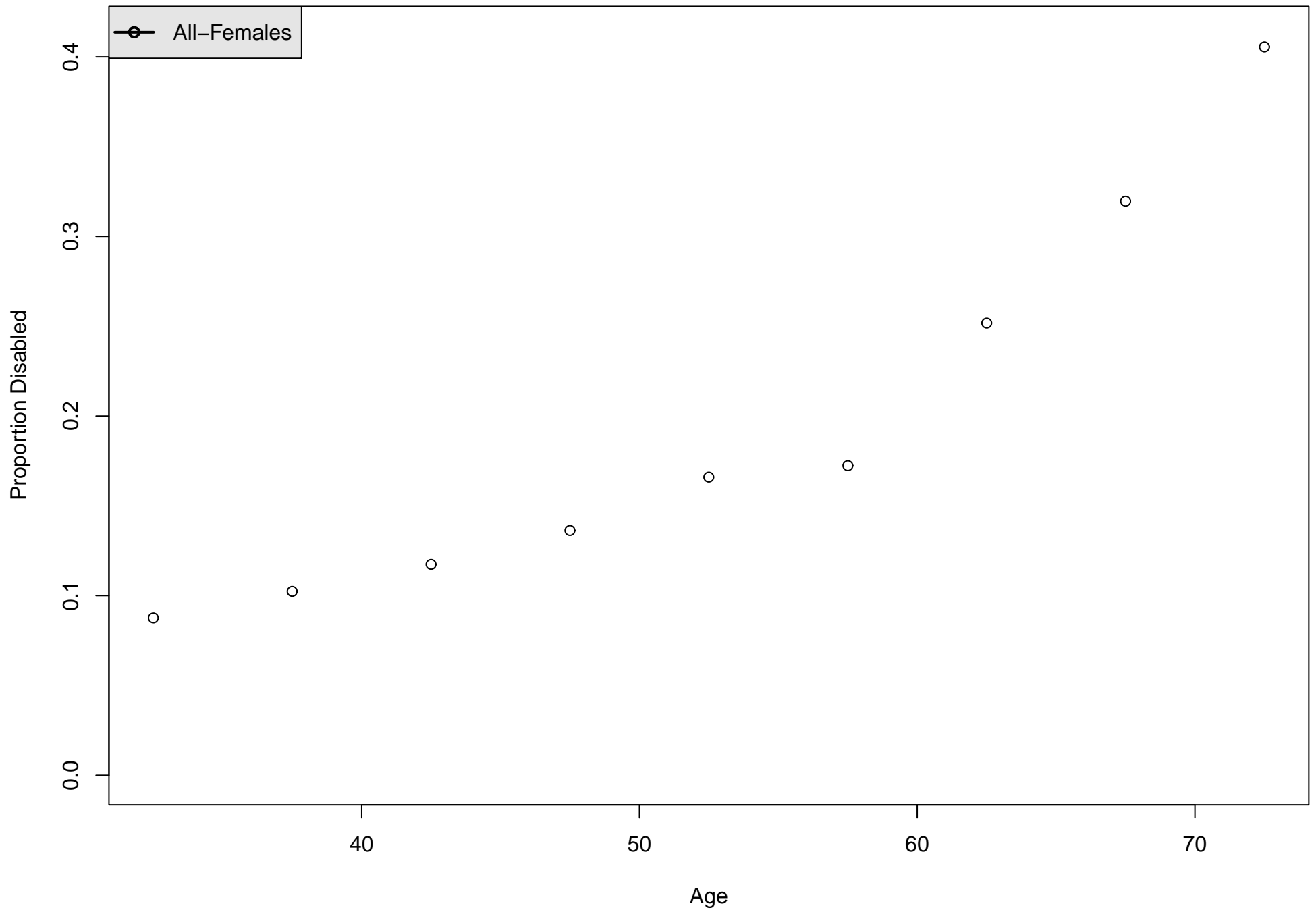- Results for age-group 30-74

Regional Groups

- Focused on the regions where little is known about the relationship
- Tried 3 relatively homogenous groups (South Asia, South East Asia, Sub Saharan Africa)
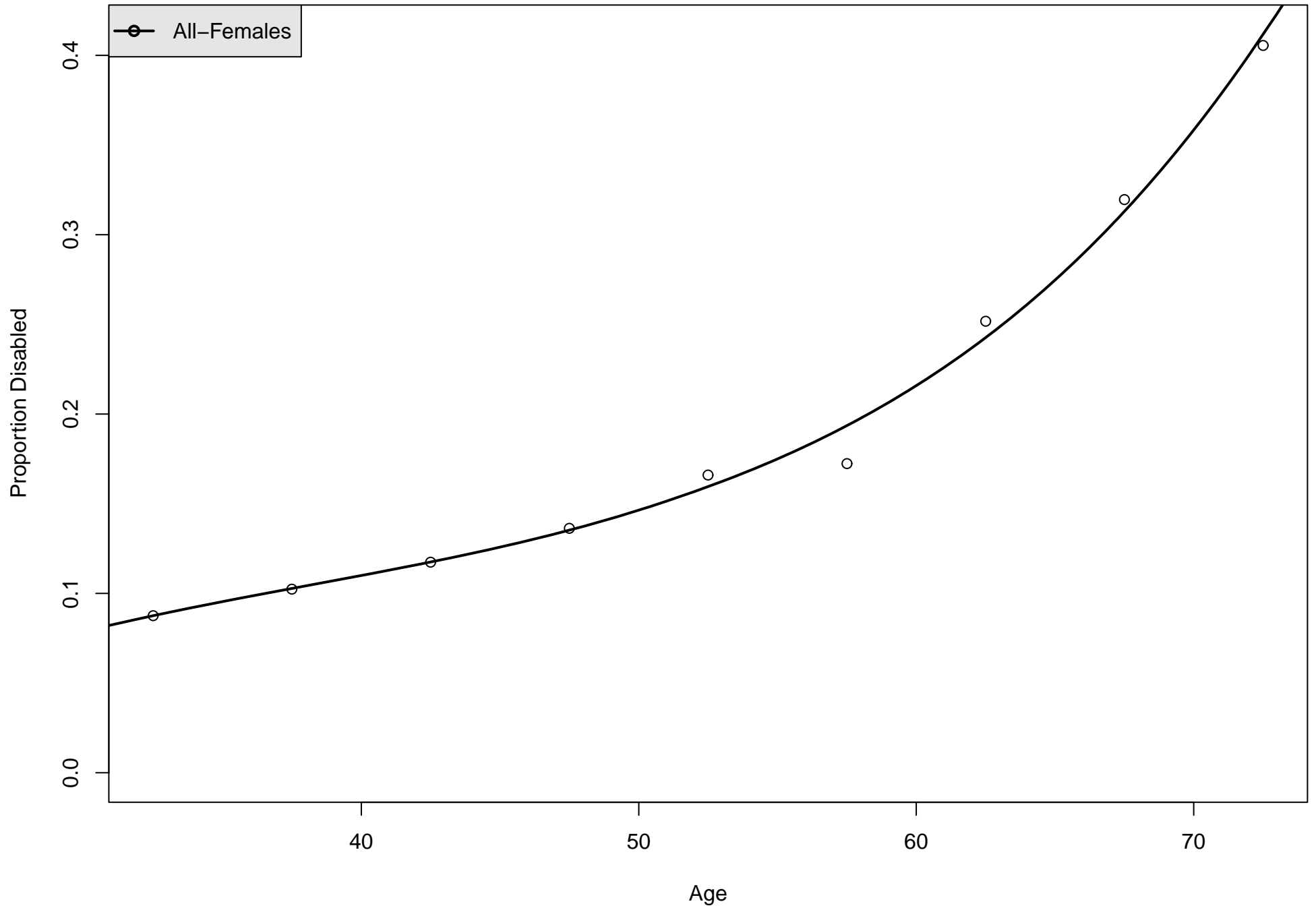
Procedure for fitting age -education models for each sex group

- Dependent Variable: Presence or absence of ADL disability or limitation
- Explanatory Variable:
  - Age (30-74, 5-yearly)
  - Sex (male, female, both sexes)
  - Education (three/four categories)
- For each Region (three regions)
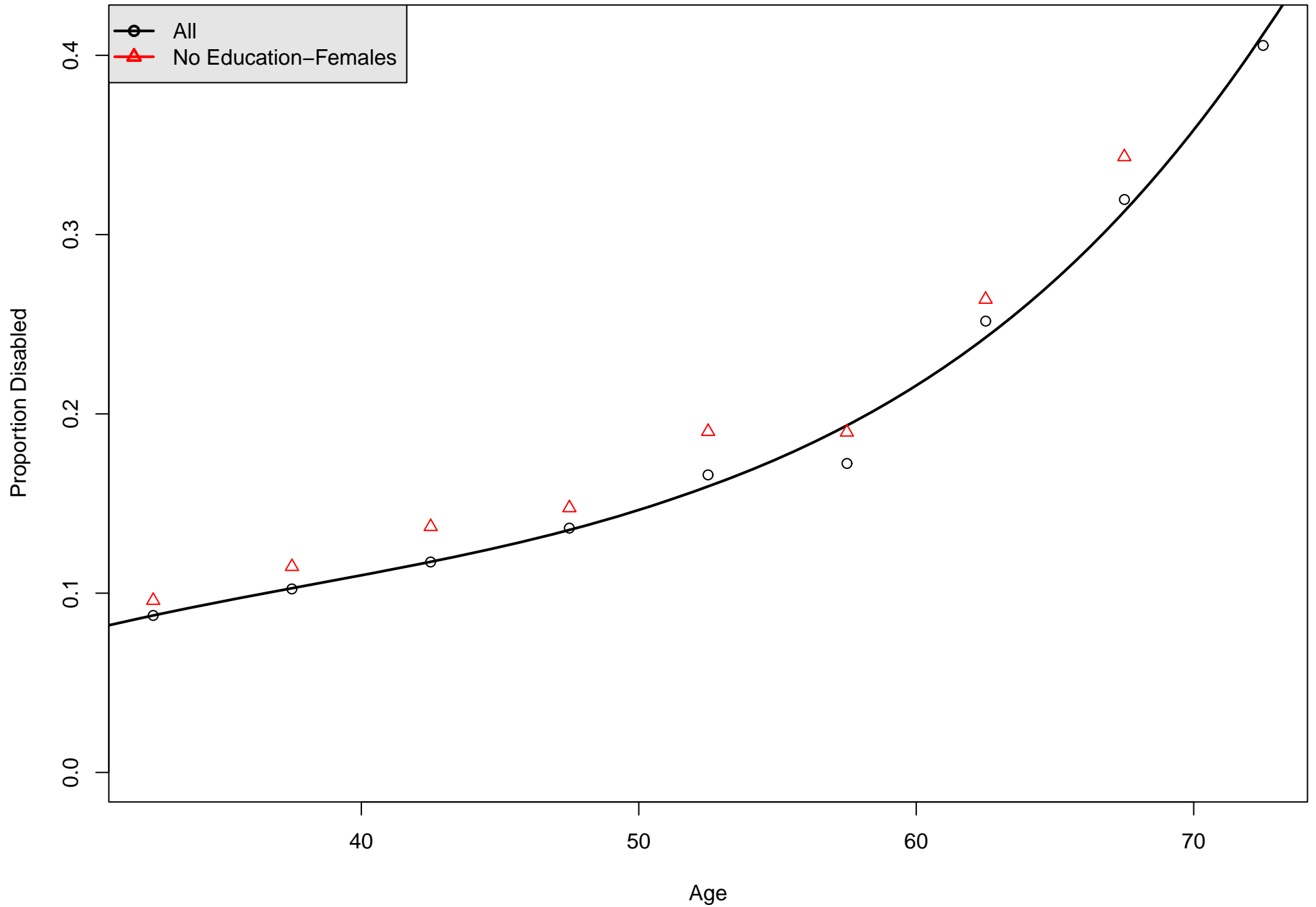- For each sex group - used logistic regression with cubic spline fit for age

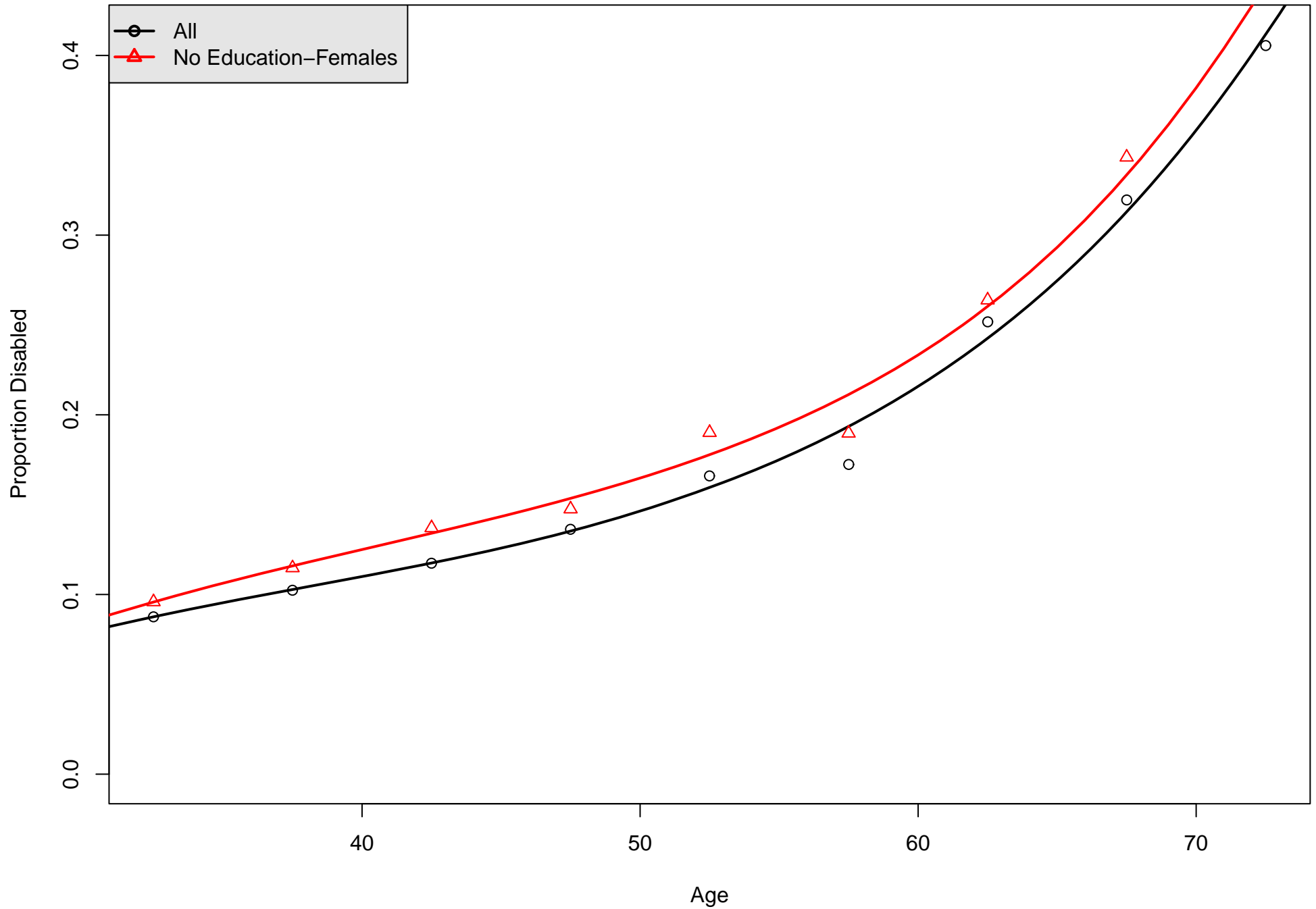**Disability Level by Age and Education level for Females in South Asia**

All–Females

Proportion Disabled

Age

Disability Level by Age and Education level for Females in South Asia

Disability Level by Age and Education level for Females in South Asia

Legend:
- All
- No Education−Females
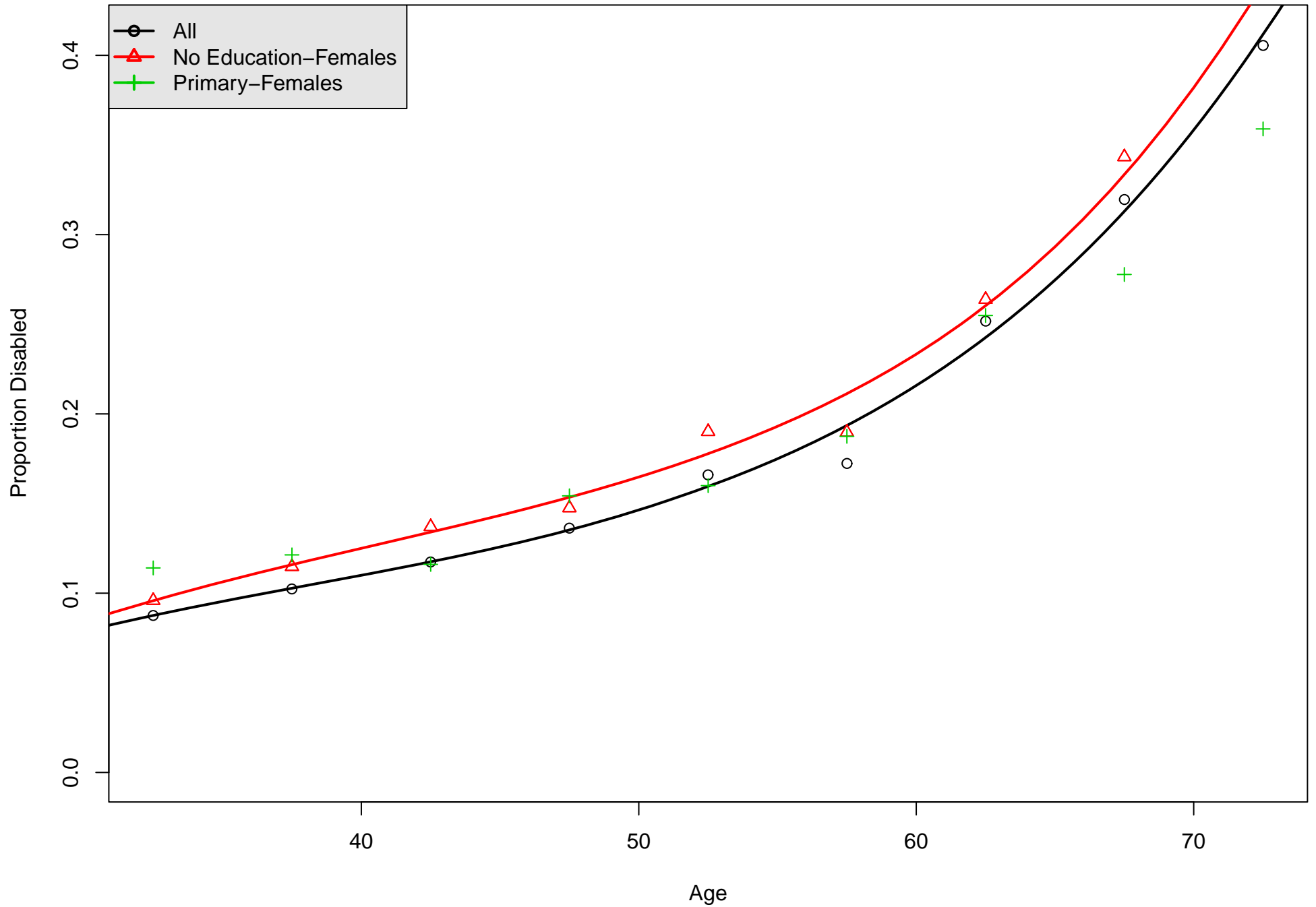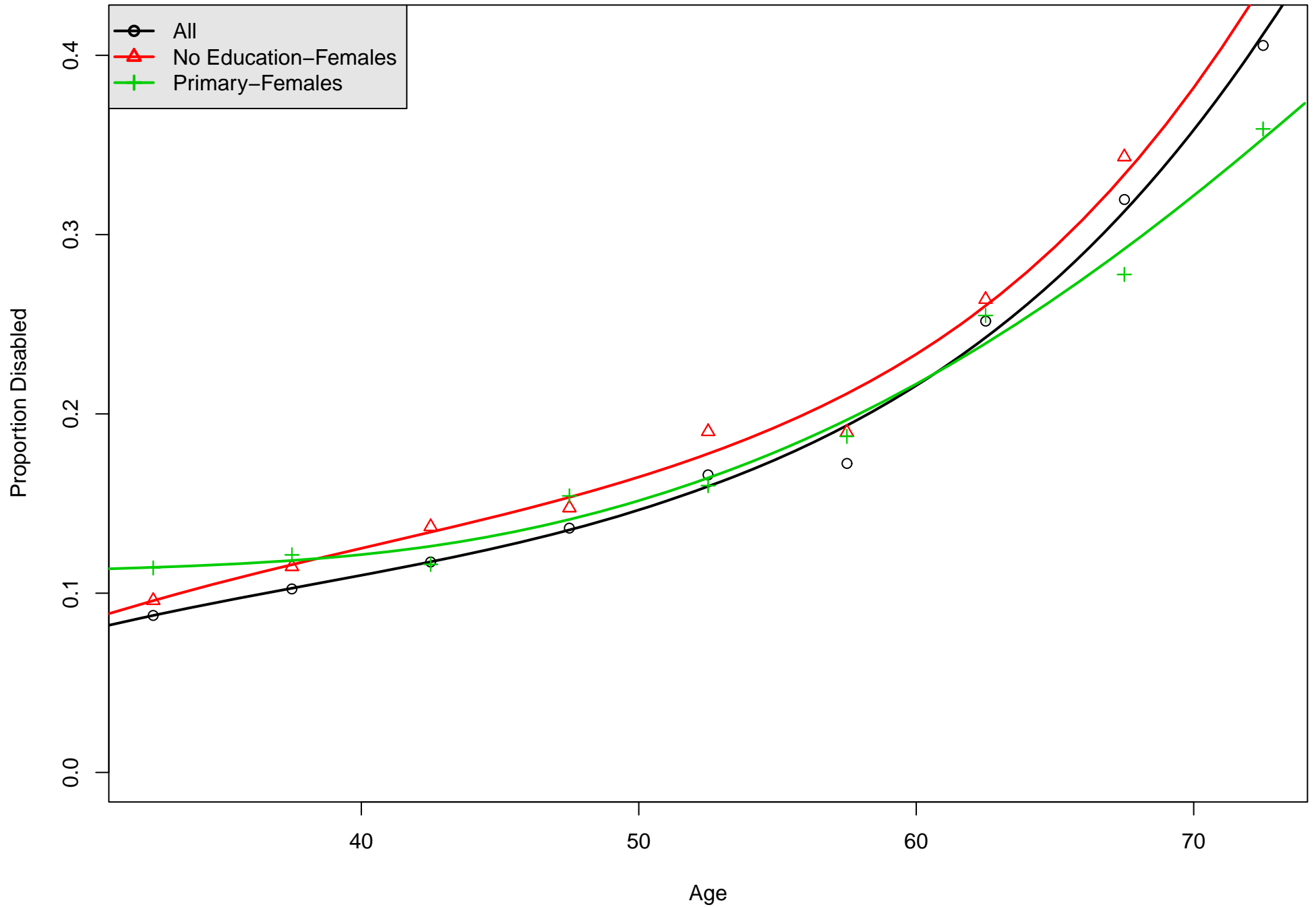
Y-axis: Proportion Disabled

X-axis: Age

Disability Level by Age and Education level for Females in South Asia

Disability Level by Age and Education level for Females in South Asia

Legend:
- All (black, circle)
- No Education−Females (red, triangle)
- Primary−Females (green, plus)

Y-axis: Proportion Disabled

X-axis: Age

Disability Level by Age and Education level for Females in South Asia

Legend:
- All
- No Education−Females
- Primary−Females
- At least Secondary−Females

Y-axis: Proportion Disabled

X-axis: Age

Disability Level by Age and Education level for Females in South Asia

Legend:
- All
- No Education–Females
- Primary–Females
- At least Secondary–Females

Y-axis: Proportion Disabled

X-axis: Age

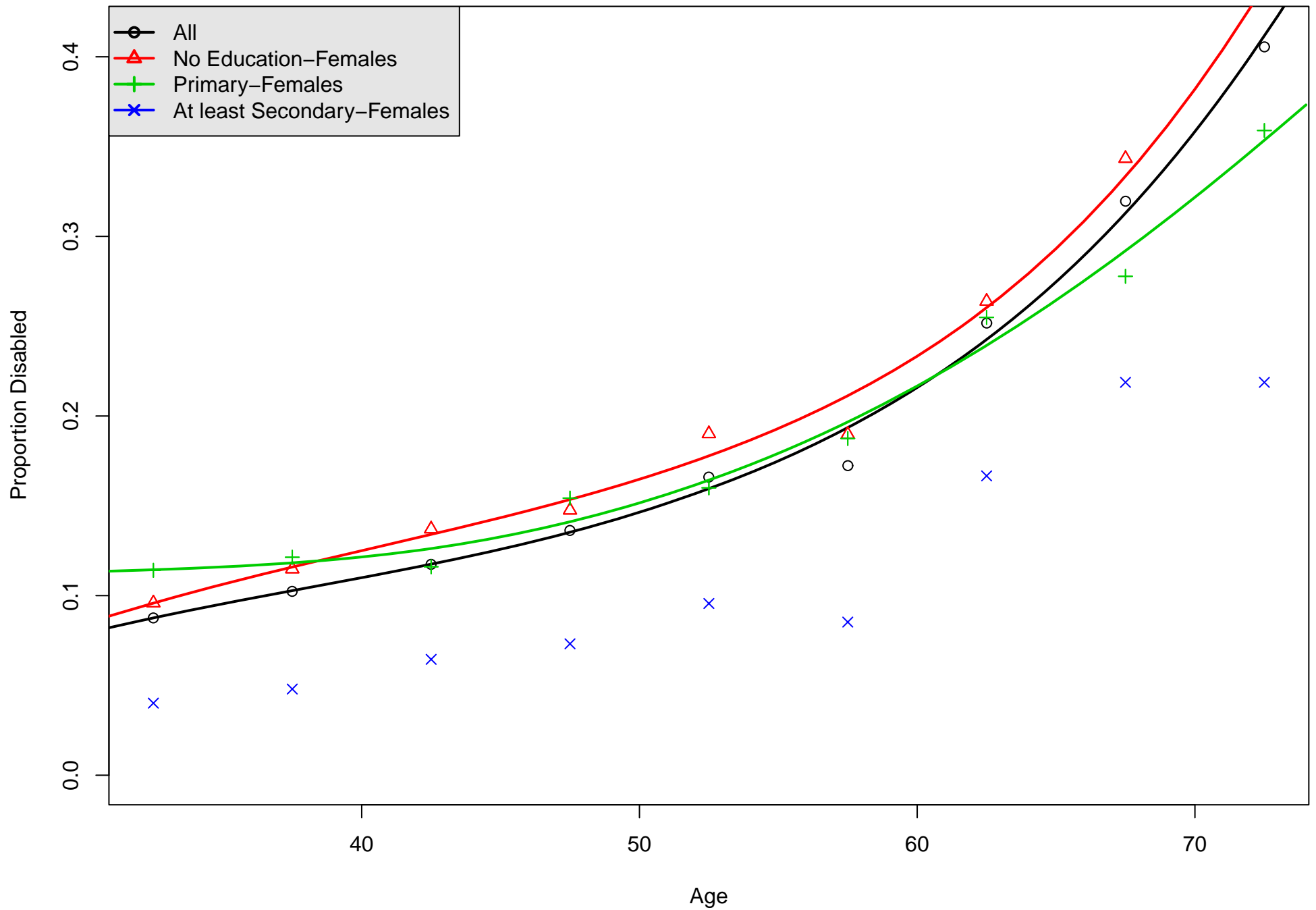**Disability Level by Age and Education level for Males in South Asia**

Disability Level by Age and Education level for Males in South Asia
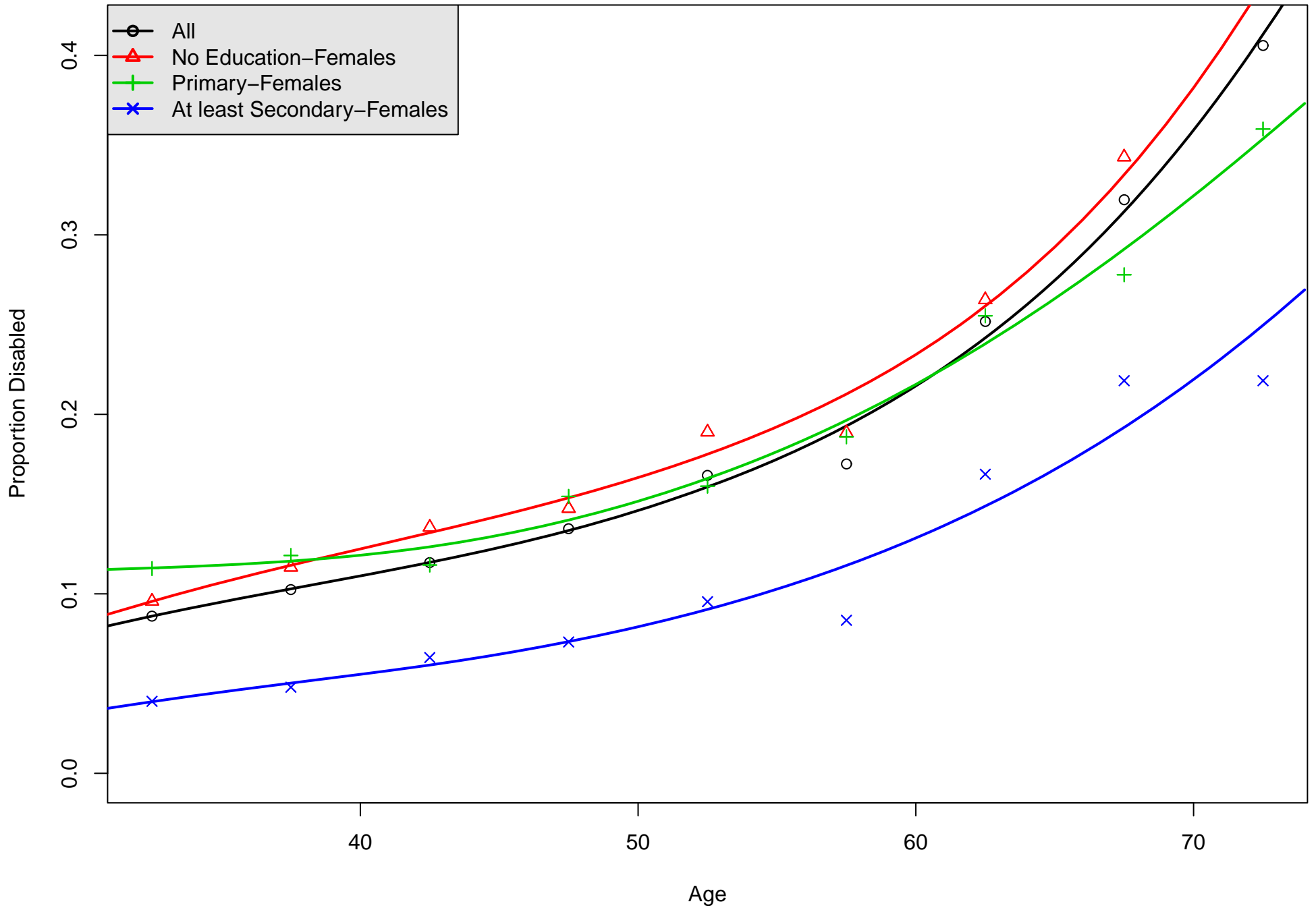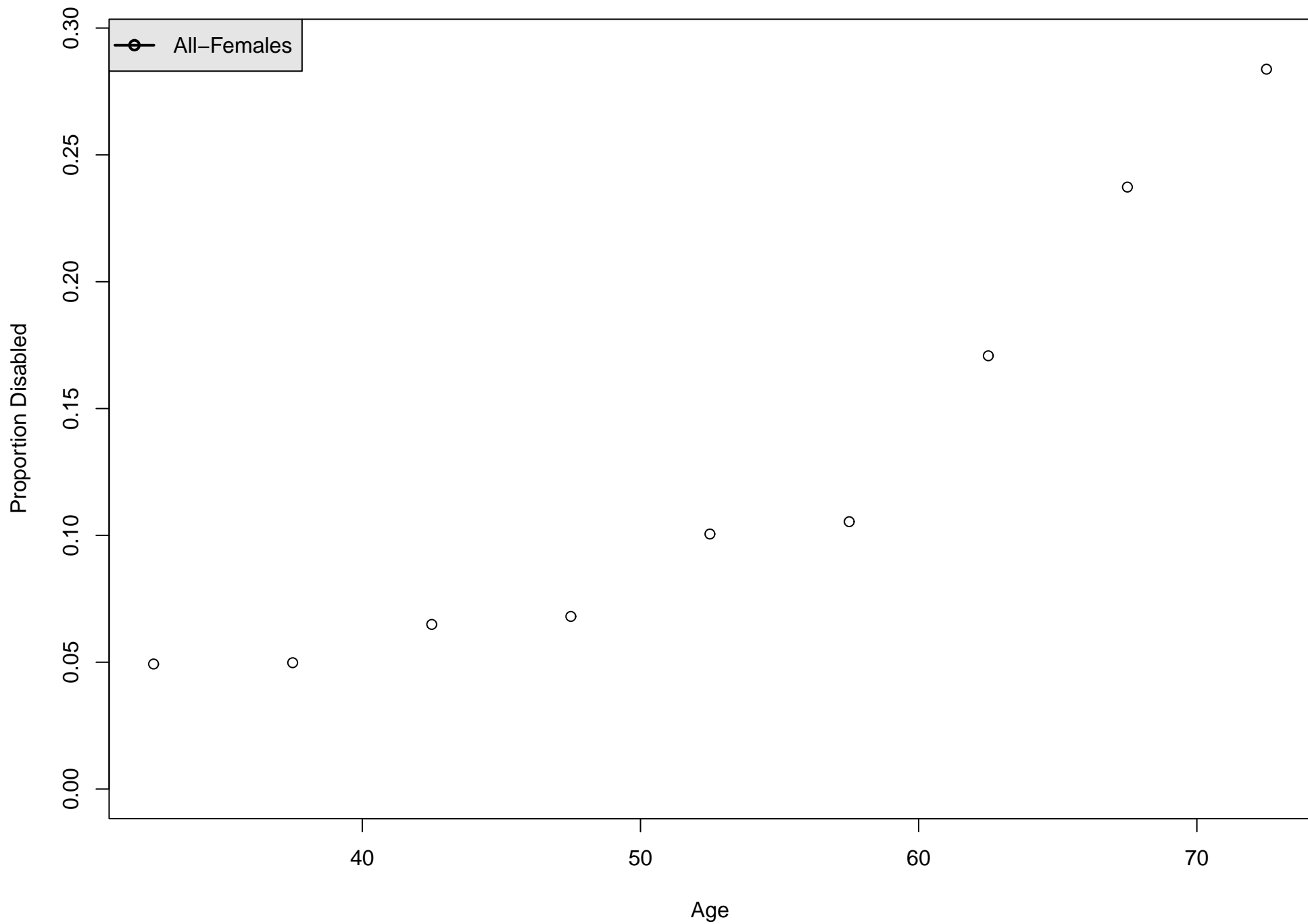
Proportion Disabled

Age

All−Females

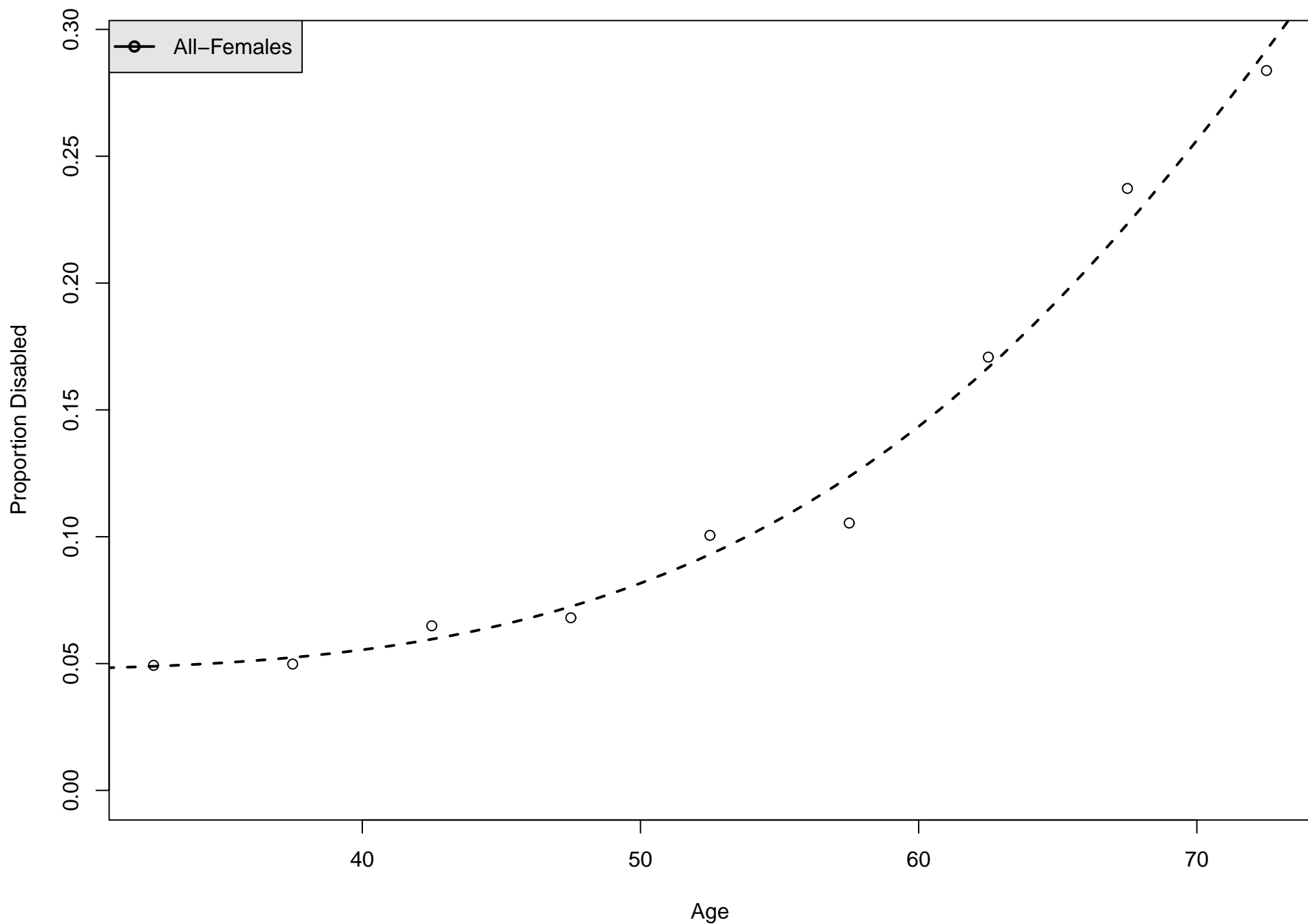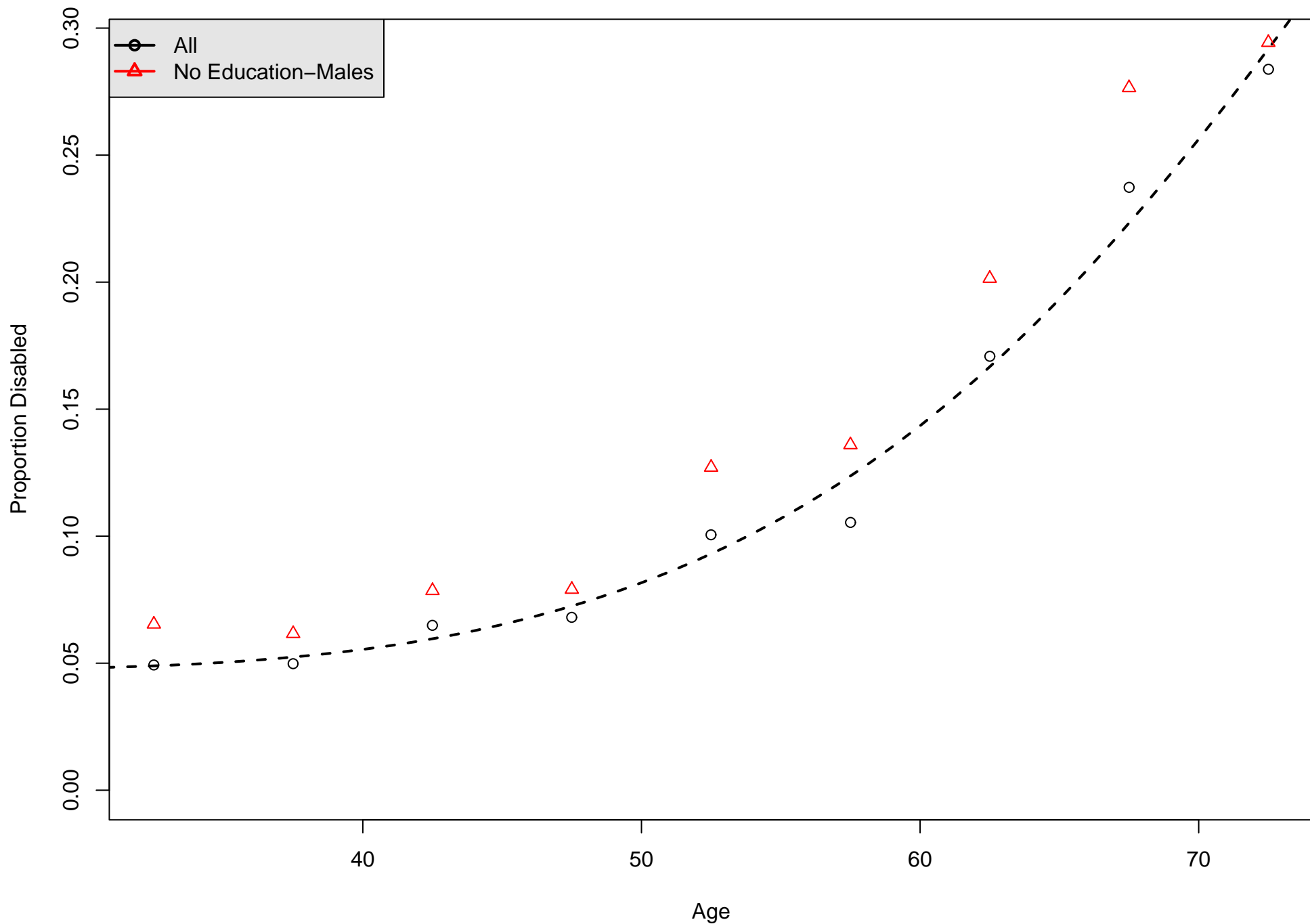**Disability Level by Age and Education level for Males in South Asia**

Disability Level by Age and Education level for Males in South Asia

Legend:
- All (○, black dashed line)
- No Education–Males (△, red dashed line)

Y-axis: Proportion Disabled (0.00 to 0.30)
X-axis: Age (40 to 70)

Disability Level by Age and Education level for Males in South Asia

Legend:
- All (black, circle)
- No Education–Males (red, triangle)
- Primary–Males (green, plus)

X-axis: Age

Y-axis: Proportion Disabled

Disability Level by Age and Education level for Males in South Asia

Legend:
- All (black, circle)
- No Education–Males (red, triangle)
- Primary–Males (green, plus)

X-axis: Age

Y-axis: Proportion Disabled

Disability Level by Age and Education level for Males in South Asia

Legend:
- All (black, circle)
- No Education–Males (red, triangle)
- Primary–Males (green, plus)
- At least Secondary–Males (blue, x)
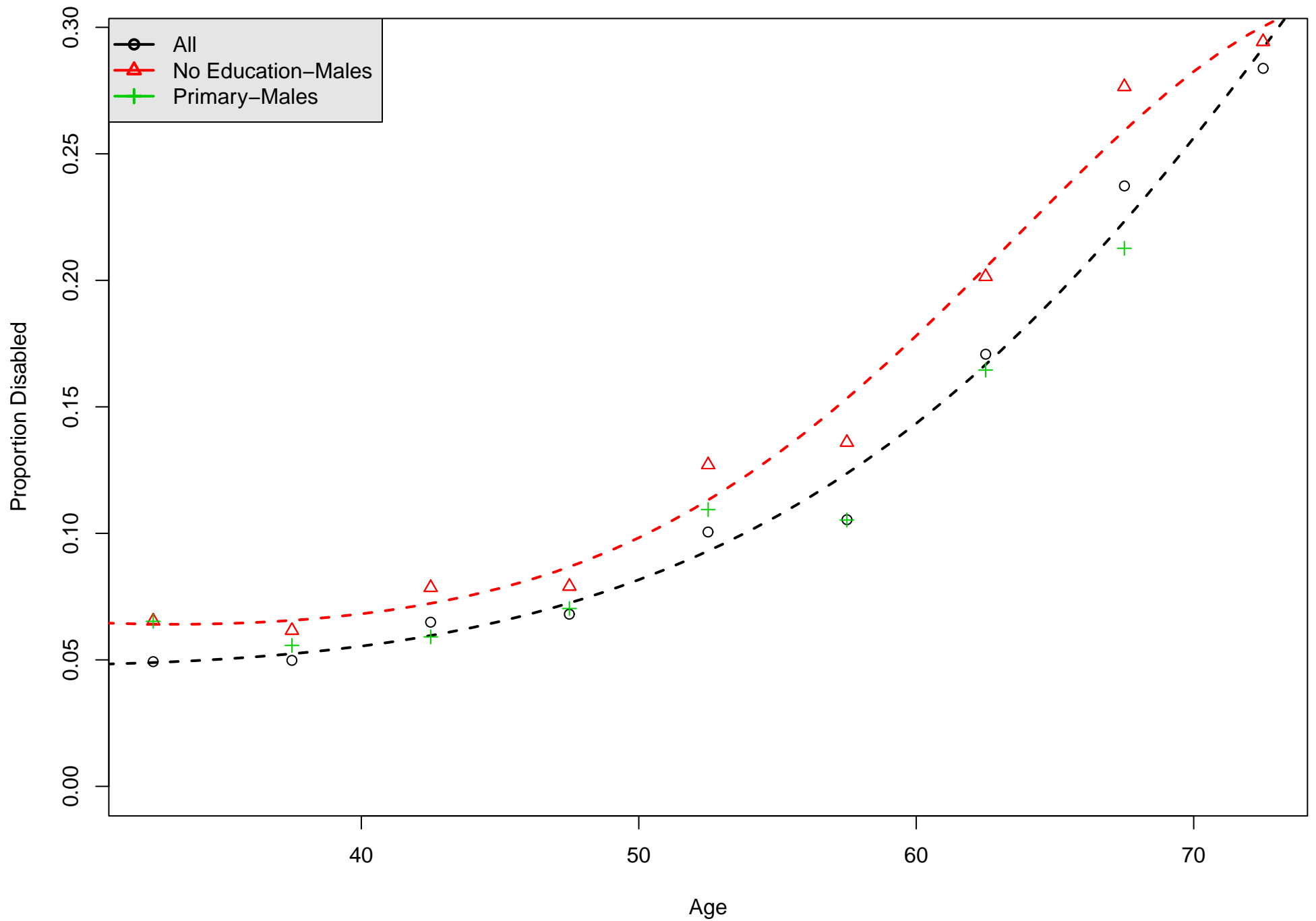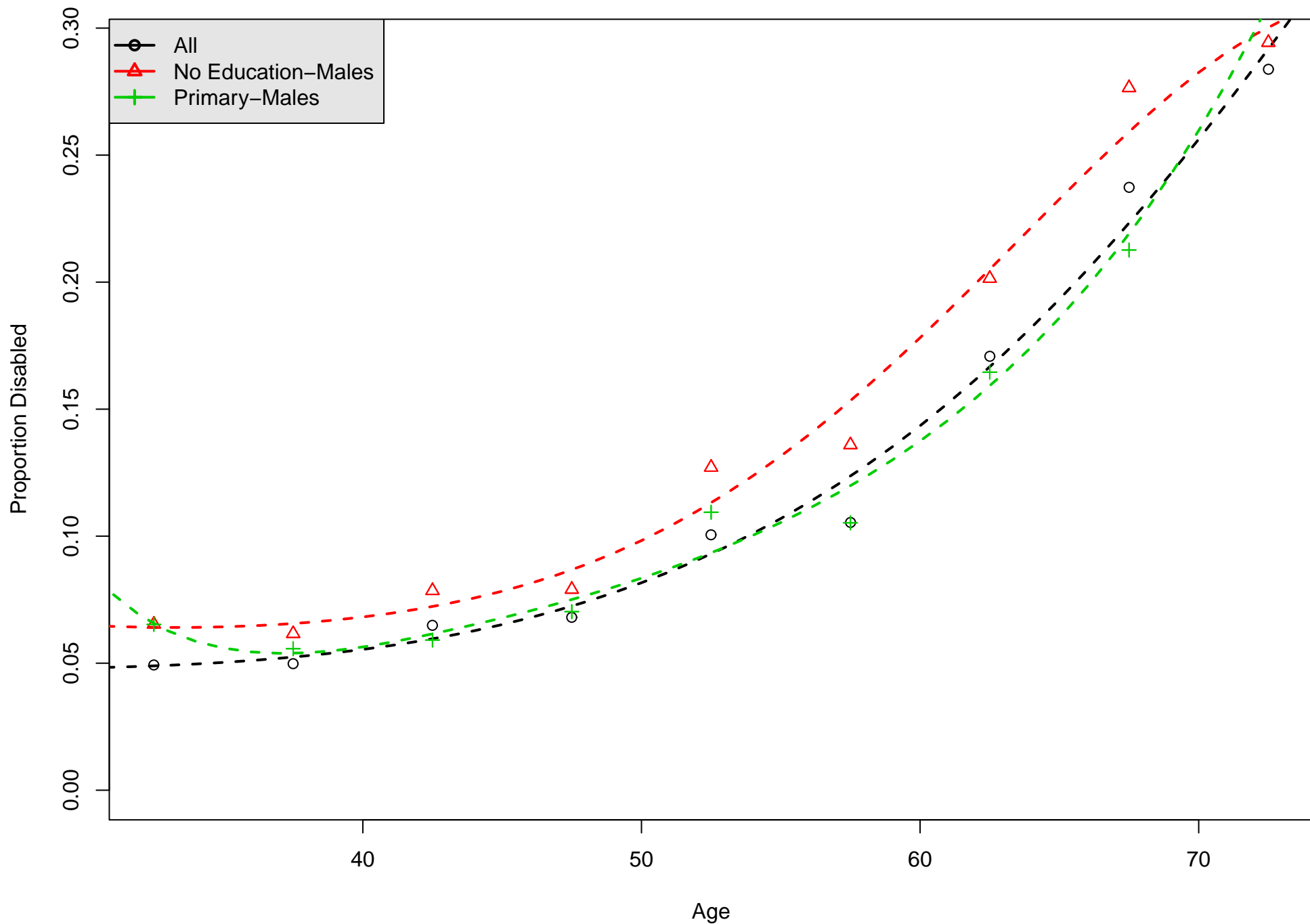
Y-axis: Proportion Disabled (0.00 to 0.30)

X-axis: Age (40 to 70)

Disability Level by Age and Education level for Males in South Asia

Disability Level by Age and Sex inSouth Asia

Legend:
- Female (red, triangle)
- Both Sexes (black, circle)
- Male (blue, x)

Y-axis: Proportion Disabled
X-axis: Age
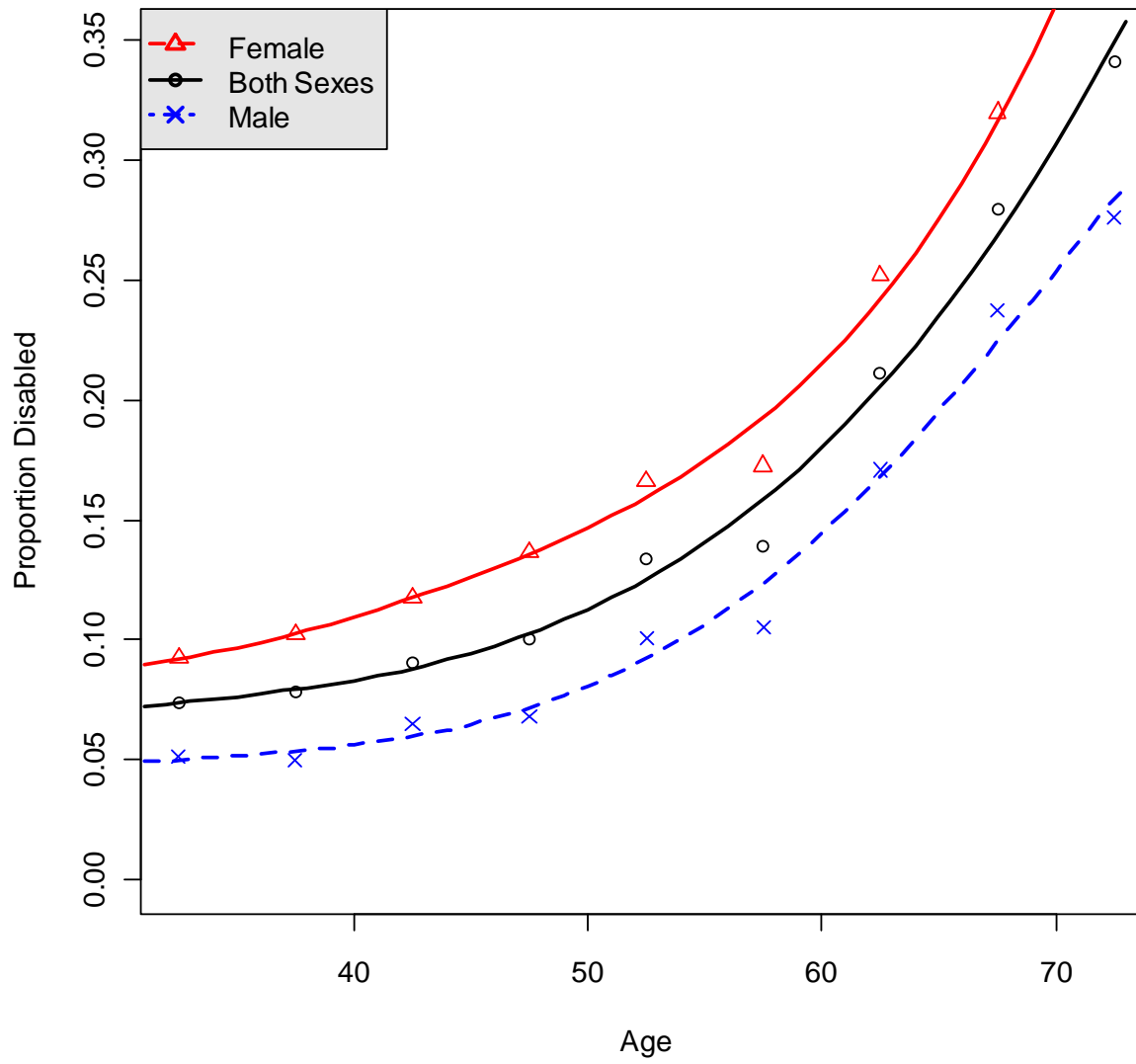
Disability Level by Age and Sex inAfrica-SS
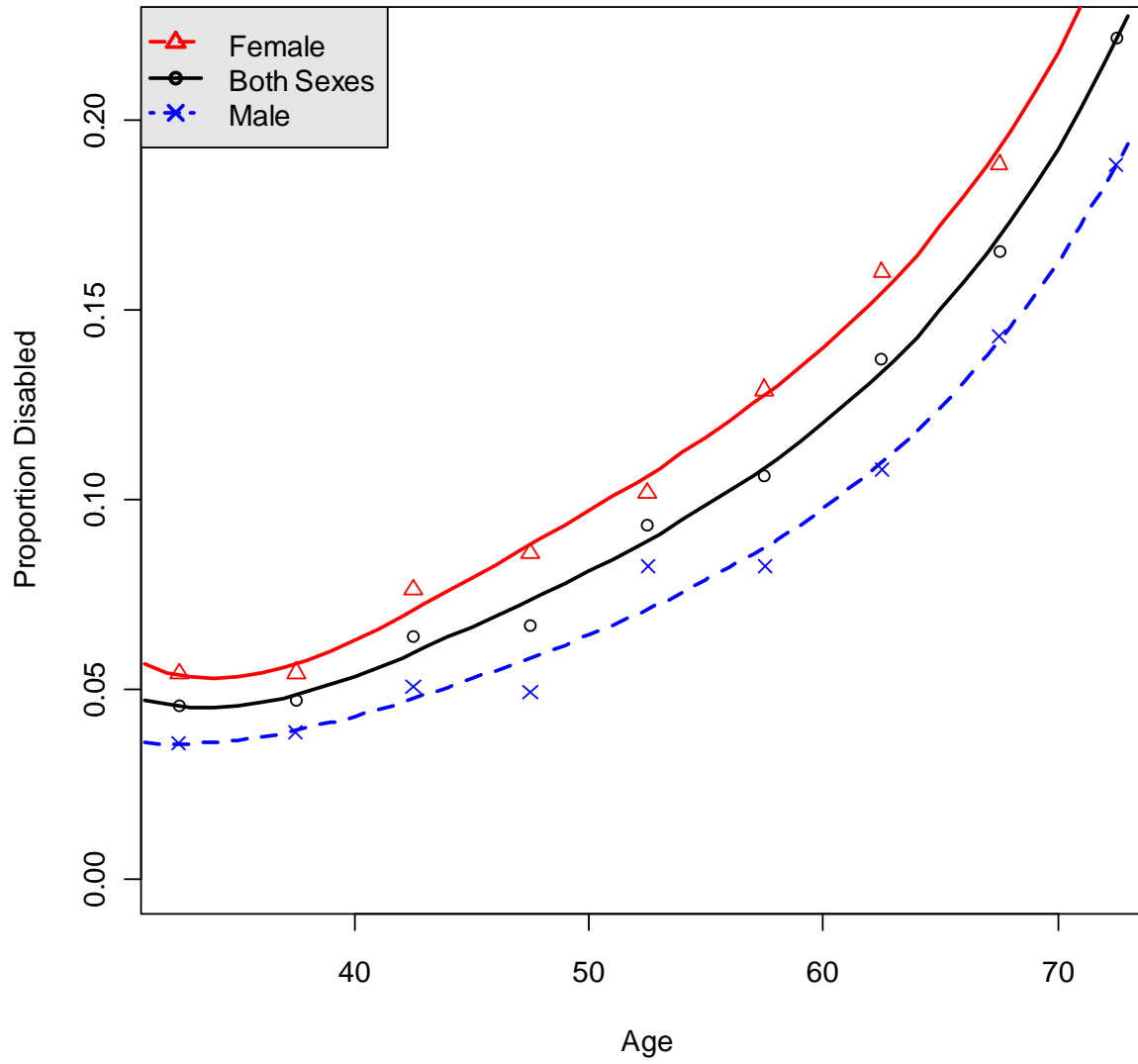
Disability Level by Age and Sex inSE Asia
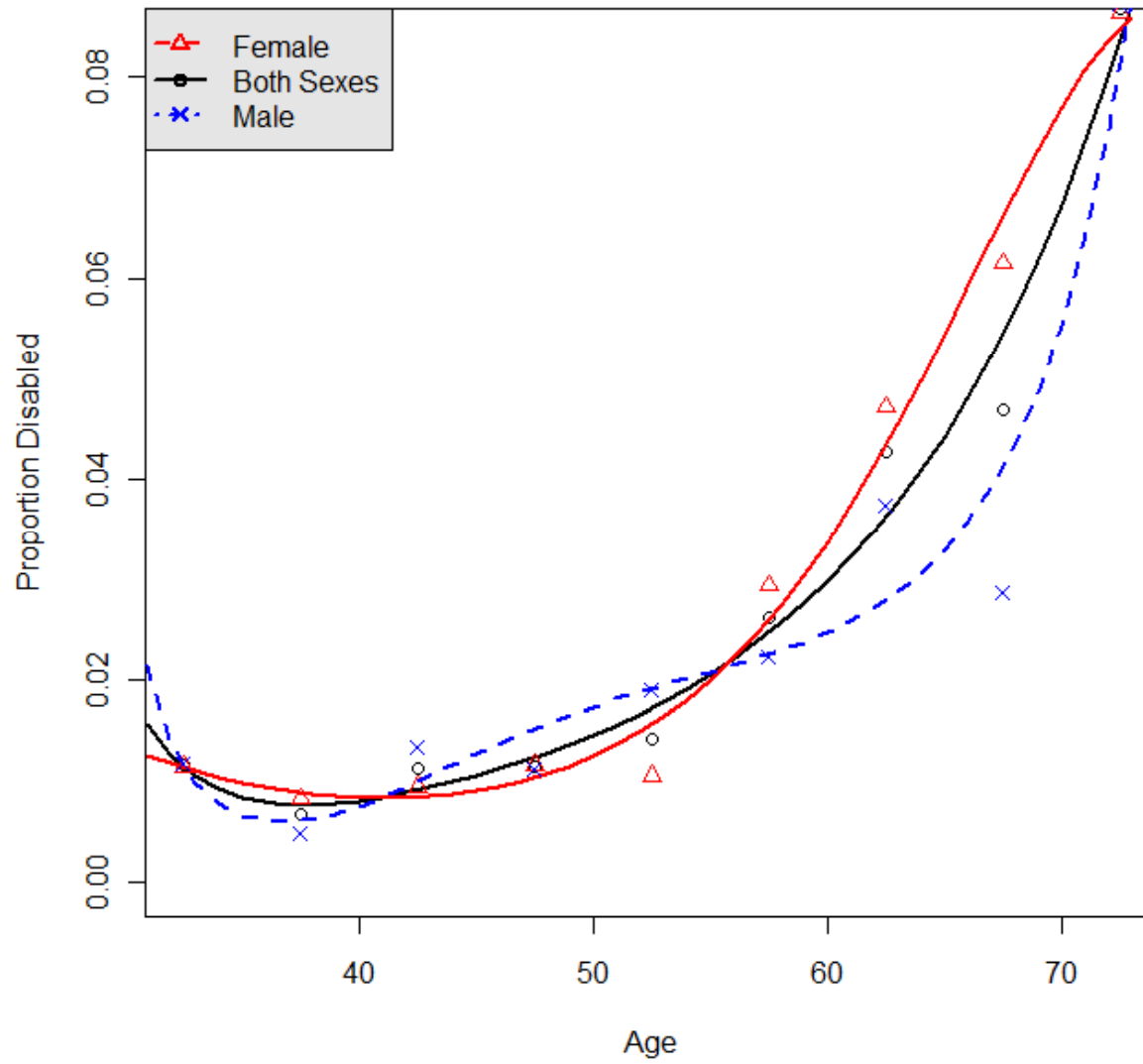
Projection of Prevalence of in ADL disability

- Population Projection by Age/Sex/Education
  - 2000-2050
  - Education Differential in fertility, mortality and migration was incorporated
  - with assumptions on fertility, mortality and migration (UN, Eurostat, and Own sources)
  - Along with Global Education Trend Scenario
  - To generate the age-sex-education specific fertility, mortality, and migration

Three education scenario

- Global Education Trend Scenario (GET)
  - Based on past experience of many countries
- Constant Enrollment Number Scenario (CEN)
  - Pessimistic Scenario
- Fast Track Scenario (FT)
  - Optimistic Scenario

Example-India 2000

India - Population by Age, Sex and Educational Attainment in 2000 - Global Education Trend Scenario

Legend:
- No Education (red)
- Primary (yellow)
- Secondary (cyan)
- Tertiary (blue)

Age groups (top to bottom): 100+, 95-99, 90-94, 85-89, 80-84, 75-79, 70-74, 65-69, 60-64, 55-59, 50-54, 45-49, 40-44, 35-39, 30-34, 25-29, 20-24, 15-19

X-axis: 70000, 56000, 42000, 28000, 14000, 0, 14000, 28000, 42000, 56000, 70000

Males **Population in Thousands** *Females*
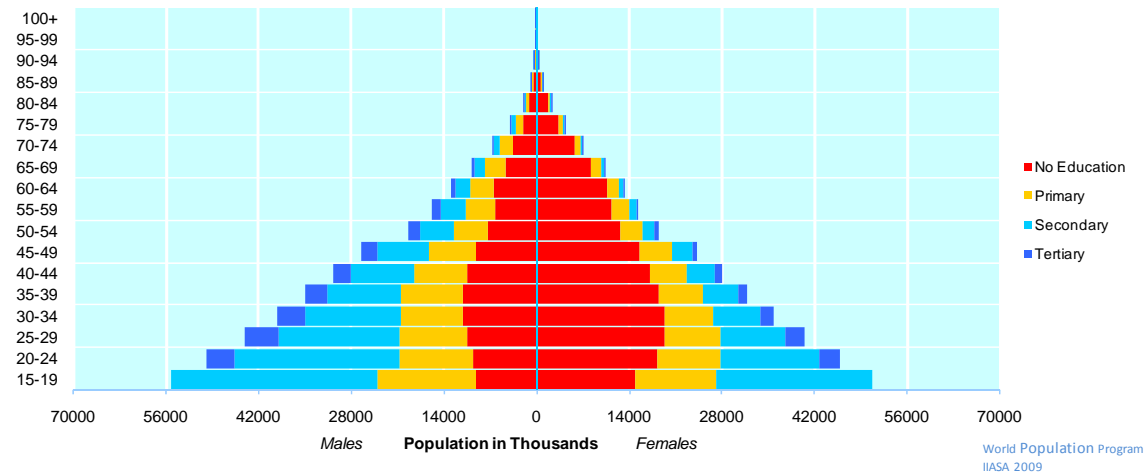
Example-India 2000

India - Population by Age, Sex and Educational Attainment in 2000 - Global Education Trend Scenario

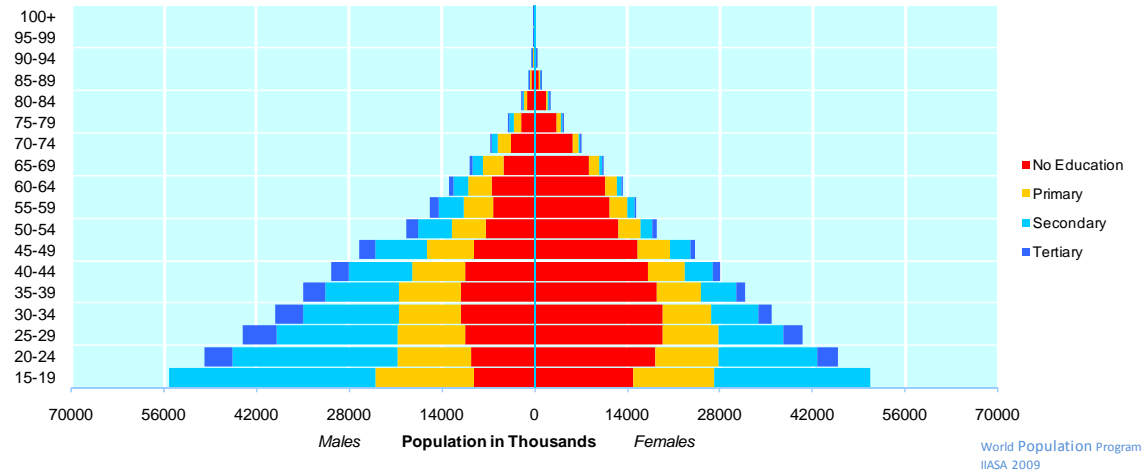
India - Population by Age, Sex and Educational Attainment in 2050 - Global Education Trend Scenario
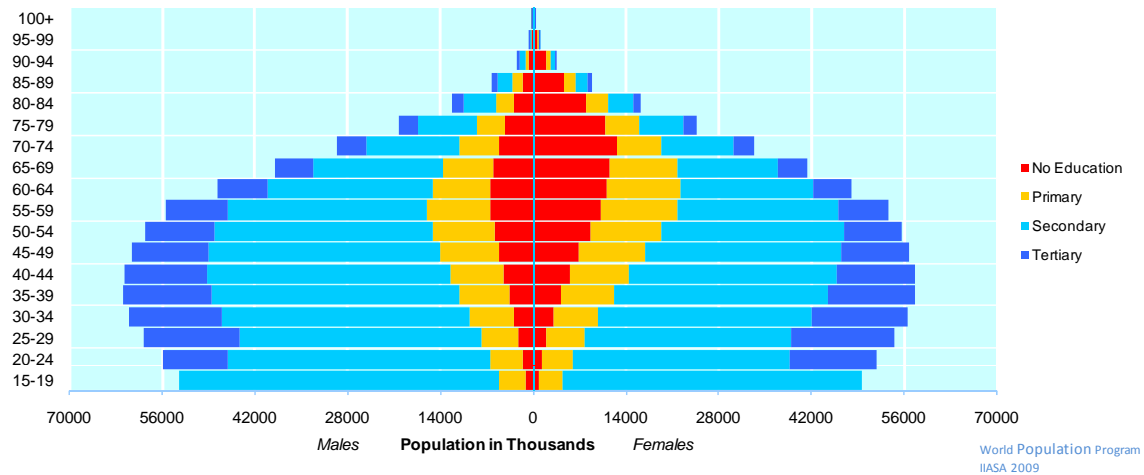
Adding Health Dimension?

- Baseline

  $\ln(p/1-p)$ = Age + Prim + Sec + Ter
- How will health evolve in the future?
  - By Age, Sex, and Education?
- How to link the health status and mortality?
- Possible Scenario:
  - Convergence to "ideal" health profile (by age)
    - Of a country (ex. Japan)
  - Speed of convergence

Constant Scenario

- Assumed that the baseline fitted **age-sex** profile of health status will remain constant, without considering education-differential, and combined with changing age structure during 2000-2050
- Next, the above steps were repeated, but with the **age-sex-education** profile of health status combined with changing age and education structure
- Comparison of results from these two exercises two will give us an idea of effect of education on health status

Fitted proportion disabled in South Asia Aged 60-74

Fitted Proportion Disabled - South Asia
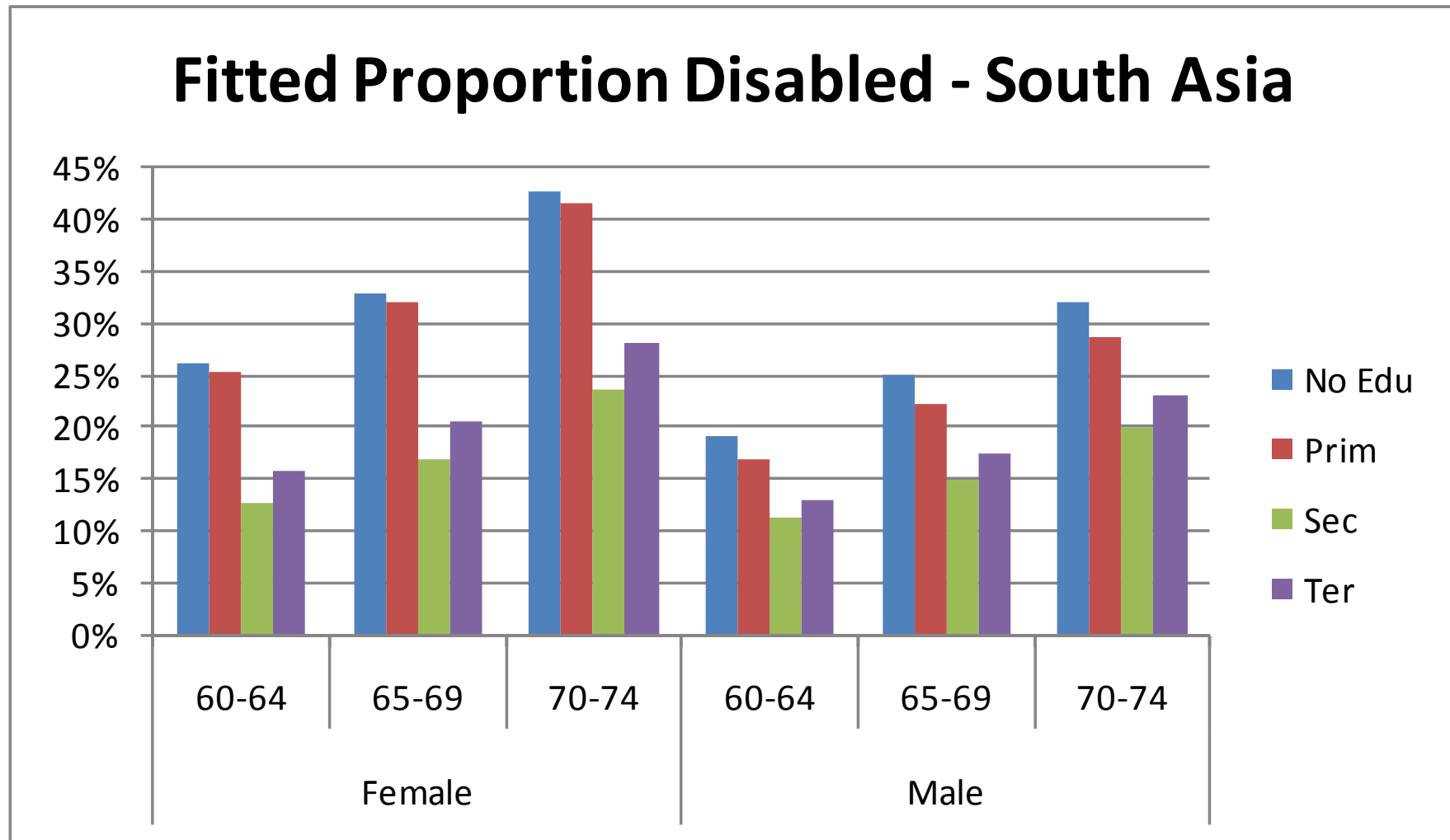
Aged 60-74
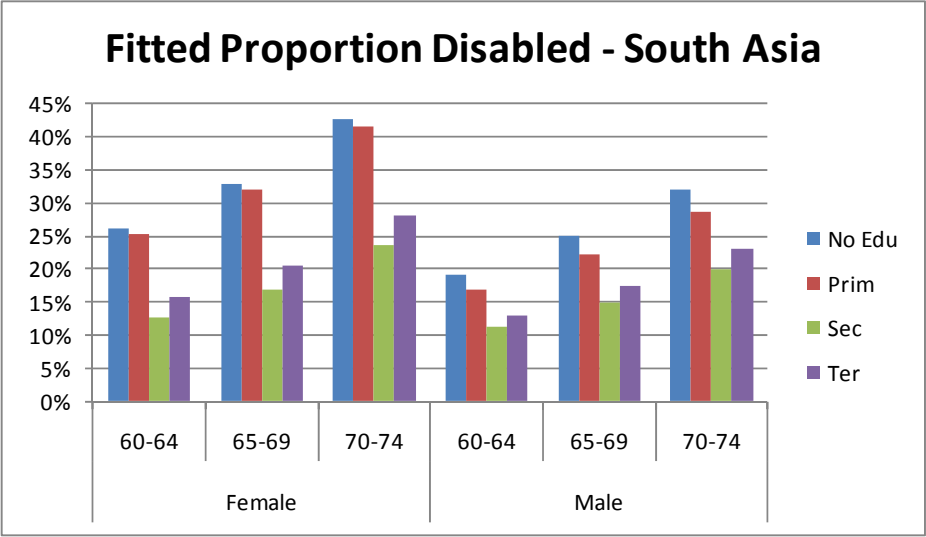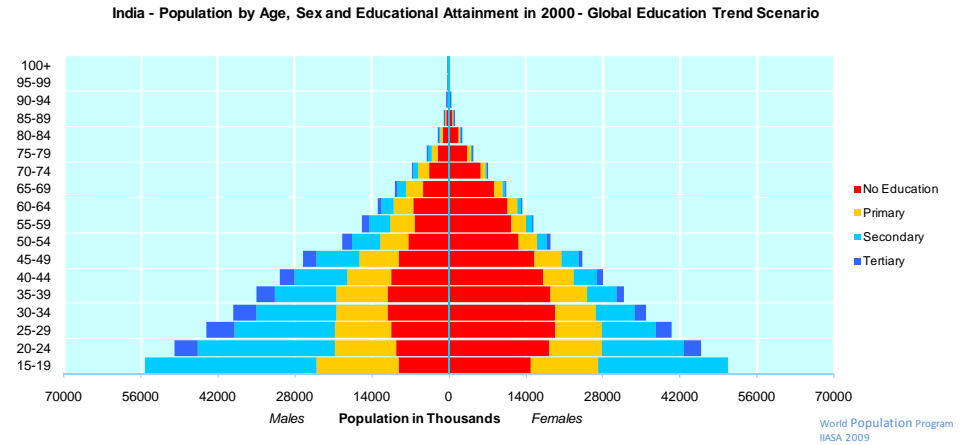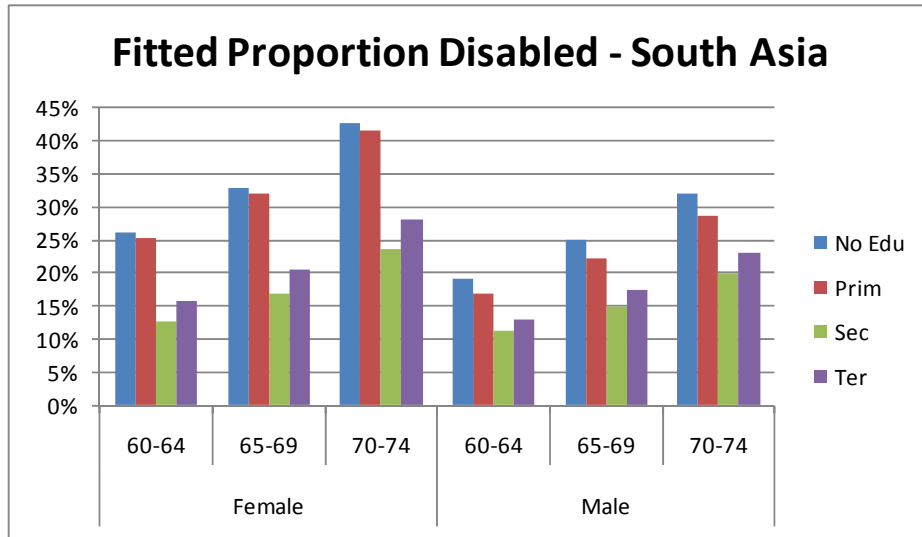
Aged 60-74

Fitted Proportion Disabled - South Asia

Legend: No Edu, Prim, Sec, Ter

X-axis: Female (60-64, 65-69, 70-74), Male (60-64, 65-69, 70-74)

Y-axis: 0% to 45%

India - Population by Age, Sex and Educational Attainment in 2000 - Global Education Trend Scenario

Legend: No Education, Primary, Secondary, Tertiary

X-axis: Males / Females — Population in Thousands (70000, 56000, 42000, 28000, 14000, 0, 14000, 28000, 42000, 56000, 70000)

Y-axis: 15-19 through 100+

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Aged 60-74

Fitted Proportion Disabled - South Asia

Legend: No Edu, Prim, Sec, Ter

X-axis groups: 60-64, 65-69, 70-74 (Female), 60-64, 65-69, 70-74 (Male)

India - Population by Age, Sex and Educational Attainment in 2000 - Global Education Trend Scenario

Legend: No Education, Primary, Secondary, Tertiary

Males — Population in Thousands — Females

India - Population by Age, Sex and Educational Attainment in 2050 - Global Education Trend Scenario

Legend: No Education, Primary, Secondary, Tertiary

Males — Population in Thousands — Females

13

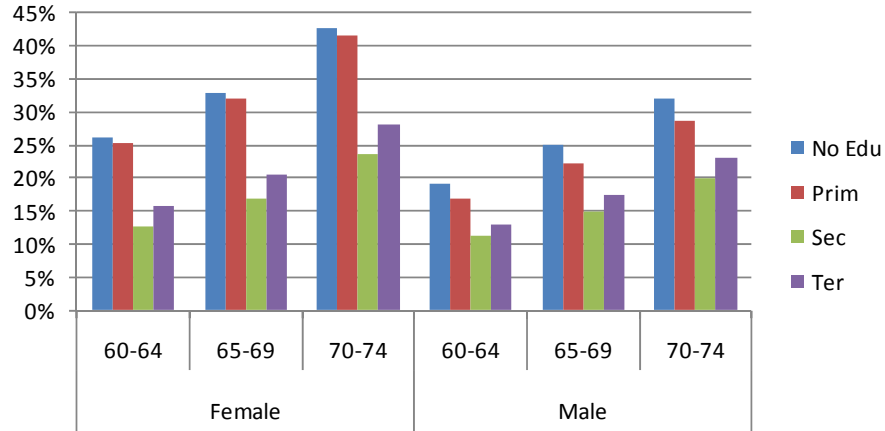# Aged 60-74

Fitted Proportion Disabled - South Asia

Legend: No Edu, Prim, Sec, Ter

Categories: Female (60-64, 65-69, 70-74), Male (60-64, 65-69, 70-74)

South Asia - Disability Prevalence for Aged 60-74

y-axis: prevalence of problem in ADL (15% to 33%)
x-axis: 2000, 2005, 2010, 2015, 2020, 2025, 2030, 2035, 2040, 2045, 2050

Legend: Female ALL, Female EduGET, Male ALL, Male EduGET

India - Population by Age, Sex and Educational Attainment in 2000 - Global Education Trend Scenario

Legend: No Education, Primary, Secondary, Tertiary

Males — Population in Thousands — Females

India - Population by Age, Sex and Educational Attainment in 2050 - Global Education Trend Scenario

Legend: No Education, Primary, Secondary, Tertiary

Males — Population in Thousands — Females

Disability Prevalence –Different Education Scenario – South Asia – Aged 30-74

South Asia - Disability Prevalence for Aged 30-74 Female

Legend: Female ALL, Female EduGET, Female EduCEN

South Asia - Disability Prevalence for Aged 30-74 Male

Legend: Male ALL, Male EduGET, Male EduCEN

Aged 60-74

Fitted Proportion Disabled - Africa - SS
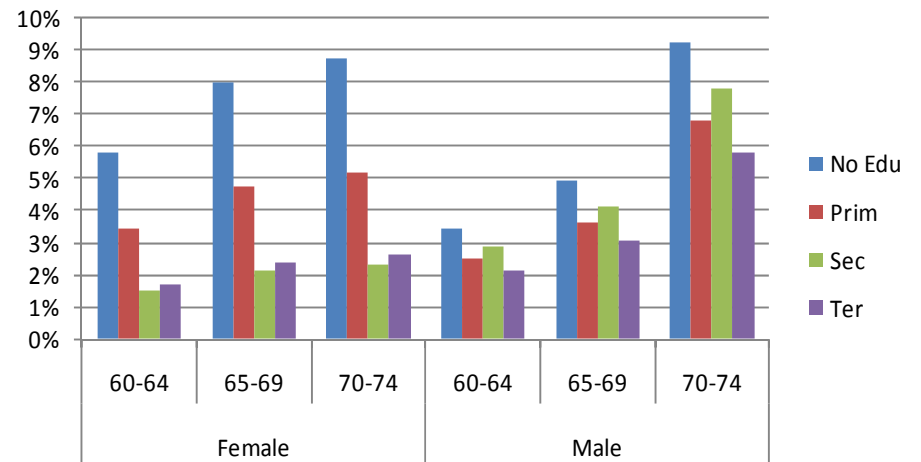
Legend: No Edu, Prim, Sec, Ter

X-axis: Female (60-64, 65-69, 70-74), Male (60-64, 65-69, 70-74)

Fitted Proportion Disabled - SE Asia

Legend: No Edu, Prim, Sec, Ter

X-axis: Female (60-64, 65-69, 70-74), Male (60-64, 65-69, 70-74)

Africa - SS - Disability Prevalence for Aged 60-74

Y-axis: prevalence of problem in ADL

Legend: Female ALL, Female EduGET, Male ALL, Male EduGET

SE Asia - Disability Prevalence for Aged 60-74

Y-axis: prevalence of problem in ADL

Legend: Female ALL, Female EduGET, Male ALL, Male EduGET
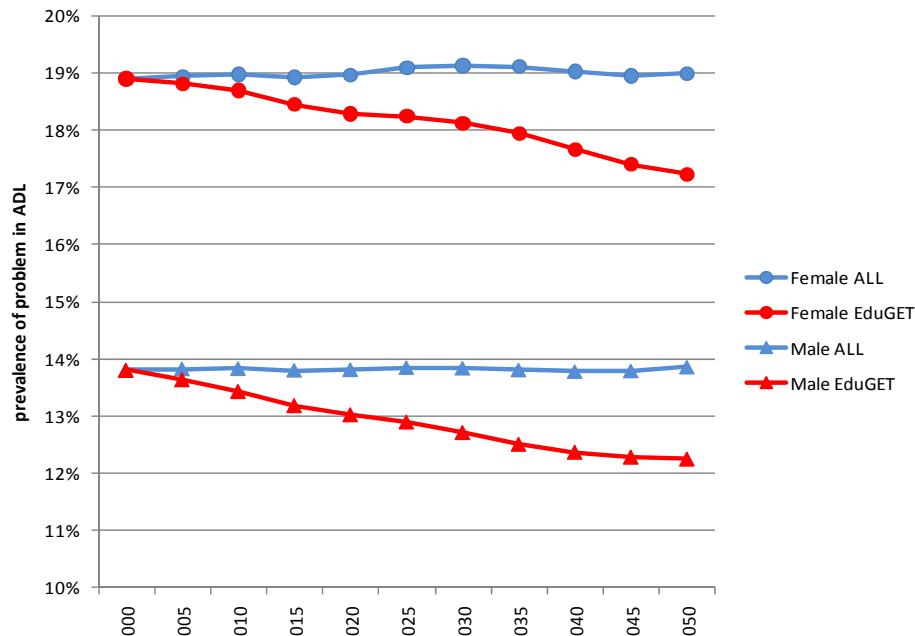
Disability Prevalence –Different Education Scenario – Africa SS – Aged 30-74
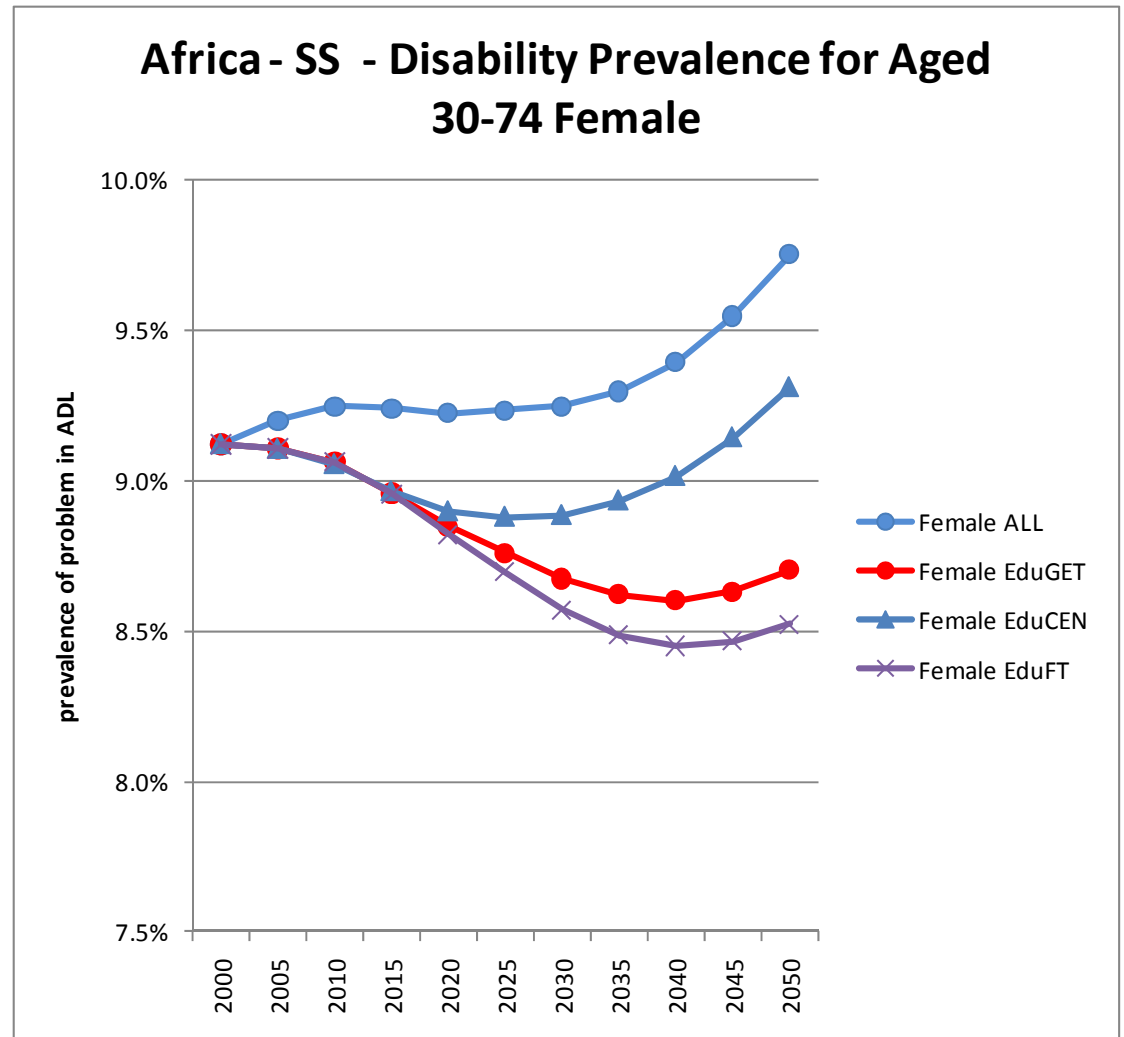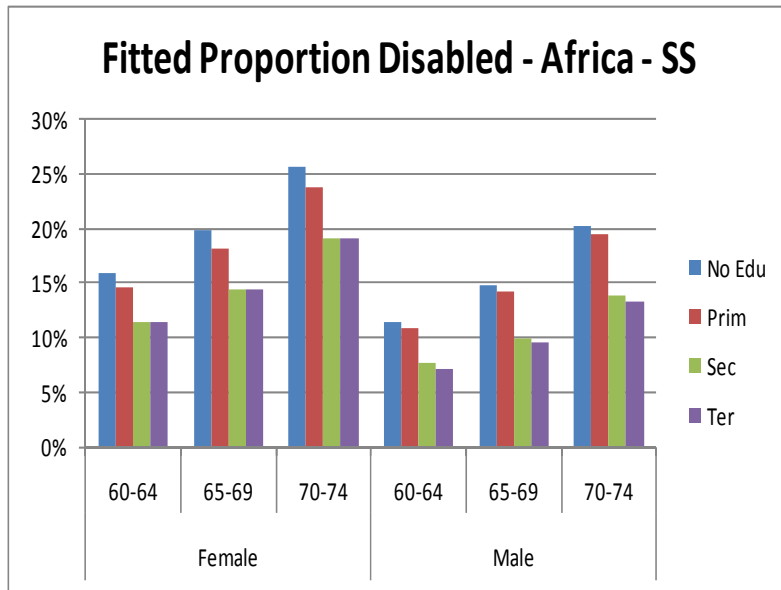
Disability Prevalence –Different Education Scenario – South Asia – Aged 30-74

Fitted Proportion Disabled - SE Asia

SE Asia - Disability Prevalence for Aged 30-74 Male
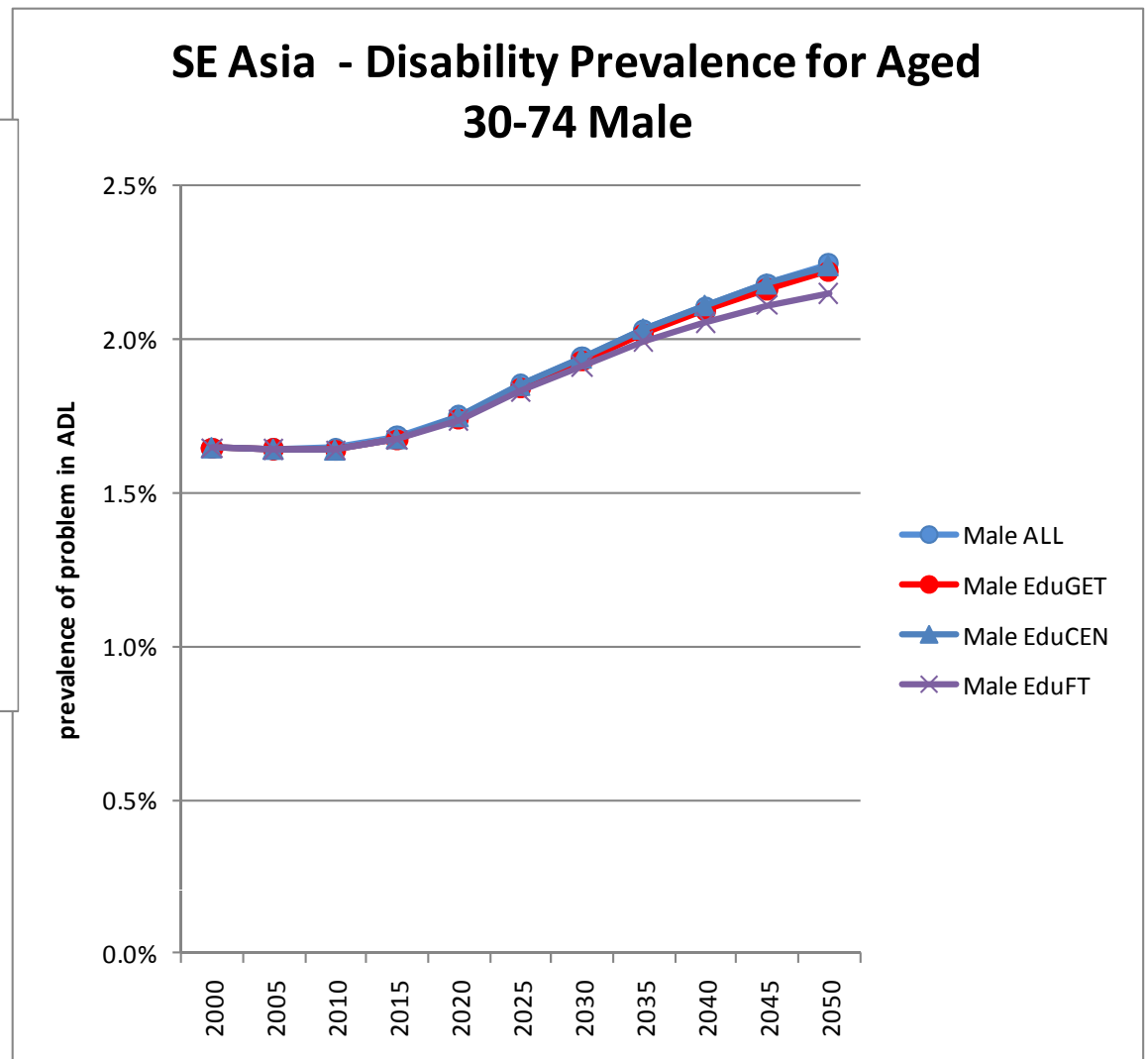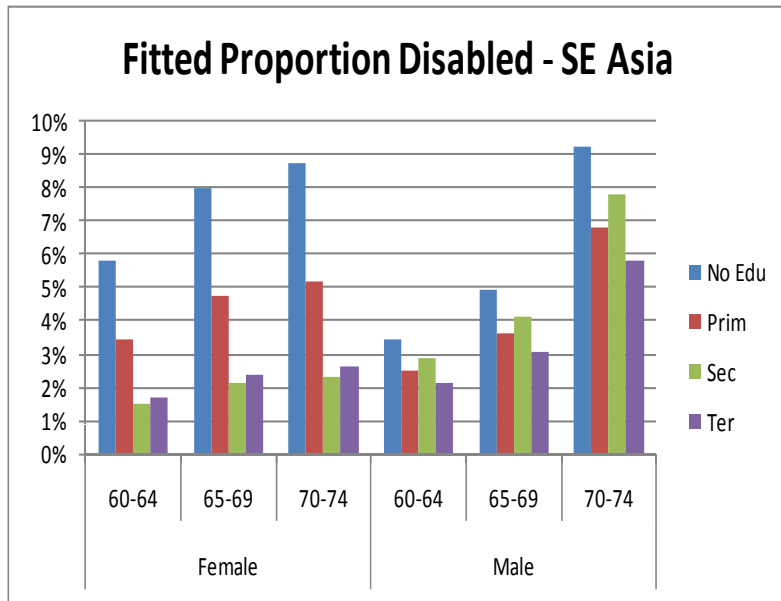
Education and Child Mortality

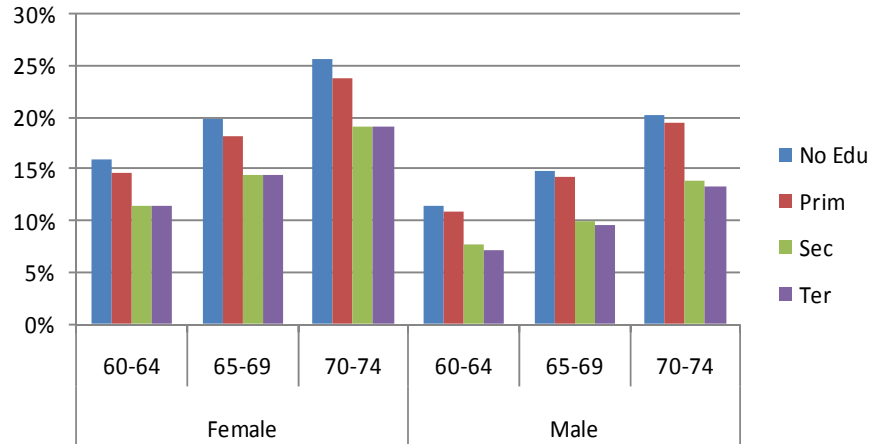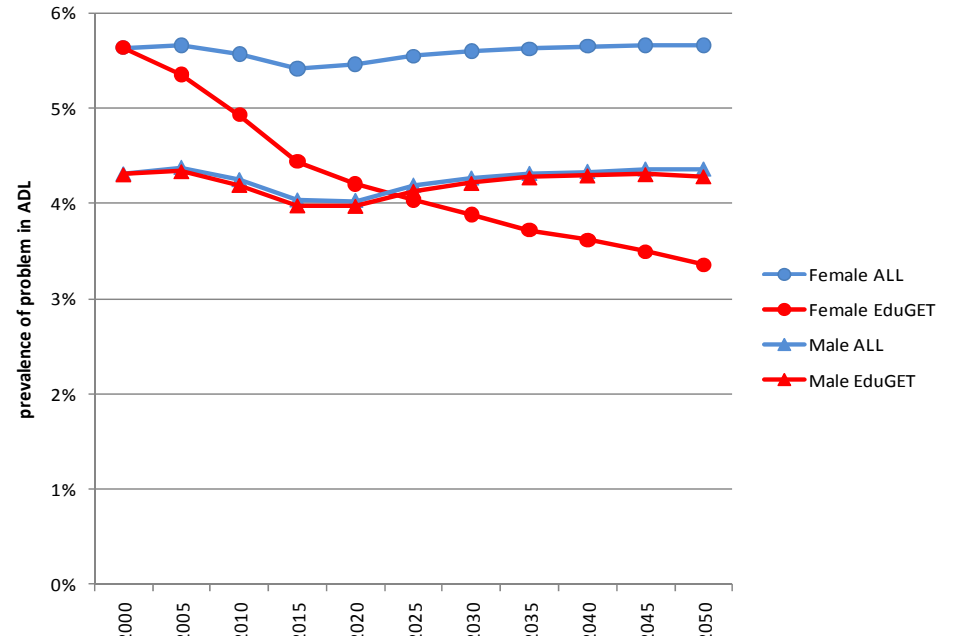**Under five child mortality by level of educational attainment of mothers**
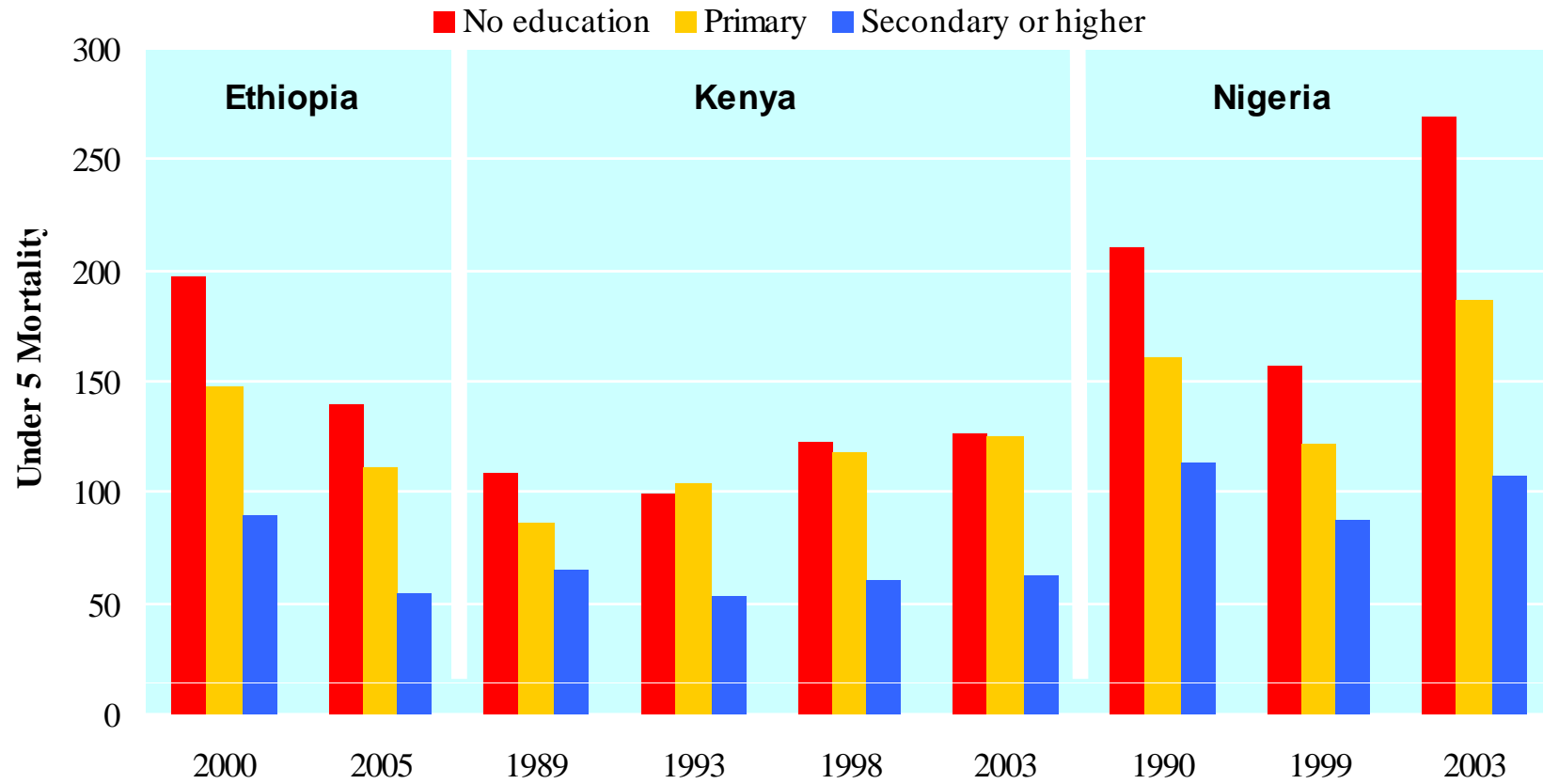
Conclusions

- Education differentials in adult health are present to a greater or lesser degree across the globe

- Increasing levels of education can be expected to result in lower levels of functional adult disability, even as population ages

- Increasing the speed at which nation's achieve higher levels of education is good policy and an important adjunct to traditional public health interventions

Next Steps

- Developing scenario for health status?
- Linking health status and mortality?
- Explaining the Differential
  - Cultural?
  - Prevalence of certain disease or condition
    - Ex. Musculo-skeletol conditions
  - Occupation?
  - Income?

Countries in the list

cntry	region	cntry	region	cntry	region	cntry	region
Burkina	1	Bangladesh	2	Austria	3	Brazil	4
Chad	1	China	2	Belgium	3	Dominican	4
Comoros	1	Georgia	2	BosniaHerzegovina	3	Ecuador	4
Congo	1	India	2	Croatia	3	Guatemala	4
CotedIvoire	1	Israel	2	Czech	3	Mexico	4
Ethiopia	1	Kazakhstan	2	Denmark	3	Paraguay	4
Ghana	1	Lao	2	Estonia	3	Uruguay	4
Kenya	1	Malaysia	2	Finland	3		
Malawi	1	Myanmar	2	France	3		
Mali	1	Nepal	2	Germany	3		
Mauritania	1	Pakistan	2	Greece	3		
Mauritius	1	Philippines	2	Hungary	3		
Morocco	1	SriLanka	2	Ireland	3		
Namibia	1	Turkey	2	Italy	3		
Senegal	1	UAE	2	Latvia	3		
SouthAfrica	1	VietNam	2	Luxembourg	3		
Swaziland	1			Netherlands	3		
Tunisia	1			Norway	3	AustraliaCATI	6
Zambia	1			Portugal	3	AustraliaDC	6
Zimbabwe	1			Russia	3		
				Slovakia	3		
				Slovenia	3		
				Spain	3		
				Sweden	3		
				UK	3		
				Ukraine	3		

- sncc cc Freq cntry 1 175 5552 Bangladesh 2 182 1026 BosniaHerzegovina 3 184 5000 Brazil 4 187 4824 Burkina 5 194 4660 Chad 6 101 3993 China 7 225 1759 Comoros 8 226 2497 Congo 9 192 3184 CotedIvoire 10 119 990 Croatia 11 121 935 Czech 12 232 4534 Dominican 13 233 4659 Ecuador 14 123 1012 Estonia 15 237 4938 Ethiopia 16 105 2755 Georgia 17 241 3938 Ghana 18 243 4770 Guatemala 19 128 1419 Hungary 20 106 9994 India 21 135 4496 Kazakhstan 22 284 4417 Kenya 23 287 4889 Lao 24 137 856 Latvia 25 292 5306 Malawi 26 293 6040 Malaysia 27 295 4285 Mali 28 298 3840 Mauritania 29 299 3887 Mauritius 30 140 10843 Mexico 31 141 5000 Morocco 32 304 5886 Myanmar 33 305 4250 Namibia 34 142 8688 Nepal 35 311 6379 Pakistan 36 315 5143 Paraguay 37 147 10078 Philippines 38 152 4422 Russia 39 328 3226 Senegal 40 110 2519 Slovakia 41 154 585 Slovenia 42 155 2352 SouthAfrica 43 156 6364 Spain 44 157 6732 SriLanka 45 335 3121 Swaziland 46 162 5069 Tunisia 47 111 11179 Turkey 48 346 1180 UAE 49 345 2850 Ukraine 50 350 2988 Uruguay 51 164 3492 VietNam 52 357 4099 Zimbabwe 53 114 1055 Austria 54 116 1012 Belgium 55 122 1003 Denmark 56 136 1013 Finland 57 131 1008 France 58 129 1259 Germany 59 127 1000 Greece 60 130 1014 Ireland 61 131 1236 Israel 62 132 1000 Italy 63 139 700 Luxembourg 64 253 1091 Netherlands 65 145 984 Norway 66 158 1000 Sweden 67 361 1200 UK 68 113 1754 Australia 69 113 1846 Australia 70 149 1030 Portugal 71 356 3809 Zambia

Region REVES

Spain	2	3	43	724	4
Austria	1	3	53	40	4
Belgium	1	3	54	56	4
Denmark	1	3	55	208	4
France	1	3	57	250	4
Germany	1	3	58	276	4
Greece	1	3	59	300	4
Italy	1	3	62	380	4
Netherlan	1	3	64	528	4
Sweden	1	3	66	752	4
Lao	2	2	23	418	3
Malaysia	2	2	26	458	3
Myanmar	2	2	32	104	3
VietNam	2	2	51	704	3
Burkina	2	1	4	854	2
Chad	2	1	5	148	2
Comoros	2	1	7	174	2
Congo	2	1	8	178	2
CotedIvoi	2	1	9	384	2
Ethiopia	2	1	15	231	2
Ghana	2	1	17	288	2
Kenya	2	1	22	404	2
Malawi	2	1	25	454	2
Mali	2	1	27	466	2
Mauritani	2	1	28	478	2
Namibia	2	1	33	516	2
Senegal	2	1	39	686	2
SouthAfri	2	1	42	710	2
Swaziland	2	1	45	748	2
Zimbabwe	2	1	52	716	2
Zambia	3	1	71	894	2
Banglades	2	2	1	50	1
India	2	2	20	356	1
Nepal	2	2	34	524	1
Pakistan	2	2	35	586	1
SriLanka	2	2	44	144	1