A statistical analysis of various factors associated with selected health problems among older adults in India

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Abstract

The paper attempts at developing a framework for understanding socioeconomic correlates of selected chronic diseases and impairments among older adults of India. Subsequently, logit regression models are utilized to explain how various socioeconomic, cultural, demographic and life style factors are associated with selected health problems among the older adults. The selected chronic diseases are chronic cough, diabetes, heart disease, urinary problems, hypertension, problem in joints and limbs and piles. The selected disabilities arise in respect of vision, hearing, locomotion, amnesia and speech. The self reported cases appearing in the 52nd round data of the National Sample Survey data have been made use of for this purpose. It has been found that the factors associated with the likelihood of having a health problem are dependent on the type of the health problem. Financial dependency, household economic status, education and lifestyle factors are found to be significant socioeconomic predictors of health at older ages.

Keywords: ageing, disability, functional status, impairment, older adults

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Introduction

The ageing of populations is an outcome of the process known as demographic transition. The process and its implications are well documented and debated in the demographic literature. One of the issues of concern in the developing world is the preparedness of these societies to ensure healthy ageing of the increasing population of Older Adults (OAs). India is no exception as OAs in India amounted to 7.10 per cent of the total population in 2001 in comparison to 5.63 per cent of the total population in 1961.

Health being one of the dimensions of well being is too complex an entity to be captured by a single measure or indicator. According to the World Health Organisation (WHO) "health is a state of complete physical mental and social well being and not merely absence of disease or infirmity." To put it in other words diseases and infirmities touch upon the physical aspects of health whereas the mental and the social aspects should not be ignored. This definition applies to all including the OAs.

Though diseases are governed by various biological factors operative in a human being, recent literature has shown that social and economic environmental factors are strongly associated with the prevalence of a disease in a population (Gliksman et al, 1995, Smith et al, 1997, Chandola 1998, Cambois et al, 2001, Adda et al, 2003, Zimmer et al, 2003, Kaneda et al, 2004, Baker et al, 2005, Raotio et al, 2005, Matthews et al, 2005, Matthews et al, 2006, Petrelli et al, 2006, Zimmer, 2006 and Merkin et al, 2007). Even early childhood conditions have a lasting effect on the health at later life (Hayward et al, 2004). The interference of socio-economic conditions in health at older ages has been debated in detail in recent demographic literature. These studies provide insight into a gamut of the problem in different socio-cultural environments.

Such studies cover the developed countries and the countries of south-east Asia. Studies exploring strength of association between health and socioeconomic factors for OA in India are lacking. Further, the relative economic position of an OA in a household and its

association with health of him/her has not been addressed in these studies. The present study is an attempt to fill these gaps. The aims of the present study are:

1. Defining health of an OA.
2. Defining socioeconomic, cultural and lifestyle factors and investigating the association of these factors with the health of an OA.
3. Investigating whether the effect of above mentioned factors vary with gender and rural/urban place of residence.

Conceptual Framework

In the present section first the indicators of health and economic, socio-cultural and other factors are defined. The effect of various economic, socio-cultural and other factors on health may vary with gender and place of residence. To investigate this variation of separate population are considered. Finally, the logistic regression models for analyses are discussed.

As stated earlier, WHO has defined health in a comprehensive manner as 'a state of complete physical, mental, and social well-being and not merely the absence of disease, or infirmity.' Physical well being materializes in the absence of diseases and the absence of any kind of handicap. This is indicated substantially by the diseases which OAs suffer from and the disabilities they encounter with growing age. Either or both of disability and disease have a bearing on the OAs ability to perform day to day activities. This may lead to handicap of one kind or the other which in turn may put restrictions on their mobility.

Handicap can arise from impairment of an organ (disability with respect to a particular organ) leading to inability to perform certain daily activities. The ability to perform essential routine activities is measured in terms of functional status. Thus, impairment of an organ and/or diseases affects the functional status of an older adult. Therefore, the diseases and the disabilities faced by an OA indicate his state of physical health.

There are eight diseases on which information is available. These are chronic cough, piles, urinary problems, pain in joints and limbs, hypertension, heart disease, diabetes and cancer. These diseases fall into two groups. The first four, which fall into the first group, do not require any diagnosis for being detected. The remaining diseases fall into the second group. They can be detected only after proper diagnosis. Prevalence of cancer is not analyzed as its prevalence is rare in all the populations. The indicator variables indicating the presence of eight chronic diseases and five kinds of disability (visual, hearing, speech, locomotor and amnesia/senility) build up the **Health** of an OA**.**

For the first group of diseases, the information on each disease is available in the form of a nominal binary variable, indicating whether the disease is present or not. For the second group, the information is available on each disease in the form of a nominal variable having three alternative responses. These responses are disease present, disease absent and not known. Since "not known" is not indicative of presence or absence of a disease, all the units responding as "not known" are not included in the analysis. Thus, for the second group of diseases also we are left with information on four binary variables, indicating presence or absence of a disease.

Each OA survives in an economic and socio-cultural environment. This environment may have some association with health of an OA. In addition to these environments, his/her lifestyle and demographic variables like age and marital status may have influence on the health of an OA. The variables that represent these environments constitute different systems. The framework of analysis presumes that health is an outcome of the effects of these systems. Not all the dependencies are established. The study tries to explore these presumptions. These systems are discussed in what follows.

The economic system consists of a set of variables related to the economic aspect of the life of an OA. Moreover, this study distinguishes between "household economic conditions" and the "economic status" of an OA within a household.

Three nominal variables describe the economic status (ES) of an OA. These are possessing and managing assets, possessing and managing property and economic dependence. On the other hand, Household per capita monthly expenditure (PCME) has been considered as a measure of household economic conditions (HEC).

The categorical variable economic dependence with three response categories, namely not dependent, dependent and partially dependent, is the variable that indicates economic security. While an OA in the category "not dependent" enjoys some economic security, OA in the category "dependent" does not enjoy that sort of economic security. An OA in the category "partially dependent" enjoys a state of economic security in between the two, mentioned already.

Property and/or assets are the economic resources that an OA may possess. In case he/she possesses either or both of these he/she may or may not manage them. Two nominal variables are included in the analysis to represent assets and property. These variables have response categories namely "having and managing", "having and not managing" and "not having."

Based on the PCME, the households have been divided into three groups. The three groups are named as lower, middle and upper economic groups. This grouping has been done for rural and urban regions separately.

The demographic variables age, marital status and number of children build up this system. Age has been made categorical by defining age groups as 60-68 years, 69-78 years and 79 years and above.

The classification of marital status (MS) as currently married, widowed, never married, divorced and separated has been natural and exhaustive. Most of the OAs in the Indian society are confined to either of the first two marital states. The latter three states contain

a small proportion of the OAs. In the present analysis, these latter three states are clubbed into a single category "others."

The variable "number of children" has been included in the framework to incorporate the effects that child bearing, during reproductive phase of a female, has on their health at older ages. The information available in the data does not tell about the actual number of children an older woman has given birth to in her reproductive phase, but it gives the actual number of surviving children at the time of survey.

Education may influence health awareness among the OAs. Thus, education has been included here in the form of a categorical variable with three categories as illiterates, literates but below matriculation and matriculation and above.

Caste is a distinct feature of the Indian social system. It has remained as an indicator of economic disparity among different social groups. The question that worth's investigating is whether any such disparity prevails in the health realm. So, this factor too has been incorporated in the framework of the study. On one hand the factor may account for health disparity among social groups and on the other hand it may show how social disparity has repercussion on health. This variable has three categories, namely scheduled castes (ST), scheduled tribes (ST) and the general castes (G).

Addiction to tobacco through chewing and smoking and that to alcohol are included in the framework to control for its effects on occurrence of diseases like heart disease and hypertension. These variables are included only in the cases of two male populations as consumption of tobacco and alcohol is rare in the female populations.

The Populations

To investigate the gender as well as rural/urban variations in the effect of various factors on health, the present study considers following four populations of OA.

1. The population of rural males (RM)
2. The population of rural females (RF)
3. The population of urban males (UM)
4. The population of urban females (UF)

The Model

Suppose for a given population "P" and a given disease/disability "D", we have a binary response variable Y_D^P coded 1 if a disease/disability is observed and coded 0 otherwise. Letting, π denote the probability that the given disease/disability has been observed, we may write

$$\mathrm{P}(Y_D^P = 1) = \pi$$
$$\mathrm{P}(Y_D^P = 0) = 1 - \pi$$

Let $\mathbf{X} = (x_1, x_2 \ldots x_k)$ be a set of explanatory variables that influence Y. Then, the logistic regression model is given by

$$\ln\left(\frac{\pi}{1-\pi}\right) = \sum_{j=1}^{k} \beta_j x_j$$

where, β's are the coefficients. The analysis includes models for each of the disease/disability for all the four populations.

Findings and Analyses

As conceptualized earlier, seven chronic diseases and five disabilities define the health of OAs. The conceptual framework consists of exposing the two OA male populations to economic, socio-cultural, demographic and lifestyle factors and the two OA female populations to economic, socio-cultural and demographic factors. These factors are found to be significantly associated with the health of OA but the effect of these factors varies with the population and disease or disability.

In what follows first, the salient findings concerning association of health with economic factors are presented. Then, association of health with socio-cultural, demographic and lifestyle factors is considered.

3.1 Health and Economic Condition

With exception of the urban female population, the association between economic dependency and prevalence of diseases like chronic cough, diabetes, heart disease, urinary problems, blood pressure and pain in joints and limbs is evident.

Piles, Pain in Joints and Limbs

The disease piles is not associated with economic dependency in any of the populations, except the population of urban males. For this population, the odds in favour of having this disease are 1.68 times more for partially dependent OA when compared to economically independent OA. For diseases like piles and pain in joints and limbs, effects of household economic conditions (HEC) are not significant. This means that occurrence of these diseases and household economic conditions are not associated. The soul exception is the population of RM, where the disease piles is less likely to occur in lower economic strata when compared with this disease prevalence in the upper economic strata. But, when we look at the association between economic dependency and the occurrence of these two diseases it is observed that the likelihood of having the disease pain in joints and limbs increases with increase in economic dependency of OA. This pattern is observed in all the populations except the population of UF. For UF, there is no strong evidence of existence of association between individual economic condition and either of these diseases. On the other hand, occurrence of piles is not associated with economic dependency in all the populations except UM where partially dependent OA are more likely to have this disease when compared to economically independent OA.

Diabetes, Heart Disease, Blood Pressure and Urinary Problems

HEC influence the occurrence of these diseases in OA. There is strong evidence that HEC shows strong association with the occurrence of these diseases in OA. The OA

belonging to middle and lower income groups are less likely to have these diseases when compared to the OA belonging to high income groups. This implies that these diseases are more likely to be found in OA who are members of economically affluent households. But, when the association between economic dependency and occurrence of these diseases is observed we see that increasing economic dependency leads to an increase in the likelihood of having these diseases.

Chronic Cough

For all the four populations, the likelihood of having this disease increase with increasing economic dependency of OA. Further, lowering economic status of households also leads to increase in the likelihood of having the disease.

Disabilities

There is no strong evidence to prove the existence of association between HEC and any of the disabilities, in any of the population. The exception is the population of UM, where OA belonging to lower and middle income groups are less likely to be suffering from speech disability.

Economic dependency shows significant association with visual disability and disability in locomotion in all the populations. The likelihood of suffering from these disabilities increases as one move from state of no dependence to the states of partial dependence and total dependence. Hearing and speech disability shows such association in both the older male populations only. Amnesia has similar kind of association with economic dependency in all the populations excluding the UF where association is not found to be significant.

Marital Status and Health

As mentioned earlier, the three states of marital status namely, never married, divorced and separated are clubbed into a single category. Therefore, the units in this state are not homogenous with respect to marital status. Hence, for obvious reasons, the interpretation of the results shall remain confined to the two marital states namely married and widowed only.

In the interpretation of the results of logistic regression, "change in MS" means a change from currently married state to widowed state. The odds ratios (OR) can be viewed as a change in susceptibility to get affected by a disease whenever there is a change in MS. If the effect is found to be statistically significant (for p-value less than 0.05), an OR greater than one shows an increased susceptibility to the respective disease/disability, for the respective population, with a change in MS. On the other hand, an OR less than one indicate the opposite.

In the cases of disabilities, as far as the two older male populations are concerned, change in MS doesn't bring about any significant change in susceptibility to disabilities. An exception occurs only for RM in having hearing disability (OR=1.28). Unlike older male populations, older female populations become more susceptible to disabilities with the change in MS (the only exception is the case of speech disability for older females where the effect is not significant).

All populations are not susceptible to piles with change in MS. But the cases for other chronic diseases differ. In UM population, the susceptibility to chronic cough increases with change in MS. For rest of the diseases this population remains immune to change in MS. Their rural counterparts i.e. the RM population becomes more susceptible to chronic cough and pain in joints and limbs with change in MS. A peculiar observation for this population is that the susceptibility for having heart disease reduces with change in MS.

Unlike their male counterparts, the UF population shows susceptibility to diseases viz. chronic cough, diabetes, urinary problems, hypertension and pain in joints and limbs with

a change in MS. Similarly, with change in MS, the RF population shows enhanced susceptibility towards having chronic cough, heart disease, hypertension and pain in joints and limbs.

The above findings indicate that, with a change in MS, the older female populations are more vulnerable to health problems. It does not mean that a change in MS has direct bearing on the state of health; however it triggers changes in surrounding environment for older females and that leads to worsening of their health.

Health and Increasing Age

Wherever the effect of age turns out to be significant, barring two exceptions, it indicates increasing vulnerability of health with increasing age. The exception occurs for the diabetes cases in the UM population and for the hypertension cases in the RF population. In the former case, when compared with the reference category (i.e. 60-67 years age group), the odds for having the disease have been only 0.49 for the "78 years and above" category. Again, in the latter case the odds were 0.81 for the category "68-77 years." The reason may be that the disease specific mortality may be such for these populations that the members die before entering the higher age categories.

Health and Number of Children

This variable has been incorporated in the framework for all the populations including the older male populations. It has been assumed that the effect of this variable on health shall not be significantly differing from zero for the male populations. But the findings did not adhere to this presumption.

This variable draws up a demarcation line between male and female populations in the sense that it has not been found to have a significant effect for the male populations as far as occurrence of diseases are concerned (the exception being the disease 'piles' for rural males). For the female populations, it has been found to have significant effect for

some diseases. While, this variable has not shown any significant effect on occurrence of disabilities among the female populations it has had significant effect on the occurrence of some disabilities in the male populations.

In the RF population, the susceptibility to chronic diseases namely chronic cough, heart disease, urinary problems and hypertension has increased with the increase in number of children. Similar has been the findings for the UF population where the concerned diseases are diabetes, heart disease and hypertension. The reasons for these observations may be biological. The reasons for the effects of this variable on the male populations, however, may not be biological.

For the UM population, an increasing susceptibility for disabilities namely visual, amnesia and speech with increasing age is also noteworthy. In the RM population, similar effect has been observed for disability in speech.

Health and Education

Education is included in the framework as a measure of awareness about health. A broad classification by years of schooling makes three categories namely “illiterates”, “literates but below matriculation” and “matriculation and above.” These constitute the three levels of the variable education and these categories are ordered from the lowest to the highest. Based on this categorization, it is presumed that susceptibility to a disease or disability in a population should increase with decrease in the level of education (awareness). But the findings present a varying picture. Among the selected diseases, occurrence of urinary problems, and among the disabilities, the disability of locomotion shows no association with this variable in all the four populations. Similarly, the disability of speech shows no association with education in RM, RF and UF populations. In what follows the association between education and diseases is analyzed first followed by an analysis of the association between education and the disabilities.

Diseases and Education

As mentioned earlier, it was presumed that lower educational levels should increase the susceptibility to diseases. Based upon the pattern observed, the diseases can be grouped into two. The first group includes those diseases for which populations show increasing susceptibility with decreasing level of education. Chronic cough and pain in joints and limbs belong to this category. For this group, the effect of education on diseases is not significant for the RF population.

The other group is the one, for which the populations show decreasing susceptibility with decreasing level of education. This group includes diabetes, heart disease, hypertension and piles. The first three of the diseases need diagnosis for being detected. Education shows significant association with piles only in RF population. The reason for this kind of observation may be that the educated OAs may go for check ups and report the disease correctly whereas the less educated OAs may have misreported these diseases as "not present" without going for any diagnosis tests.

Disabilities and Education

For RF population, the effect of education on disability is not significant. For the remaining three populations, lower categories of education have been found contributing to increased susceptibility to disabilities wherever education has significant effect. It happens in the case of visual disability for the three remaining populations. Similar results are observed for amnesia in case of both the urban populations. In the case of disability of hearing, similar results hold for RM and UF populations. For the urban male population, being literate at a level below matriculation increases the susceptibility to disability of speech.

Social Groups and Health

In what follows, association between social group and disabilities is analyzed followed by an analysis of association between social group and diseases.

A careful observation of the effect of this variable on occurrence of disabilities show that in the RF population, ST people are more susceptible than other groups in getting affected by all disabilities (barring visual disability). There are similar findings for ST in RM, UM and UF populations for disability of hearing and UM population for disability of speech. The SC people are more susceptible to disability of vision in RF population and disability of locomotion in UM population.

In the UF population, the ST people are less susceptible to diseases like heart disease, hypertension and pain in joints and limbs. In this population, the SC and ST people are more susceptible to chronic cough when compared with the general caste. The odds ratios are1.50 and 1.27 respectively.

In the UM population, this variable is found to be associated with chronic cough, diabetes and heart disease. When compared with the G caste people, the ST people are found less susceptible to diabetes and heart disease. However, the ST people are found less susceptible to diabetes but more susceptible to chronic cough.

In RF population, the ST people are less susceptible to hypertension. Both SC and ST people are more susceptible to pain in joints and limbs in this population. In RM population, ST people are less susceptible to diabetes and more susceptible to pain in joints and limbs.

Lifestyle Factors and Health

In the UM population, those chewing tobacco are more susceptible to disability of vision, piles and pain in joints and limbs. On the contrary, susceptibility to urinary problems reduced for those chewing tobacco in this population. In the RM population, smoking

tobacco increases susceptibility to diseases like piles and diabetes. On the contrary, it reduces susceptibility to chronic cough and disability of locomotion. Those consuming alcohol are less susceptible to diabetes in this population. We are yet to find any scientific reasons to justify this.

Conclusion and Discussion

It is noteworthy that out of the selected diseases and disabilities, only a few affect the male population with a change in MS. On the other hand, the older female populations are susceptible to most of the diseases and disabilities with a change in MS. Here we see gender differences in health at older ages that are induced by social forces. Another important observation is that the ST older females in rural areas are more susceptible to suffer from disabilities of all kinds when compared to general caste older females.

Economic dependence of an OA and HEC are two different aspects of economic environment of an OA. Barring a few exceptions, economic dependency of an OA is associated with the health of an OA in the sense that increasing economic dependency leads to increased susceptibility to diseases/disabilities. HEC is found to be associated with health only in cases of diseases like heart disease, blood pressure, diabetes and urinary problems in the sense that the OAs living in households belonging to higher economic strata are more likely to suffer from these diseases. The reasons behind the exceptional behaviour of the UF population by showing no significant association between economic dependency/HEC and diseases/disabilities are not clear here and it need further investigation.

This study follows a comparatively restricted definition of health in the sense that it investigates the state of health vis-à-vis some selected diseases and disabilities. In other words, the aspects of mental and social well being are not touched upon in the present study; however, the aspects covered are sufficient to indicate the state of physical well being. Further, it should be noted that if the environment has an effect on the occurrence

of a disease, it is not instantaneous but involves a time lag. Therefore, longitudinal studies are more appropriate for such investigations. Hence, this analysis should be better viewed as an attempt to find associations between prevailing environment and prevailing health.

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Table 3.1: Logistic Regression Odds Ratios for Having a Particular Health Problem in a Particular Population for "Partially Dependent" and "Fully Dependent" OA when Reference Category is "Not dependent"

Sr. No.	Health Problem	Populations							
		Rural Males		Rural Females		Urban Males		Urban Females	
		Partially Dependent	Fully Dependent	Partially Dependent	Fully Dependent	Partially Dependent	Fully Dependent	Partially Dependent	Fully Dependent
1	Chronic cough	1.52**	2.03**	1.04	1.43**	1.45**	1.57**	1.5*	1.46*
2	Diabetes	1.05	2.19**	0.61	1.7	1.26	1.05	0.98	0.96
3	Heart Disease	1.29	1.75**	1.18	2.49*	1.32	1.12	1.48	1.15
4	Urinary Problems	1.32	1.7**	2.43	3.13*	1.52*	1.41	1.68	1.44
5	Blood Pressure	1.29*	1.48**	0.96	2.36**	1.11	1.33*	0.96	0.97
6	Pain in Joints and Limbs	1.25**	1.5**	1.09	1.41**	1.37**	1.56**	0.98	0.97
7	Piles	0.95	1.02	0.63	0.72	1.68*	1.3	1.55	1.25
8	Disability: Visual	1.24**	1.85**	1.17	1.63**	1.15	1.69**	1.31	1.32*
9	Disability: Hearing	1.4**	1.9**	0.93	1.21	1.38*	1.52**	1.46	1.24
10	Disability: Locomotion	1.3*	2.57**	1.36	1.98**	1.79**	3.17**	1.33	1.8*
11	Disability: Amnesia	1.69**	1.8**	1.4*	1.52*	1.54*	1.53**	1.43	1.4
12	Disability: Speech	1.1	1.53*	1.07	1.2	1.92*	2.39**	1.64	2.02

**** indicates that p-value is less than or equal to 0.01 and * indicates that p-value is less than or equal to 0.05**

Table 3.2: Logistic Regression Odds Ratios for Having a Particular Health Problem in a Particular Population for "Middle Economic Group" and "Lower Economic Group" OA when Reference Category is "Higher Economic Group"

Sr. No.	Health Problem	Populations							
		Rural Males		Rural Females		Urban Males		Urban Females	
		Middle Economic Group	Lower Economic Group	Middle Economic Group	Lower Economic Group	Middle Economic Group	Lower Economic Group	Middle Economic Group	Lower Economic Group
1	Chronic cough	0.92	0.85*	1.31**	1.33**	1.11	1.19	0.99	1.11
2	Diabetes	0.58**	0.39**	0.45**	0.41**	0.81	0.54**	0.72*	0.33**
3	Heart Disease	0.6**	0.56**	0.83	0.97	0.52**	0.52**	0.7*	0.63*
4	Urinary Problems	0.9	0.75	1.2	1.4	0.86	0.82	0.63*	0.52*
5	Blood Pressure	0.71**	0.61**	0.84	0.54**	0.74**	0.68**	0.77**	0.54**
6	Pain in Joints and Limbs	1.03	0.98	0.98	0.95	0.98	1.09	0.88	1
7	Piles	1.06	0.71*	0.98	0.79	1.04	0.76	0.76	0.75
8	Disability: Visual	0.97	1.03	1	1.03	0.98	0.96	0.96	1.05
9	Disability: Hearing	0.97	1	1.09	1.13	1	0.99	0.97	1.11
10	Disability: Locomotion	0.91	0.98	1.08	1.11	0.79	0.82	0.93	0.87
11	Disability: Amnesia	1.06	1.22*	1.12	1.18	1.12	1.07	0.98	1.16
12	Disability: Speech	0.86	0.93	0.94	1.12	0.66*	0.62*	0.73	0.81

** indicates that p-value is less than or equal to 0.01 and * indicates that p-value is less than or equal to 0.05

Table 3.3: Logistic Regression Odds Ratios for Having a Particular Health Problem in a Particular Population for "Widowed" and "Never Married/ Divorced/ Separated" OA when Reference Category is "Married"

Sr. No.	Health Problem	Populations							
		Rural Males		Rural Females		Urban Males		Urban Females	
		Widowed	Never Married/ Divorced/ Separated	Widowed	Never Married/ Divorced/ Separated	Widowed	Never Married/ Divorced/ Separated	Widowed	Never Married/ Divorced/ Separated
1	Chronic cough	1.2**	0.75	1.33**	1.92*	1.23*	1.66	1.66**	1.73
2	Diabetes	0.69	0.28	1.15	0.86	1.14	0.75	1.37*	3*
3	Heart Disease	0.66*	0.25	2.12*	1.88	1.02	0.63	1.3	2.79*
4	Urinary Problems	1.16	0.01	0.97	0.01	0.95	0.01	1.67*	2.97
5	Blood Pressure	1.04	0.57	1.86**	1.18	1.05	0.85	1.49**	1.95*
6	Pain in Joints and Limbs	1.2**	0.92	1.31**	1.49	1.15	0.78	1.43**	1.57
7	Piles	1.03	2.21*	1.08	1.12	1.04	1.54	1.19	0.02
8	Disability: Visual	0.94	0.74	1.7**	1.56	1.04	0.95	1.53**	1.73
9	Disability: Hearing	1.28**	0.62	1.77**	2.22**	1.05	0.99	1.54**	1.88
10	Disability: Locomotion	1.06	1.53	1.39**	2.46**	0.97	0.85	1.31**	1.83
11	Disability: Amnesia	1.09	0.63	1.39**	1.05	1.12	1.61	1.58**	1.44
12	Disability: Speech	0.96	1.66	1.78**	2.86**	0.95	1.44	1.26	2.37

**** indicates that p-value is less than or equal to 0.01 and * indicates that p-value is less than or equal to 0.05**

Table 3.4: Logistic Regression Odds Ratios for Having a Particular Health Problem in a Particular Population for Unit Increase in Number of Children

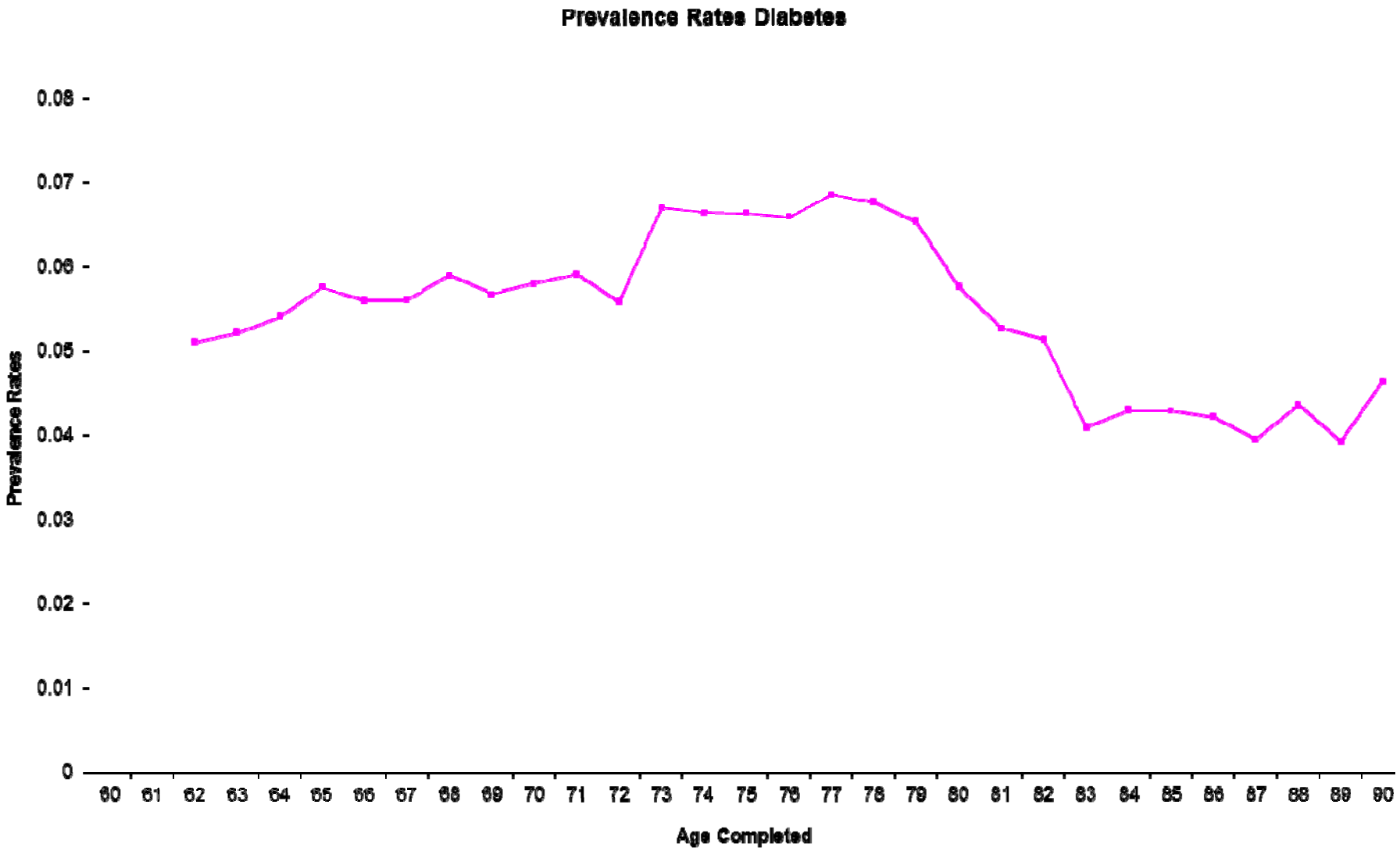
Sr. No.	Health Problem	Populations			
		Rural Males	Rural Females	Urban Males	Urban Females
1	Chronic cough	1	1.02**	1.01	1.02
2	Diabetes	1.01	1.04	1.01	1.07**
3	Heart Disease	1.01	1.07**	1.04	1.12**
4	Urinary Problems	1.02	1.05*	1	1.01
5	Blood Pressure	1.02	1.03*	1.03	1.09**
6	Pain in Joints and Limbs	1	1	0.99	1.02
7	Piles	1.04**	1.03	0.98	1.03
8	Disability: Visual	1	1	1.04**	1.02
9	Disability: Hearing	1	0.76	1.02	1
10	Disability: Locomotion	1.01	0.99	1.02	0.98
11	Disability: Amnesia	1	1.01	1.07**	0.99
12	Disability: Speech	1.03*	1	1.07*	1.02

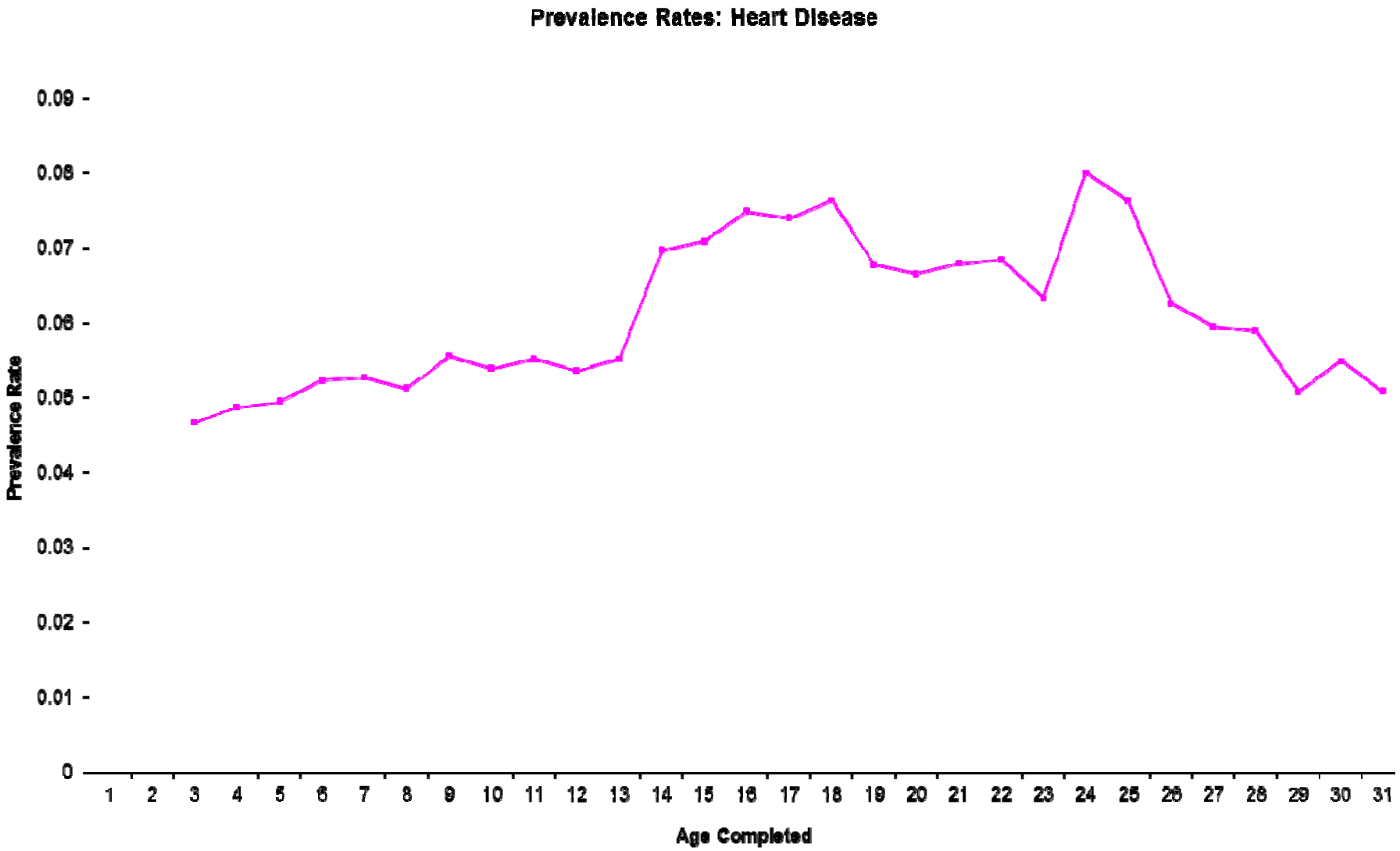
** indicates that p-value is less than or equal to 0.01 and * indicates that p-value is less than or equal to 0.05

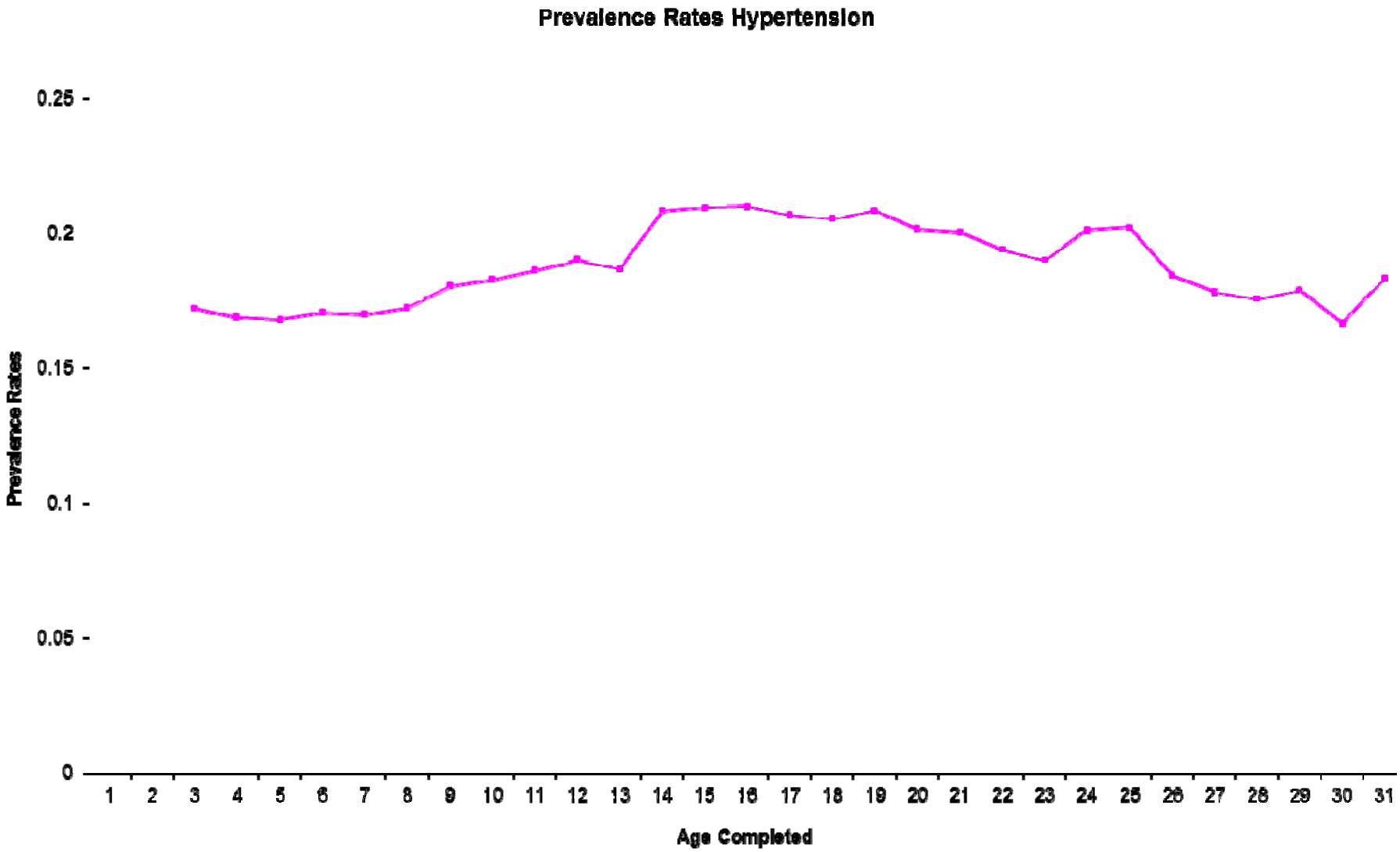
Table 3.5: Logistic Regression Odds Ratios for Having a Particular Health Problem in a Particular Population for "Literate and Below Matriculation" and "Illiterate" OA when Reference Category is "Matriculation and Above"

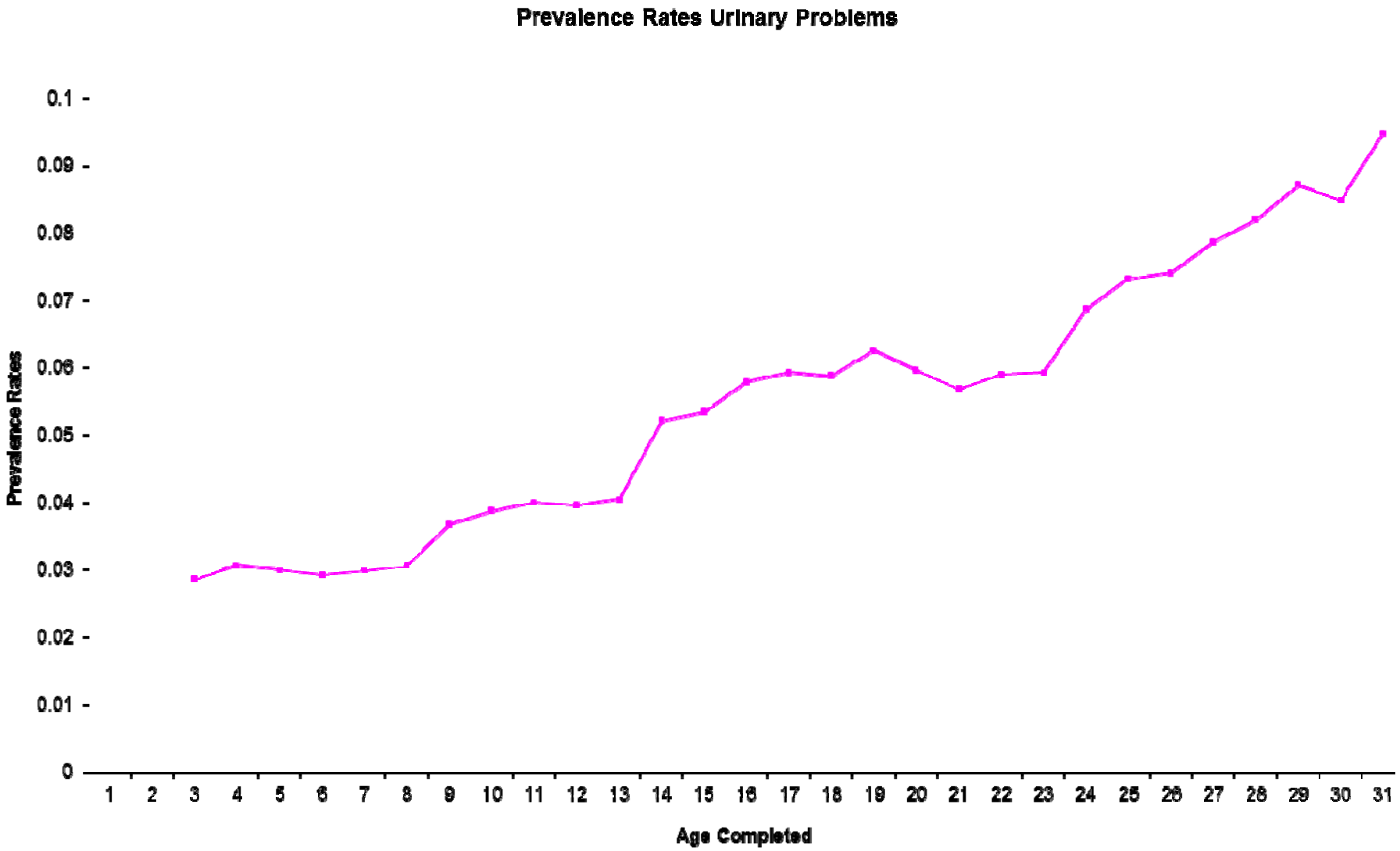
Sr. No.	Health Problem	Education							
		RM		RF		UM		UF	
		Literate Below Matriculation	Illiterate	Literate Below Matriculation	Illiterate	Literate Below Matriculation	Illiterate	Literate Below Matriculation	Illiterate
1	Chronic cough	1.4*	1.46*	1.4	1.55	1.31**	1.6**	1.5	2.12**
2	Diabetes	0.68	0.23**	0.98	0.22*	0.98	0.55**	0.78	0.49**
3	Heart Disease	0.96	0.49**	0.31	0.16**	0.91	0.64*	1.23	0.75
4	Urinary Problems	1.19	0.93	0.71	0.43	1.02	1.07	1.1	1.28
5	Blood Pressure	0.76	0.31**	0.95	0.44	0.84*	0.53**	0.88	0.69*
6	Pain in Joints and Limbs	1.4**	1.37*	0.82	0.66	1.29**	1.3**	1.45**	1.55**
7	Piles	0.79	0.59	0.25*	0.21**	0.99	1.05	0.62	0.61
8	Disability: Visual	1.33	1.43*	1.52	1.59	1.04	1.48**	1.11	1.56**
9	Disability: Hearing	1.67*	1.8**	0.67	0.79	1.17	1.23	1.82*	2.11**
10	Disability: Locomotion	1.21	1.21	1.3	1.51	1.08	1.25	1.21	1.51
11	Disability: Amnesia	1.25	1.18	0.85	0.88	1.37*	1.66**	1.99*	2.63**
12	Disability: Speech	1.19	1.05	0.4	0.54	1.55*	1.5	1.76	2.36

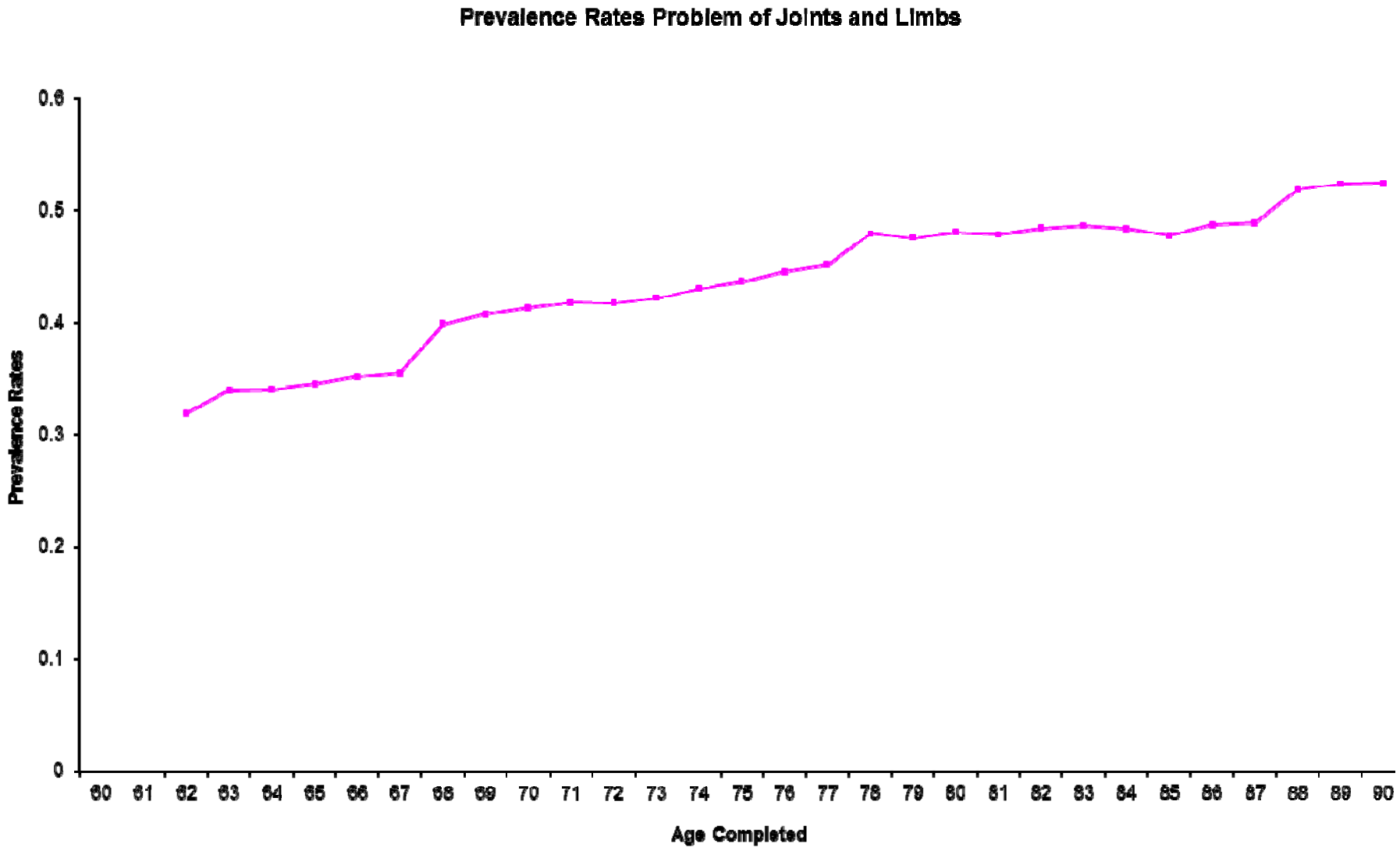
**** indicates that p-value is less than or equal to 0.01 and * indicates that p-value is less than or equal to 0.05**

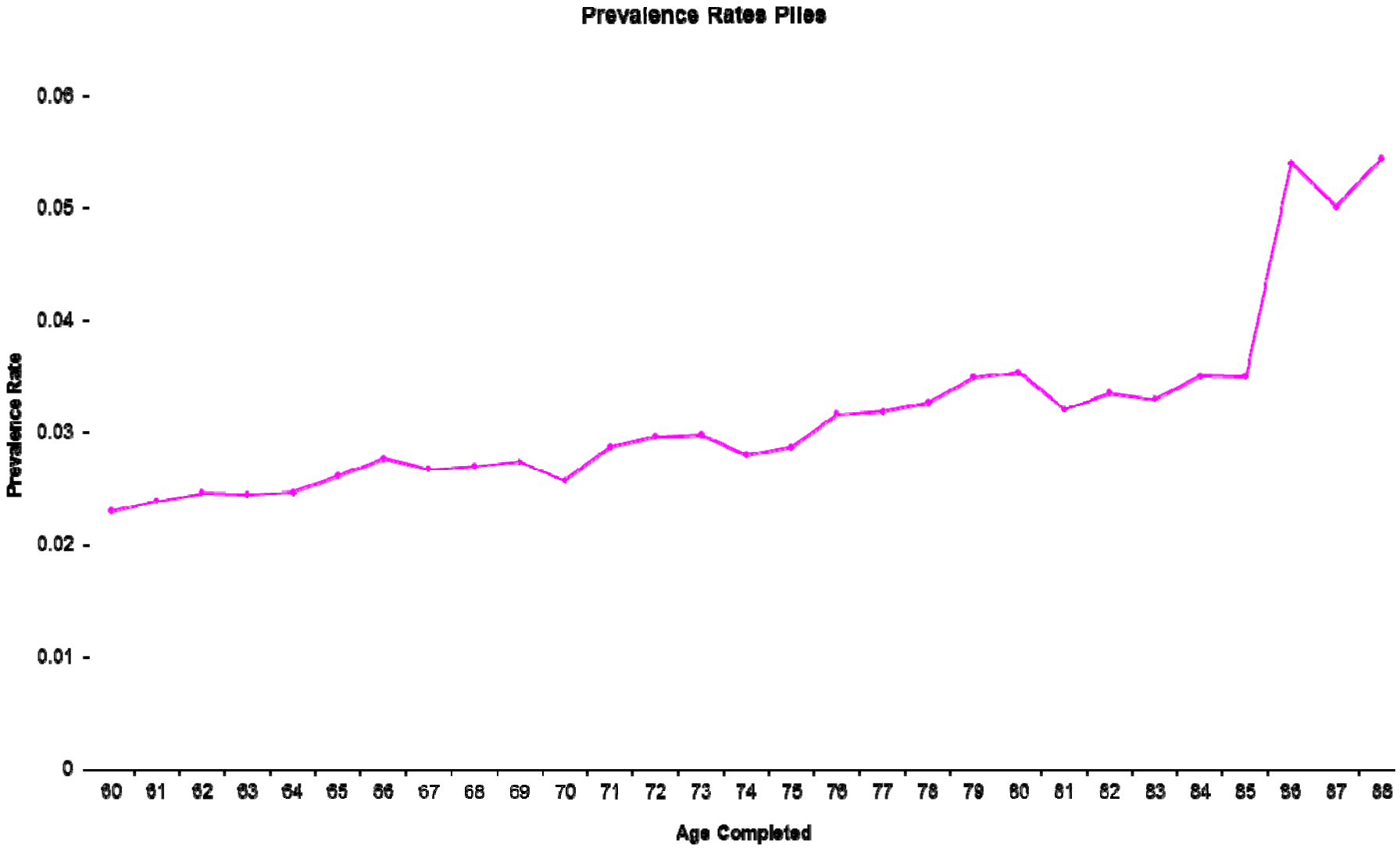

Prevalence Rates Diabetes
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Prevalence Rates
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90
Age Completed

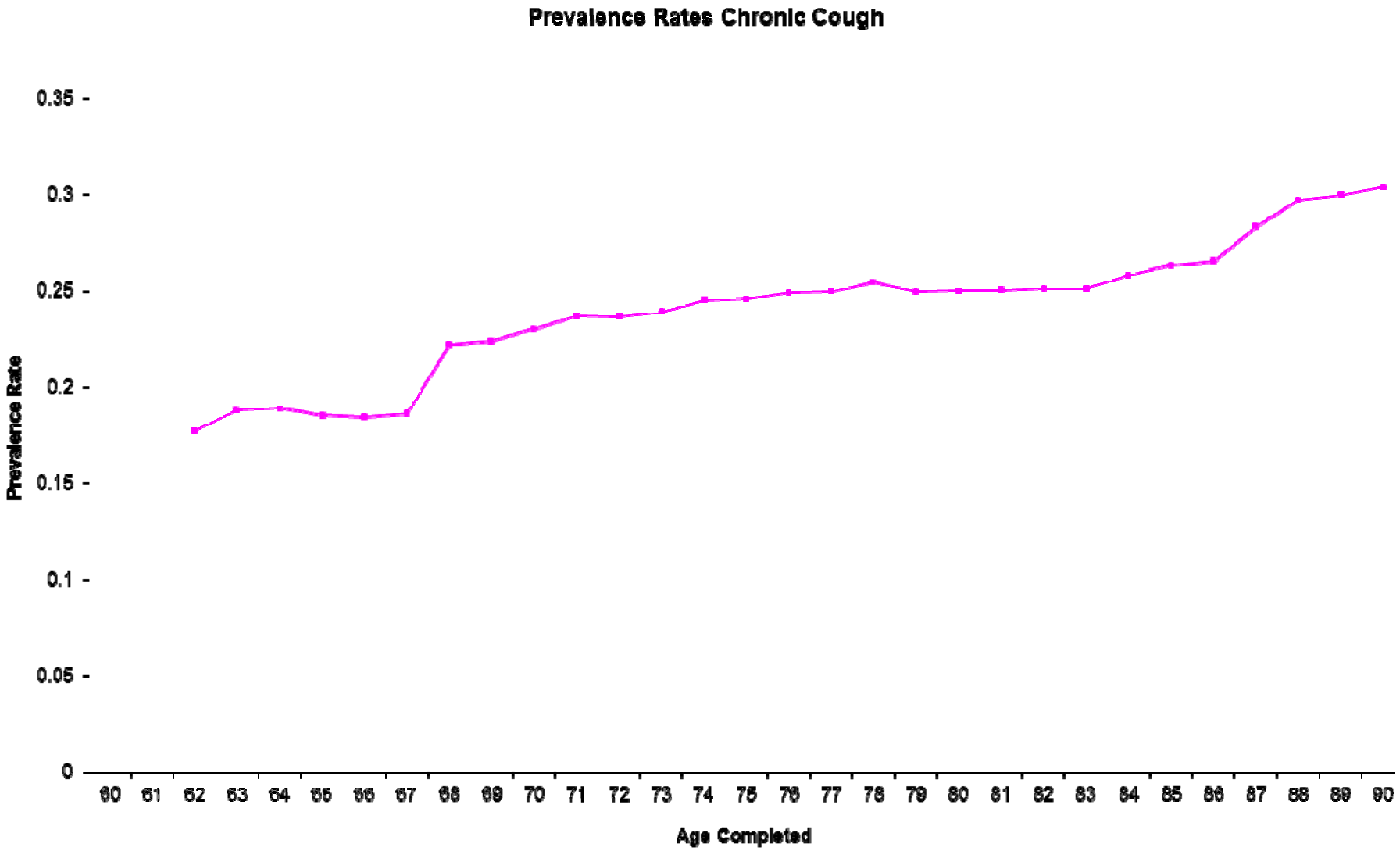

Prevalence Rates: Heart Disease
Prevalence Rate
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Age Completed

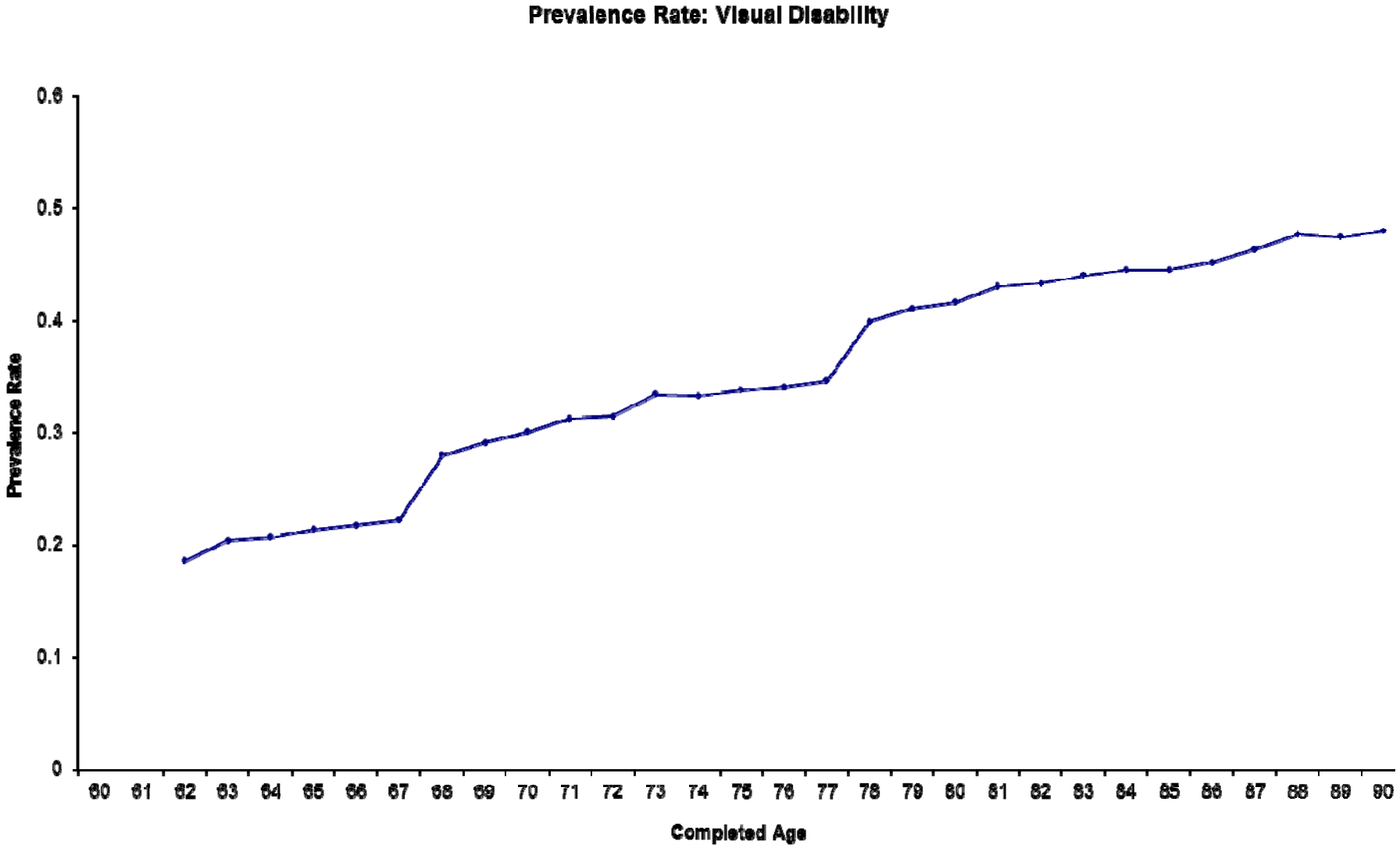

Prevalence Rates Hypertension
0.25
0.2
0.15
0.1
0.05
0
Prevalence Rates
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Age Completed

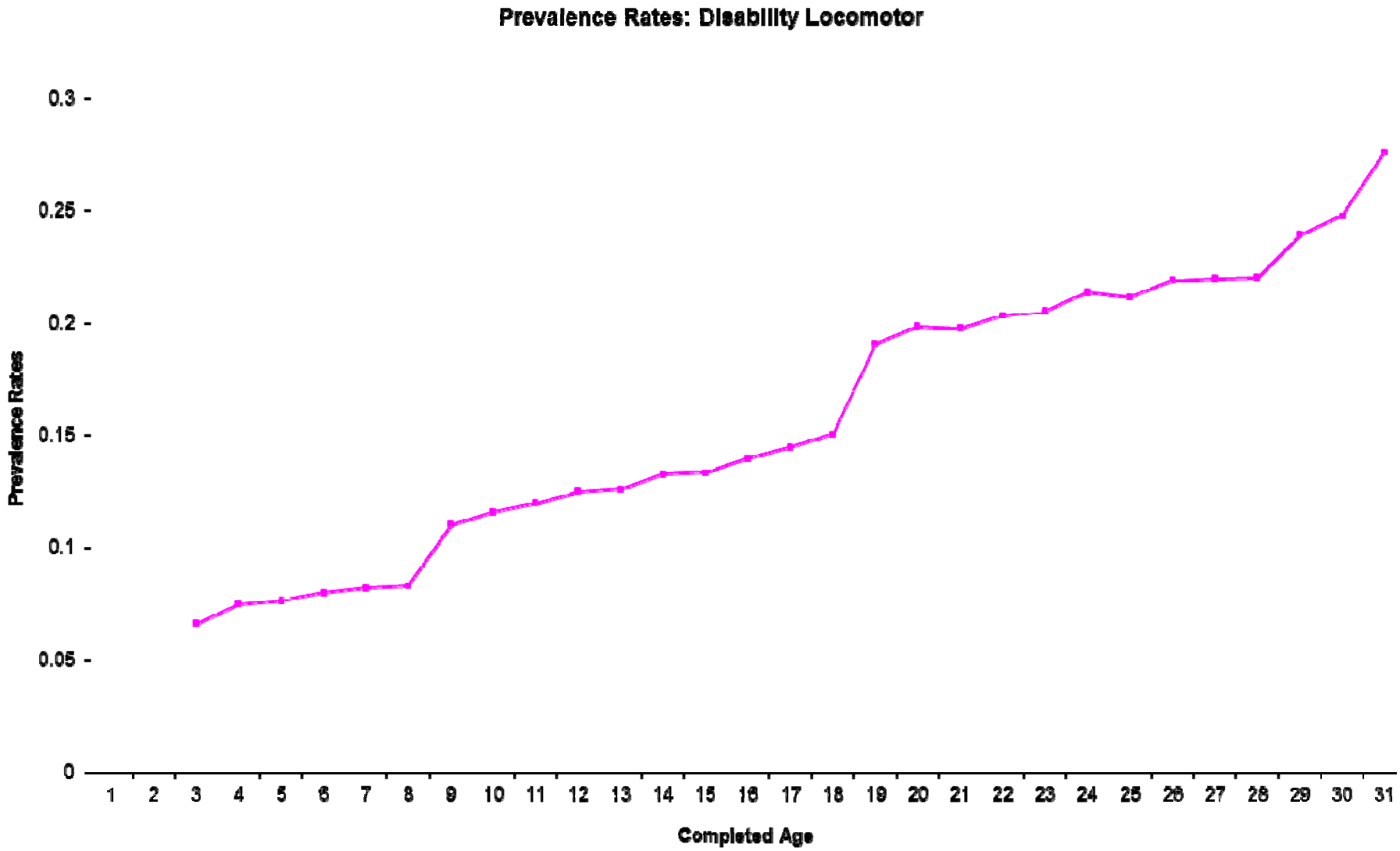

Prevalence Rates Urinary Problems
Prevalence Rates
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Age Completed


Prevalence Rates Problem of Joints and Limbs
Prevalence Rates
0.6
0.5
0.4
0.3
0.2
0.1
0
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90
Age Completed


Prevalence Rates Piles
0.06
0.05
0.04
0.03
0.02
0.01
0
Prevalence Rate
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88
Age Completed


Prevalence Rates Chronic Cough
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Prevalence Rate
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90
Age Completed


Prevalence Rate: Visual Disability
Prevalence Rate
0.6
0.5
0.4
0.3
0.2
0.1
0
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90
Completed Age


Prevalence Rates: Disability Locomotor
Prevalence Rates
0.3
0.25
0.2
0.15
0.1
0.05
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Completed Age