



Factors associated with persons with disability employment in India: a cross-sectional study

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1 **TITLE PAGE**

2

3 **Title:** *Factors associated with persons with disability employment in India: a cross-sectional study*4 **Authors:**

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15

16 * *Corresponding author*17 **ABSTRACT**

18 **Background.** Over twenty million persons with disability in India are increasingly being offered poverty
19 alleviation strategies, including employment programs. This study employs a spatial analytic approach to
20 identify correlates of employment among persons with disability in India, considering sight, speech,
21 hearing, movement, and mental disabilities.

22 **Methods.** Based on 2001 Census data, this study utilizes linear regression and spatial autoregressive
23 models to identify factors associated with the proportion employed among persons with disability at the
24 district level. Models stratified by rural and urban areas were also considered.

25 **Results.** Spatial autoregressive models revealed that different factors contribute to employment of
26 persons with disability in rural and urban areas. In rural areas, having mental disability decreased the
27 likelihood of employment, while being female and having movement, or sight impairment (compared to
28 other disabilities) increased the likelihood of employment. In urban areas, being female and illiterate
29 decreased the likelihood of employment but having sight, mental and movement impairment (compared to
30 other disabilities) increased the likelihood of employment.

31 **Conclusions.** Poverty alleviation programs designed for persons with disability in India should account
32 for differences in employment by disability types and should be spatially targeted. Since persons with
33 disability in rural and urban areas have different factors contributing to their employment, it is vital that
34 government and service-planning organizations account for these differences when creating programs
35 aimed at livelihood development.

36 **Keywords**

37 Disability; India; Employment; Persons with Disability.

38 **BACKGROUND**

39 According to the 2001 Indian Census, there were 21.9 million people (2.1% of the population) living with
40 disability, the majority located in rural areas (75%) and most unemployed (65.5%) [1]. Understanding the
41 differential employment of persons with disability (PwD) is especially relevant since in the last two
42 decades the national government has adopted progressive disability law.

43 Indian disability legislation dates as far back as the 1987 Mental Health Act [2], followed by the 1992
44 Rehabilitation Council of India Act [3], which supported the growth of human resources within the
45 disability rehabilitation sector. India was the first nation in South Asia to sign the Proclamation on the
46 Full Participation and Equality of People with Disabilities in the Asian and Pacific [4]. This resulted in
47 the 1995 Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act
48 [5]. The Act was known to be one of most comprehensive pieces of legislation pertaining to persons with
49 disabilities in the region. Specific to employment, it had provisions on non-discrimination in the built
50 environment and in government employment. It gave statutory recognition to an employment reservation
51 policy of 3% in government and public education institutions. Specifically, a 1% reservation is required
52 for three disability categories combined: hearing, vision and locomotor. Further, an unemployment
53 allowance exists for those registered with the Special Employment Exchange program (a national
54 employment service) for more than two years without securing employment.

55 Since poverty is the greatest challenge before planners in India, and the incidence of disabilities is very
56 high in rural (75% of total) and poor families, the 1995 Act has mandated the government to include PwD
57 in all its mainstream poverty alleviation programs. The Act states that, at all levels, the government shall
58 reserve not less than 3% of all funds in poverty alleviation programs for the benefit of PwD. Nevertheless,
59 the 1995 Act has shortcomings, such as vague terminology, and gaps regarding the implementation,
60 monitoring and evaluation of programs. Further, the Act states that reforms should only be adopted
61 “within the limits of the state’s capacity”. There are no mechanisms empowering any authority or court to
62 impose fines or levies in the case of the breach of the provisions relating to training and employment [6].
63 Overall, the Act has failed to improve the lives of persons with disabilities and protect their human rights
64 [6].

65 In 2007 India signed and ratified the Convention on the Rights of Persons with Disability (CRPD), absent
66 of the Optional Protocol (which provides an internationally recognized mechanism to ensure that rights
67 are realized through systematic reporting and evaluation of countries by established international
68 committees). Although it was enacted in 2008, comprehensive reforms are yet to take place [6]. Given the
69 large discrepancies between the approach of the Indian government and the CRPD, there are debates
70 about whether the previous disability legislation should be reformed or a new act should be created.

71 Although the legislation focused attention on disability, there has been a noted lag in implementation of
72 services and programming for PwD [7-9]. This is especially true in rural areas, since the relatively few
73 public rehabilitation services are mostly located in urban centers [10]. As governmental and non-
74 governmental agencies begin to address this gap, it remains unclear what factors contribute the most to
75 PwD employment, and whether their employment experiences differ geographically across India.

76 Considering labor market supply, PwD experience barriers of accessibility to and ability at the workplace.
77 Productivity is largely dependent upon the characteristics of the type of disability and the requirements of
78 the job. For example, a person with hearing impairment may find it difficult to do telecommunication
79 work, but excel in mathematically-based accounting work. Overall, according to labor market theory, a
80 higher reservation wage and a lower market wage make a PwD less likely to be employed than a person
81 without disability [11].

82 Discrimination can play a role when PwD with equal productivity to those with no disability have
83 unequal opportunities. There has been a dynamic shift from the *medical* model of disability to the *social*
84 model [12]. The social model of disability draws a clear distinction between impairments and disability
85 by clarifying that the degree of disability is a function of the societal barriers that fail to accommodate
86 difference. A bio-pyschosocial definition of disability is reflected in the Preamble of the Convention on
87 the Rights of Persons with Disability's (CRPD) definition of disability as well [13]. Despite this
88 conceptual shift, the official discourse continues to perceive disability as purely a medical condition,
89 framing the individual on his/her own without engaging with the wider social and physical context [14].
90 Scholars argue that this has led to a "top-down" approach where blanket policies are applied to all PwD
91 with a disregard for heterogeneity in experiences.

92 The International Labor Organization (ILO) has outlined two categories of factors which affect full
93 participation of PwD in the Indian labor market [15]: environmental and social. Physical environment and
94 public facilities and utilities have not been developed or designed with the requirements of each category
95 of disability in mind and nearly all mainstream training programs and work sites exclude disability groups
96 due to these barriers. For example there are over 100 regional sign languages, but there is no acceptable
97 national sign language for use by all people with speech/hearing impairment during vocational training
98 sessions [16]. Social barriers comprise a critical impediment in the process of full participation. Baldwin
99 and Johnson [17] explain that employment discrimination can occur due to prejudice, differential
100 information about the average productivity of persons with and without disabilities, or the exploitation of
101 workers by employers [13, 17].

102 In India, research on disability has been limited by the availability of data. For example, the National
103 Sample Survey has never collected data on employment across disability status. The 2001 Indian Census
104 included multiple questions on disability, and also collected data on literacy, sex, and employment status.
105 No detailed information on amount of education and level of income were included. This paper takes
106 advantage of this information available on the Census to investigate the correlates of the proportion of
107 PwD employed in India, accounting for geographic variation at the state and residential (rural and urban)
108 levels. Results have direct implications for the planning of interventions targeted to PwD. To the best of
109 our knowledge, this is the first study to investigate the differential determinants of employment among
110 PwD in rural compared to urban areas in India, accounting for potential spatial effects.

111 **MATERIALS AND METHODS**

112 **Disability definition**

113 The most common definition and classification of disability within the Indian government was
114 determined with the enactment of the 1995 Act, and states that a person is considered to have a disability
115 if they suffer 'from not less than 40% of any disability as certified by a medical authority' [5]. Disability
116 is considered to be blindness, low vision, leprosy-cured, hearing impairment, locomotor, mental
117 retardation, or mental illness. In 1999, the National Welfare of Persons with Autism, Cerebral Pulsy,
118 Mental Retardation and Multiple Disability Act, added two classes: people with autism and people with
119 multiple disabilities [18]. The 2001 Indian Census states that "defining and measuring disability is a
120 complex issue and it is not easy to communicate these concepts during the census process, in which only
121 a limited amount of questioning time is possible with a household for obtaining detailed information on
122 every individual". The Census therefore used its own version of disability types, classified into five
123 categories: (i) sight (ii) speech (iii) hearing (iv) movement and (v) mental [1]. This definition has been
124 accepted by the government, both administratively and legally, and is thus used in this paper.

125 **Data**

126 The data source for this study is the 2001 Population Census, which included multiple questions on
127 disability. Each person was asked if he/she had a physical or mental disability according to five
128 categories: speech, sight, hearing, mental (mental), or movement (physical) [19]. If a person has two or
129 more types of disabilities only one was recorded, and it was left to the respondent to decide which one
130 they wanted to be classified into as the most dominant. This was a choice made by the Government of
131 India's Census Office at the time. Persons with temporary mental or locomotor inability (due to acute
132 medical conditions) on the date of enumeration were not considered as disabled.

133 The dependent variable in this research is employment and it is defined as those that participated in
134 "work" according for the Indian Census. The Census defines work as "participation in any economically
135 productive activity with or without compensation, wages or profit. Such participation may be physical
136 and/or mental in nature. Work involves not only actual work but also includes effective supervision and
137 direction of work. It even includes part time help or unpaid work on farm, family enterprise or in any
138 other economic activity". There are several categories of "work" used by the Census including main
139 worker, marginal worker, cultivator, agricultural laborers, household industry workers and other workers
140 [20]. According to the Census 2001 metadata, "the reference period for determining a person as worker
141 and non-worker is one year preceding the date of enumeration".

142 The disability data were detailed by district, which is the first-level administrative unit within an Indian
143 state. There are 890 districts within the 28 states and seven union territories of India. Of these, 47 are
144 island districts (such as the Andaman and Nicobar Islands, which have no neighboring districts and
145 therefore are not suitable for spatial analytical methods). Of the remaining 843 districts, 250 have no
146 inhabitants. Percentages were calculated considering only the 593 remaining districts with reported
147 inhabitants in the Census. Each district can have both rural and urban areas, and a small number are
148 considered as exclusively rural or urban; thus the denominator for urban and rural percentages varied. In
149 the urban/rural analysis rural and urban percentages were calculated for each variable. We started with a
150 dataset that was stratified by rural and urban PwD from the Indian Census, so the districts did not have to
151 classify as urban and rural. Table 2 reports the total 843 because all districts are used regardless of their
152 inhabitants in the spatial model, since it will exclude those districts automatically.

153 The disability data were spatially joined to the 2001 Census geographic dataset (retrieved from Harvard
154 GeoSpatial Library, Cambridge, Massachusetts). The data were projected using Kalianpur 1975 India
155 Zone IIB, which is a spatial adjustment to view a specific part of the globe in a flat way. Data joining and
156 projection were done in ArcGIS 10 (Environmental System Research Institute, Redlands, California). The
157 regression was completed in GeoDaTM. The research was ethically approved by the Harvard School of
158 Public Health's Department of Global Health and Population as a part of the fulfillment for a Master's of
159 Science and it was determined that International Review Board submission was not necessary due to the
160 analysis of secondary data from the Indian Census which is publically available.

161 The main variable of interest is the proportion of employed PwD in a district. The variable was calculated
162 as a rate: the total number of employed persons with disability in a district as the numerator and the total
163 number of persons with disability in the denominator. Employment is defined as six types of "workers":
164 main workers, marginal workers, cultivators, agricultural labourers, household industry workers and other
165 workers. Other relevant variables, all at the district-level included: (i) proportion of female PwD; (ii)
166 proportion of PwD who are literate; (iii) proportion of PwD by disability type; and (iv) proportion of PwD
167 living in urban areas. These variables were calculated with all ages of PwD as the denominator, except for
168 the literacy variable. Age restrictions were not included in the data because this information was not
169 available. Therefore, this analysis should only be interpreted as the proportion of employed persons with
170 disability of total persons with disability in a district. There is potential confounding due to variation in
171 age distributions between districts but this is likely small. Population density (total number of persons
172 with and without disability) was also considered and not included because persons with disability are

173 looked as a separate population in this analysis. Further, data was available for only those that lived in
174 urban and those that lived in rural areas (as separate data sets). This was used in a stratified analysis of
175 rural and urban populations to identify any patterns in characteristics that predicted employment.

176 In the 2001 Census, literacy was defined as the ability to read in the local language. In this research it is
177 used as a crude estimate to determine whether someone has at least a few years of schooling. Although
178 the ideal variable would be years of education, this information was not collected for PwD in the 2001
179 Census. We would expect this variable to predict employment because of the intimate link between
180 education and employment that is experienced throughout India, especially among PwD [8, 21].
181 Therefore we may expect literacy to positively predict employment.

182 **Analytical approach**

183 Linear regression models were used to assess potential determinants of the proportion of PwD employed
184 at the district-level. Linear regression has several assumptions, which were assessed. Potential covariates
185 were chosen based on three criteria: (i) evidence from the literature regarding common drivers of
186 employment and those specific to PwD, in India and in other countries; (ii) special attention to variables
187 that can contribute to the formulation of state and local policy; and (iii) the availability of data in the 2001
188 Indian Census at the district-level.

189 Three model formulations were considered. The first (labeled as Model 1) included (i) proportion of
190 female PwD in a district; (ii) proportion of illiterate PwD in a district; (iii) proportion of PwD by
191 disability type in a district, considering four categories: mental, movement, sight, and speech/hearing
192 (combining speech and hearing in one category is plausible because they can be considered
193 communication disorders that generally (but not always) occur together [22]; and (iv) proportion of PwD
194 living in urban areas in a district. The second model (labeled as Model 2) included all variables from
195 Model 1 and added state fixed effects in order to account for potential correlation between the proportion
196 of PwD employed and state characteristics.

197 Since previous studies have shown that employment for PwD is more difficult in rural areas [11, 23],
198 compared to urban areas, we stratified the analysis by area of residence. We considered the model
199 formulation with greatest explanatory power (as defined by the R^2 observed in Models 1 and 2) and run
200 two additional models, one for urban and another for rural PwD. Further stratification could have been
201 pursued based on variable distribution. The purpose of the model was not to account for the differences in
202 distribution of disability characteristics. It was a cross sectional look at how the distribution of these
203 characteristics influenced employment.

204 Lastly, we considered that the proportion of PwD employed could vary spatially [13, 24, 25], and in this
205 case the presence of spatial autocorrelation would violate basic assumptions of linear models [26]. Thus,
206 we tested the residuals of each model for the presence of spatial autocorrelation using the global Moran's
207 I indicator. If the test was significant, we used spatial autoregressive models, and included spatial lag
208 terms based on diagnostics provided by Langrange Multiplier tests [26]. Model goodness-of-fit was
209 assessed by comparing the likelihood ratio and the Bruesch-Pagan test of each model, The Breusch-Pagan
210 test is used to compare the standardized square of the OLS residuals regressed against the square of the
211 original coefficients to determine the presence of heteroskedasticity in the error terms. All regression
212 models were run in GeoDA, an open-source spatial analysis software.

213 **RESULTS**

214 *Disability in India*

215 In 2001 there were 22 million people living with a disability in India, corresponding to 2.1% of the
216 population or 21 disability cases per 1000 [27]. Table 1 presents descriptive statistics for PwD in India in
217 2001 by area of residency. The most common disability type at the district-level was sight (47.5%),
218 followed by movement (27.7%) and mental (10.1%). On average, 46.6% of PwD in a district were literate
219 (compared with 64.8% literacy among the general population in 2001), with a mean of 57% literacy
220 among males and 35% literacy among females [28]. These statistics varied in rural compared to urban
221 areas, particularly regarding illiteracy, employment, hearing disability, and mental disability.

222 There was great variability of characteristics within PwD who were employed. Of all employed PwD,
223 58.3% were either cultivators or agricultural laborers, 4.6% were household workers, and 37.3% were
224 classified as other (data not shown). This could explain the higher proportion of employed PwD in rural
225 areas, possibly due to the greater availability of agricultural work. Employment among males and females
226 was 44.8% and 29.6%, respectively (compared to an employment rate of 39.1% among the general
227 population) (data not shown) [28]. The difference in worker participation rates between males and
228 females was larger in the urban areas when compared to rural, and the lowest worker participation rate
229 was for urban females (29.4%).

230 Adding state fixed effects to this model increased the R^2 (from 42% to 76%), and changed the magnitude
231 and direction of some coefficients, indicating that state-specific characteristics play a role in levels of
232 employment among PwD.

233 The final model was stratified by rural and urban and included state fixed effects (Table 2). No disability
234 type was associated with fewer PwD employed in urban areas. While there would be a 0.455 percentage
235 point decrease in PwD employed in urban areas for each additional unit of female PwD, in rural areas the
236 association is the opposite, with a 0.629 percentage point increase in PwD employed for each additional
237 unit of female PwD. This could be the result of more opportunities for agricultural employment among
238 women in rural areas. In this stratified model, illiteracy is negatively associated with PwD employed, with
239 0.039 and 0.265 percentage point decrease in PwD employed in rural and urban areas, respectively, for
240 each additional unit of illiterate persons.

241 This stratified model, however, had very significant spatial autocorrelation in the residuals (as indicated
242 by the highly significant Moran's I test), and thus the coefficients are likely to be biased. Based on the
243 robust Lagrange multiplier test spatial autoregressive models considering a lag term on the residuals
244 (labeled as Spatial Error Model in Table 2) were fit. They showed improvements in the R^2 of both the
245 urban and rural models, and differences in magnitude, direction, and significance of coefficients (as
246 compared to the non-spatial stratified model). Controlling for spatial effects, no type of disability is
247 associated with a decrease in the percentage point of PwD employed, with the exception of mental
248 disability in rural areas. A unit increase in mental health related PwD was associated with a 0.404
249 percentage point decrease in PwD employed in rural areas, whereas a unit increase in PwD with mental
250 health was associated with a 0.378 percentage point increase in PwD employed in urban areas. The
251 negative association between females and PwD employment and illiteracy and PwD employment for
252 urban areas observed in the first model persists after controlling for spatial effects. A unit increase in
253 female PwD was associated with a 0.561 percentage point decrease in PwD employed in urban areas. A
254 unit increase in illiterate PwD was associated with a 0.123 percentage point decrease in PwD employed in
255 urban areas.

256 Results of the Breusch-Pagan test suggest that heteroskedasticity remains after introducing the spatial lag
257 term. In addition, the Likelihood Ratio Test of Spatial Lag Dependence is also significant. Therefore,
258 although the introduction of the spatial lag term improved the model fit, it did not completely remove the
259 spatial effects.

260 **DISCUSSION**

261 Our results showed that disability type, gender, and illiteracy were associated with PwD employment, and
262 that the magnitude and direction of the association was not the same for urban and rural areas. Being a
263 female and being illiterate results in less PwD employment in urban areas, while having mental disability
264 results in fewer PwD employed in rural areas. Having movement and sight disability (holding all other
265 variables constant) resulted in increased PwD employment in urban and rural areas. This is expected
266 because most public programs target movement and sight disability [29]. The presence of spatial effects
267 underscores the need to properly address local idiosyncrasies in policies and programs aimed to improve
268 employment of PwD.

269 Regarding policy and programmatic issues, strategies implemented in urban areas need to address gender
270 and illiteracy discrimination. While these results align with previous research [30-33], it is important to
271 identify if there are fewer jobs available for female PwD and for illiterate PwD, if these people lack the
272 proper training to undertake the job, or if they are qualified but do not have equal job opportunities.
273 Moreover, it is crucial to assess the extent to which these issues vary across districts and states. The fact
274 that in rural areas gender and illiteracy is not associated with fewer PwD employment could be a result of
275 the prominence of agricultural labor [7, 11, 23, 34].

276 Current disability rights legislation for employment assumes homogeneity of experiences. Most efforts
277 target PwD with vocational training and employment services through Federal mandates of “one size fits
278 all” type of policy. There are although a few state-government initiated pilot programs which challenge
279 this approach. For example, the state of Andhra Pradesh and Pune have explored the utility of disability
280 self-help groups that provide more autonomy to local leaders for rural development [7]. Self-help groups
281 take the form of neighborhood-based collectives, which actively participate in problem solving and in the
282 development of local programming. Self-help groups have been widely employed for women, but its
283 application to PwD is less prevalent [35-39]. They mostly take the form of microcredit-based
284 interventions that provide entrepreneurial opportunities. Their applicability beyond economic
285 empowerment has although been the most salient feature. They allow for PwD communities to
286 systematically organize around issues that are pertinent and pressing to them, allowing for programming
287 to be more local and therefore more contextualized.

288 Regarding disability type, mental problems seem to be a major barrier for PwD employment in rural
289 areas. This could be a result of lack of jobs suitable to persons with mental disabilities, of discrimination,
290 or of lack of minimum training to conduct the job. This has important implications for targeted initiatives.
291 The Rural Health Commission and the National Rural Employment Guarantee Act target persons in rural
292 areas, without attention to specific disability types. For example, in the state of Andhra Pradesh, the
293 Society for the Elimination of Rural Poverty has piloted microcredit schemes for PwD in rural areas,
294 targeting all PwD, with no differential interventions for particular disability types. Also, a governmental
295 agency based in south eastern India called the National Institute for the Mentally Handicapped has
296 developed extensive vocational training for PwD, which has proven effective in increasing employability
297 [40], but their scope is limited to urban areas. Another, non-governmental organization called Maharogi
298 Sewa Samiti based in central India has developed a vocational training center for rural school drop outs
299 and youth with disabilities. Although they target PwD in rural areas, all of the training occurs in the urban
300 centers causing low retention rates. A similar initiative has been initiated by one governmental agency,
301 the Society for the Elimination of Rural Poverty in Hyderabad. But they face similar issues with the
302 context of an urban-based training approach.

303 This study has some limitations. Our data do not allow making conclusions about causality. Nevertheless
304 our modeling approach and results shed light into factors associated with PwD employment, and make it
305 clear that programmatic efforts designed to improve the wellbeing of PwD must account for disability

306 type and spatial differences. In addition, we had a limited set of variables to include in our models. For
307 example we would expect age and socioeconomic status to play a role in employment. Yet, the models
308 had a high explanatory power, for both urban and rural areas. Another limitation is that the definition of
309 disability varies across different surveys, and therefore caution is needed when attempting to establish
310 comparisons between our results and others previously published [14]. Further, the decision of the Census
311 of India to not include multiple disabilities as a category has implications for the interpretation of results.
312 Mainly, caution should be used when extending these results to the small percentage of people with
313 multiple disabilities. A recent article on disability estimates from the 2001 Census and the 2002 58th
314 round of the National Sample Survey (NSS) concluded that “prevalence estimates in the census and the
315 NSS are clearly not comparable... and it is unsure what aspects of disability are captured by the census
316 and NSS current disability definitions” [11]. Lastly, the analysis was limited to district-level number of
317 PwD; thus, due to the lack of individual-level data, the model predicts the likelihood of having lower or
318 higher proportion of (percentage point increase or decrease in) PwD employed within a district, based on
319 the type of disability and other variables.

320 **CONCLUSION**

321 Persons with disability have different employment experiences depending on their disability type,
322 literacy, gender, and on whether they live in rural or urban areas. Although India has achieved significant
323 progress regarding disability legislation, and has recently made an effort to implement poverty alleviation
324 strategies targeting PwD, failure to account for these differences may hinder the benefits of the efforts.

325 Policies implemented at the national level without considering local idiosyncrasies are not likely to result
326 in equitable improvements for the livelihood of PwD. There is a need to better understand the barriers to
327 PwD employment, and how those barriers may vary by disability type across different districts in India.
328 Such knowledge would provide much needed evidence that could be translated in more effective local
329 policies. The results presented here are a first step towards building this knowledge by unveiling
330 significant differences across urban and rural areas and type of disability and gender.

331 **LIST OF ABBREVIATIONS**

332 Persons with disability (PwD), National Sample Survey (NSS), International Labor Organization (ILO),
333 Convention on the Rights of Persons with Disabilities (CRPD)

334 **DECLARATIONS**

335 *Ethics approval and consent to participate*

336 Not applicable.

337 *Consent for publication*

338 Not applicable

339 *Availability of data and material*

340 The data utilized in this research is available to the public, for a small fee, through the Indian Census
341 Bureau upon special request. They can be contacted using information on this website:
342 <http://www.censusindia.gov.in/AboutUs/Contactus/Contactus>

343 *Competing interests*

344 The authors declare that they have no competing interests.

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348 ***Authors' contributions***

349 RN acquired the data, run all the models, conducted the bibliography review, and wrote the manuscript.
350 MCC advised on the methodological approach, on the interpretation of results, and wrote the manuscript.

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Table 1. Characteristics of PwD (% in the district) in India detailed by area of residence - 2001

Characteristics	Total (n=593 districts)	Rural (n=583 districts)	Urban (n=584 districts)
Seeing	47.5% (0.103)	46.7% (0.104)	48.92% (0.129)
Hearing	6.8% (0.034)	7.16% (0.035)	4.92% (0.023)
Speech	7.8% (0.026)	7.89% (0.027)	7.54% (0.024)
Movement	27.7% (0.081)	28.5% (0.082)	27.15% (0.093)
Mental	10.1% (0.033)	9.76% (0.032)	11.45% (0.039)
Female	42.3% (0.039)	42.5% (0.039)	41.2% (0.047)
Illiteracy	53.4% (0.101)	55.94% (0.097)	38.36% (0.072)
Employment	36.0% (0.072)	37.34% (0.074)	29.43% (0.073)

440 Standard deviations presented in parenthesis.

441 Source: Author's Calculation from 2001 Indian Census.

442

443 **Table 2. Stratified regression models on the proportion of employed PwD by District¹ in India, 2001**

Variable	Model 1: Stratified		Model 2: Spatial Error Model	
	Rural	Urban	Rural	Urban
Constant	0.00898 (0.0211)	0.0230** (0.0101)	-0.0181 (0.0165)	-0.0114 (0.0084)
Movement	-0.0285 (0.0356)	0.1649*** (0.0315)	0.3161*** (0.0412)	0.4776*** (0.0340)
Mental	-0.7955*** (0.1000)	0.2293 (0.0646)	-0.4046** (0.1030)	0.3778*** (0.0620)
Sight	0.2012*** (0.0352)	0.4575 (0.0322)	0.3899*** (0.0350)	0.6200*** (0.0308)
Female	0.629*** (0.0547)	-0.4551*** (0.0428)	0.2529*** (0.0580)	-0.5614*** (0.0399)
Illiterate	-0.0387 (0.0296)	-0.2651*** (0.0273)	0.0350 (0.0297)	-0.1225*** (0.0271)
Spatial Error			Yes	Yes
State Fixed Effects (No. Categories)	Yes(21)	Yes (21)	Yes (21)	Yes (21)
R-Squared	0.4753	0.6695	0.6967	0.7800
No. Obs.	843	843	843	843
Global Moran's I	19.0492***	14.6926***		
Lagrange Multiplier (lag)	96.1904***	64.9307***		
Robust LM (lag)	13.0312***	13.8244***		
Lagrange Multiplier (error)	321.4412***	136.9104***		
Robust LM (error)	136.9104***	239.0752***		
Breusch Pagan-Test			323.7729***	392.6021***
Likelihood Ratio Test			350.1907***	252.7653***

444 Robust standard errors are reported in parentheses.

445 **, *** indicates significance at the 95%, and 99% level, respectively.

446 ¹Total number of persons with disability in India in 2001=22 million persons or 2.1% of the total

447 population