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Exploring the Determinants of Labour Participation among Persons with Disabilities

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Abstract

The objective of the study is to estimate the impact of various factors on the labour force participation of disabled persons, focusing on three key dimensions: demographic, socioeconomic, and contextual factors. The study uses micro-level data from the Labour Force Survey (LFS) 2020-21, with a sample of 23,443 persons with disabilities. Logistic regression modeling was employed, given the binary nature of the labor participation variable. The analysis reveals a parabolic relationship between age and participation, with participation increasing during middle age and declining at older ages, reflecting life cycle patterns. Pronounced gender disparities show females being less inclined to participate in the labour force. Marital status plays a key role, with married and widowed individuals more likely to participate than their never-married counterparts. Individuals from less developed provinces and urban areas are less likely to participate, while education and household income positively influence participation. Conversely, certified disabilities reduce participation, reflecting systemic barriers and diminished economic necessity. The reliance on disability allowances do not impact the

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likelihood of labour participation. These findings emphasize the need to address structural and social inequalities to enhance labour force participation among persons with disabilities.

Keywords: Labour Participation, Disability, Person with disabilities, Labour Force Survey

Introduction

Disability refers to a condition where a person is unable to perform certain tasks or faces significant difficulty in doing so. In economics, it is defined as a condition that reduces an individual's ability to work, affecting productivity and impacting employers and society. Disabilities can include hearing or speech impairments, mobility challenges, congenital conditions, or those acquired through accidents. The concept varies globally, with no universally agreed-upon definition (Adeel, 2019; Hussain et al., 2020). According to Agovino and Rapposelli (2017), a person is classified as disabled if they are unable to work due to illness, accident, or hereditary conditions. Globally, over one billion people live with disabilities, most residing in developing nations (Braithwaite & Mont, 2009; Ahamd et al., 2024). In Pakistan, addressing the needs of persons with disabilities (PWDs) remains a significant challenge. The International Year of Disabled Persons (1981), initiated by the UN, highlights efforts to raise awareness and promote inclusion.

Pakistan reports 2.49% of its population as Persons with Disabilities (PWDs) in the 1998 census, a figure that significantly underestimates the actual percentage, which some estimates place closer to 10%. Only 136,928 PWDs have registered with national identity cards, reflecting gaps in official documentation (Arsh et al., 2019). For PWDs, employment is a critical socioeconomic issue that impacts income inequality, poverty, and economic growth. Unemployment and underemployment among PWDs exacerbate poverty and economic instability, as traditional employment structures often fail to accommodate their needs. Inclusive work environments, better wages, and vocational training are essential

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to improving their productivity and contributions (Ali & Senturk, 2019; Verulava & Bedianashvili, 2021; Audi, 2022). Self-employment has emerged as a viable alternative for PWDs, offering flexibility and allowing individuals to define their own roles. This model is particularly effective in overcoming societal barriers and stereotypes. Vocational rehabilitation programs increasingly promote self-employment, reflecting its success in empowering PWDs and fostering economic participation (Ouimette & Rammler, 2017).

The existing literature has been extensively discuss the labour participation of the abled individuals given the presence of non-labour income in household and also examined the preferences towards different employment statuses (Audi & Ali, 2017; Shair et al., 2023a; 2023b; 2024). However, the labour participation examination with a specific focus on disabled person is unexplored at country level due to lack of inclusion of a separate section in the previous waves of nationally representative data sources. This is a preliminary study aims to estimate the impact of demographic, socioeconomic, and contextual factors on the labour force participation of persons with disabilities (PWDs). Using data from the Labour Force Survey (LFS) 2020-21, which included a disability module for the first time in Pakistan, the study identifies barriers limiting PWDs' participation in the workforce. Unemployment and low wages among PWDs exacerbate issues like poverty, food insecurity, and poor access to education and health, hindering progress toward the 8th Sustainable Development Goal (SDG) of decent employment for all. The findings will guide policymakers in designing interventions to address labour market challenges, ensuring social protection and fostering an inclusive labour market for PWDs.

Research Methodology

The effects of socioeconomic, regional, and demographic factors on the labour force participation of disabled people can be thoroughly examined using regression analysis. Given the binary nature of the dependent variable, which is labour

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participation of the individuals. The study uses Logistic regression model. The econometric regression model is as follow:

$$LFP_i = \beta_0 + \beta_1 age_i + \beta_2 gender_i + \beta_3 marital\ status_i + \beta_4 province_i + \beta_5 region_i + \beta_6 education + \beta_7 household\ income_i + \beta_8 certified\ disability_i + \beta_9 disability\ allowance_i + \varepsilon_i \quad (1)$$

Here the LFP_i is labour force participation of disable persons, coded 1 if participates and 0 otherwise. Though other socioeconomic, regional and demographic variables are also on right side of equation 1.There are three main categories of demographic, socio-economic and contextual factor (a) demographic factors: Gender, age, and marital status, province, and region. (b) Socioeconomic: education and house hold income. (c) contextual factors include: certification of the disability, and disability allowance. Variable descriptions are provided in the table 1 specified beneath.

Table 1: Definition of the Variables

Variables	Description
Dependent variable:	
Labour participation	A binary variable, coded 1 if individual participate in labour market, 0 otherwise.
Independent variable:	
Age	Age of individual in years old.
Female	A gender based variable coded 1 for female, 0 otherwise.
Marital status	A multinomial categorical variable which consist of: Never married, Married, Widow/Widower, Divorced
Province	A multinomial categorical variable which consist of dummies of four province i.e. KPK, Punjab, Sindh, and Balochistan
Region	A region based variable, coded 1 for individuals of urban

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	area and 0 otherwise.
Education:	An ordinal categorical variable which consist of five education categories: No education, Primary, Middle, Secondary, and Higher.
Ln (household income)	It is the sum of the labour income of the all household members. It converted into the log natural unit form.
Certified disability	A dummy variable coded 1 if disability of the individual is certified, 0 otherwise.
Disability allowance	A dummy variable coded 1 if individual receives disability allowance, 0 otherwise.

Data and Descriptive Analysis

Data Source

We will utilize micro-level data from the Labour Force Survey (LFS) 2020-21, collected by the Federal Bureau of Statistics (FBS), Government of Pakistan. For the first time, the LFS 2020-21 was conducted at the district level, using a sample size of 99,904 households, and included a disability module to support the achievement of the 8th Sustainable Development Goal (SDG), which emphasizes decent and well-paid jobs for all. In the present study, the sample consists of 23,443 persons with disabilities.

Descriptive Analysis

The descriptive statistics of the variables used in the study are presented in Table 2. The descriptive statistics for the variable 'Labour participation' indicate that 38.9% of individuals in the sample participate in the labour force, as reflected by the mean value of 0.389. It also depicts that 4 out of 10 disabled person are participate in labour market. Since the variable is binary (coded as 1 for participation and 0 for non-participation), the mean represents the proportion of participants. The standard deviation of 0.487 suggests moderate variation in labour force participation across the sample. The minimum value is 0, indicating individuals

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not participating in the labour force, while the maximum value is 1, representing those who are participating. These statistics highlight that a significant portion of the sample is not engaged in labour force activities, pointing to potential factors influencing participation rates.

The descriptive statistics for the variables 'age' and 'gender' reveal notable patterns in labour force participation. The average age of individuals in the sample is 50.05 years, with a standard deviation of 14.60, ranging from 15 to 65 years. Labour force participants have a slightly lower average age (49.64 years) compared to non-participants (50.31 years), suggesting that older individuals are more likely to be outside the labour force, potentially due to retirement or other factors. In terms of gender, males constitute 53.9% of the overall sample, while females make up 46.1%. However, there is a significant gender disparity in labour force participation, with males representing 90.9% of participants and females only 9.1%. Conversely, among non-labour participants, females account for 69.6%, while males make up just 30.4%. This highlights substantial age and gender-related differences in labour force engagement, pointing to potential barriers faced particularly by women in accessing employment opportunities.

Regarding marital status, 14.1% of the sample has never been married, 71.1% are married, 14.3% are widows or widowers, and only 0.6% are divorced. Among labour force participants, 81.4% are married, suggesting a strong association between marriage and higher labour force participation. Conversely, widows, widowers (7.7%), and never-married individuals (10.3%) are underrepresented among participants, while a significant proportion of non-participants are widows or widowers (18.4%) and never married (16.4%).

In terms of provincial representation, the majority of the sample resides in Punjab (51.9%), followed by Sindh (21.5%), KP (19.7%), and Balochistan (6.9%). Labour force participation is highest in Punjab (55.7%) and lowest in KP (17.2%), while non-participation is more pronounced in KP (21.3%) and Sindh (22.7%).

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These findings suggest that marital status and geographic location significantly influence labour market engagement, likely reflecting underlying socioeconomic and cultural factors.

The descriptive statistics for the region variable indicate that the majority of the sample resides in rural areas, with 74.9% of individuals living in rural regions and 25.1% in urban areas. Among labour force participants, 77.5% are from rural areas, and 22.5% are from urban areas, suggesting slightly higher labour force participation in rural regions. Conversely, among non-participants, 73.2% reside in rural areas, while 26.8% live in urban areas, indicating a marginally higher proportion of non-participants in urban regions. These findings highlight the regional disparity in labour force participation, with rural areas showing a stronger representation among participants.

The descriptive statistics for education and household income highlight significant patterns in labour force participation. Overall, 65.1% of the sample has no formal education, 14.1% have completed primary education, 7.6% have reached the middle level, 10% have completed secondary education, and only 3.2% have attained higher education. Among labour force participants, the proportion of individuals with no education drops to 50.9%, while those with primary (18.7%), middle (11.1%), secondary (14.1%), and higher education (5.3%) are more represented, suggesting that education positively influences labour force participation. Conversely, among non-participants, a significantly higher proportion (74.2%) has no formal education, while only 11.2%, 5.3%, 7.4%, and 1.9% have attained primary, middle, secondary, and higher education, respectively. Additionally, the average log of household income is higher for labour force participants (10.158) compared to non-participants (9.587), indicating a positive association between labour force participation and household income. These findings underscore the critical role of education and income in shaping labour market engagement.

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The data on certified disability and disability allowance reveals key insights about the sample. On average, only 2.5% of individuals in the whole sample have certified disabilities, with the same proportion among both labour participants and non-participants, indicating no significant difference in certification rates between these groups. Similarly, only 0.5% of the sample receives a disability allowance, with slightly higher representation among labour participants (0.6%) compared to non-participants (0.5%). It depicts the lower level of individuals with certified disability and limited access to disability allowances.

Table 2: Descriptive Statistics

Variable	Whole sample				Labour participants	Not labour participating
	Mean	Std. dev.	Min	Max	Mean	Mean
Labour participation	0.389	0.487	0	1		
Age	50.046	14.599	15	65	49.637	50.307
Gender:						
Male	0.539	0.498	0	1	0.909	0.304
Female	0.461	0.498	0	1	0.091	0.696
Marital status:						
Never married	0.141	0.348	0	1	0.103	0.164
Married	0.711	0.453	0	1	0.814	0.645
Widow/Widower	0.143	0.35	0	1	0.077	0.184
Divorced	0.006	0.075	0	1	0.006	0.006
Province:						
KP	0.197	0.398	0	1	0.172	0.213
Punjab	0.519	0.5	0	1	0.557	0.494
Sindh	0.215	0.411	0	1	0.197	0.227

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Balochistan	0.069	0.253	0	1	0.073	0.066
Region:						
Rural	0.749	0.434	0	1	0.775	0.732
Urban	0.251	0.434	0	1	0.225	0.268
Education:						
No education	0.651	0.477	0	1	0.509	0.742
Primary	0.141	0.348	0	1	0.187	0.112
Middle	0.076	0.265	0	1	0.111	0.053
Secondary	0.1	0.3	0	1	0.141	0.074
Higher	0.032	0.176	0	1	0.053	0.019
Ln (household income)	9.809	1.632	4.605	13.981	10.158	9.587
Certified disability	0.025	0.156	0	1	0.025	0.025
Disability allowance	0.005	0.074	0	1	0.006	0.005

Results and Discussion

In Table 3 we present the estimates of the logistic regression model. Four regression models were estimated. The determinants of labour force participation among individuals with disabilities must be estimated for four regression models, with each model including a different set of predictors. Model 1 looks at demographic factors, such as age, gender and marital status and provides information as to how basic personal characteristics impact the likelihood of participation. Accounting for regional factors, model 2 incorporates province, rural-urban differences to highlight geographical variation of labour engagement. Skill level and economic conditions are shown to impact labour force participation (Model 3) using socioeconomic factors such as education and household income.

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More specifically, Model 4 adds contextual factors, including disability certification and allowances to pick up policy and support related effects.

Age and labour force participation of people with disabilities are presented in the coefficients of the logit regression model in odds ratio form and insights are afforded into the relationship. Across all four models the odds ratio for age is majorly greater than 1, 1.151 in Model 1, 1.154 in Model 2, 1.166 in Model 3 and even 1.162 in Model 4. This means that higher age is associated with higher participation in labour force. In Model 1, for example, if we assume that age is increased by one year all other variables constant, the odds of being in the labour force increase by approximately 15.1% (that is: 1.151 - 1 = 0.151, or 15.1%). Similarly, in Model 4, controlling for demographic, regional, socioeconomic, and contextual factors, the odds of labour force participation increase by 16.2% for each additional year of age. This consistent pattern highlights the increasing likelihood of labour participation with age, at least initially.

The coefficient for age-squared, on the other hand, is consistently 0.998 across all models, suggesting a non-linear relationship between age and labour force participation. An odds ratio below 1 implies that the positive effect of age diminishes slightly as individuals grow older. This indicates a quadratic (parabolic) relationship, where labour force participation initially increases with age, reaches a peak, and then begins to decline at older ages. This pattern is consistent with the typical life cycle of labour participation, where younger individuals may face barriers to entering the labour force, participation peaks during middle age, and then declines as individuals approach retirement age or face health-related challenges.

For disabled individuals, the inverted-U shape relationship between age and labour participation reflects how physical and social factors interact over time. Younger individuals may face barriers such as lack of experience or education, leading to lower participation (Dixon, 2007; Mehmood et al., 2022). As they age,

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they gain skills and opportunities, increasing their likelihood of participation. However, at older ages, physical decline and health-related challenges reduce their ability to work, lowering participation rates again (Brock, 2010). This creates a peak in middle age, forming the inverted-U shape.

The logit regression results show a negative relationship between labour force participation among persons with disabilities and being female. However, across all four models, the odds for females are consistently very low, in the range from 0.0285 through to 0.0311, strongly suggesting that females with disabilities are significantly less likely to participate in the labour force compared to their male peers. For an example, in Model 1, the odds of labour force participation for females is 96.89 percent lower than males, and in Model 4, among demographic, regional, socioeconomic, and contextual factors controlling for it, the odds is 97.15 percent lower.

Females with disabilities are less inclined to labour participation due to multiple barriers, including societal expectations, cultural norms, and gender discrimination that limit their opportunities (Kossek, 2007). Traditional caregiving roles and limited access to education or vocational training exacerbate these challenges. Additionally, workplaces often lack inclusivity and accommodations for both gender and disability needs, further discouraging participation. Social stigma and safety concerns also play significant roles, creating a compounded disadvantage for disabled women compared to their male counterparts in accessing and participating in the labour force (Schur et al., 2005; Modibbo & Inuwa, 2020).
Results of the logit regression show that marital status is statistically important in influencing labour force participation among people with disabilities, with 'Never married' as the reference group. In term of labour market participation, married individuals exhibit very clear advantage as compared with others who never married and odds ratios are consistently higher ranging from 4.700 in Model 1 and 5.313 in Model 4 indicating that married individuals are approximately 4.7 to 5.3

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times more likely to join in the labour market. We also find that widowed individuals have high odds ratios (ranging from 4.679 to 5.504), which suggests a strong positive relationship between labour force participation. Like other groups, divorced persons have higher odds, but with lower amounts than their respective cohorts, ranging between 3.751 and 4.416, or 3.75 to 4.4 times as likely to be employed in the labour force as the never married group.

Finally, never married persons with disabilities are less likely to engage in labour participation due to fewer economic pressures since they are likewise less likely to have dependents or household responsibilities imposed on them to work (Verbrugge, 1983). They may also face social isolation, lack of support networks, and stigma, which limit access to employment opportunities. Additionally, they often lack the motivation or resources, such as education and vocational training, to enter the labour force. Structural barriers, combined with personal circumstances, contribute to their reduced likelihood of labour participation compared to their married or widowed counterparts.

The logit regression results reveal that geographic location, represented by province, has a modest influence on labour force participation among persons with disabilities, with KPK (Khyber Pakhtunkhwa) serving as the reference category. Punjab consistently shows higher odds of participation compared to KPK, with odds ratios ranging from 1.433 in Model 2 to 1.320 in Model 4, indicating that disabled individuals in Punjab are approximately 32% to 43% more likely to participate in the labour force. In contrast, Sindh shows odds ratios close to 1 in all models, suggesting no significant difference in labour force participation compared to KPK. Similarly, Balochistan exhibits odds ratios fluctuating around 1, with slightly lower odds in Models 3 and 4 (0.954 and 0.963), but these differences are not statistically significant. These results imply that Punjab possesses a slight edge for the participation of persons with disabilities in the labour force, but that Sindh, Balochistan and Chakwal (KPK) show negligible other differences. This suggests

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that further exploration of regional dynamics may be required in order to foster more equitable labour market inclusion.

Persons with disabilities from less developed provinces are less inclined to labour participation due to limited access to education, vocational training, and inclusive employment opportunities (Lamichhane, 2015). Underdeveloped infrastructure and inadequate workplace accommodations further hinder their ability to engage in the labour force. Additionally, socio-cultural stigmas around disabilities are often more prevalent in less developed regions, restricting their social and economic inclusion. A lack of targeted government policies and support programs in these areas exacerbates these challenges, leaving individuals with disabilities with fewer pathways to participate in the labour market.

The models show that one lives in an urban areas drastically diminishes the odds for labour participation compared to rural areas. Using Model 1, the odds ratio of 0.676 (highly significant health corresponds directly to a reduction of 32.4% in the odds of participation in labour among disabled people in urban environments compared to disabled people living in rural areas). In Models 2 through 4 this effect becomes much stronger, with the odds ratio lower at 0.596, meaning disabled individuals in urban areas have 40.4 per cent lower odds of labour participation. It is reassuring to see that the odds ratio achieved is insensitive to changes in additional variables, and is thus indicative of a stable negative relationship. These results help to explain why disabled people in urban areas might find it harder to participate in the labour market: perhaps a lack of competition in urban job markets make these a more attractive place; less inclusive work environments; or other systemic hurdles. However, the extremely high statistical significance of our results adds confidence to their robustness.

Persons with disabilities from urban areas may be less inclined to labour participation due to increased competition in urban labour markets, where higher educational qualifications and skills are often required. They may also face greater

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social stigma and discrimination in formal workplaces. Additionally, urban areas, despite better infrastructure, often lack inclusive workplaces or disability-friendly policies (Fritz, 2019). High living costs and limited support networks can further discourage participation. The availability of social welfare programs in urban settings may also reduce the economic necessity to engage in the labour force for some disabled individuals.

The logit regression results highlight the significant impact of education on labour force participation among persons with disabilities, with 'No education' serving as the reference category. Individuals with primary education are 25.5% to 25.8% more likely to participate in the labour force, as indicated by odds ratios of 1.255 in Model 3 and 1.258 in Model 4. Those with middle-level education show even greater odds of participation, at 1.331 in both models, reflecting a 33.1% increase in likelihood compared to those with no education. Secondary education also has a positive effect, with odds ratios of 1.191 in Model 3 and 1.199 in Model 4, corresponding to a 19.1% to 19.9% increase in participation. However, the most significant impact is observed for individuals with higher education, with odds ratios of 1.853 in Model 3 and 1.861 in Model 4, indicating an 85.3% to 86.1% higher likelihood of labour force participation. Our findings stress the salience of education in boosting the market outcomes of people with disabilities, with increases in education levels increasingly benefiting those receiving a higher education. The first emphasizes the need for policies that make educational access for persons with disabilities more accessible to ensure their economic inclusion.

For disabled persons, increased education enhances skills, knowledge, and qualifications, making them more competitive in the labour market. Education also improves confidence and social networks, helping individuals overcome barriers to employment (Mishra, 2020). It enables access to better-paying and more accommodating jobs, especially in formal sectors, which are more likely to provide inclusive environments and support systems (Pike et al., 2017).

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Additionally, higher education fosters awareness of rights and opportunities, empowering disabled individuals to seek and secure employment. Thus, education reduces barriers and increases the likelihood of labour participation for persons with disabilities.

Household income has odds ratio 1.446 in Models 3 and 4, implying that there is a strong positive correlation. That is, a 1% rise in household income increases the odds of a disabled person working by 44.6 percentage points, conditional on other factors. This result is highly statistically significant and in so doing substantiates the high robustness of this result, suggesting that greater labour participation is enabled from higher household income by persons with disabilities. As a result, improved access to resources, education, or employment opportunities which higher income households may be better equipped to provide may be responsible for a degree of this. The consistent effect across Models 3 and 4 highlights the importance of household income as a very significant determinant of labour participation of disabled family members.

For disabled persons, an increase in household income is associated with higher labour participation as it provides resources for education, skill development, and vocational training, enhancing employability (Schur, 2002). Higher income also enables access to assistive devices, transportation, and healthcare, reducing barriers to workforce entry. Moreover, financially stable households may afford better caregiving arrangements, allowing disabled individuals to focus on employment (Cook, 2006). Additionally, greater household income fosters confidence and motivation to seek employment, as individuals perceive better opportunities and support in navigating workplace challenges.

By contrast, the odds ratio of the variable 'Certified disability' is 0.715, which is a great way to say 'is significant and negative.' As a result, individuals with a certified disability have 28.5% lower odds of participating in labour conditional on other characteristics. This result is highly statistically significant

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and, in particular, suggests that individuals with certified disabilities may face systemic barriers at the level of (for example) discrimination, stigmatization, absent or insufficient workplace accommodations, and so on despite the fact that they are officially recognized and certified as having disabilities. The findings in this paper emphasize the need for policy and intervention targeting inclusive labour participation among people with certified disabilities.

Certified disability may lower the likelihood of labour participation among disabled persons because it often highlights the severity of the disability, which could limit their physical or cognitive ability to work (Heymann et al., 2014). Certification may also stigmatize individuals, discouraging employers from hiring them due to perceived limitations or the need for accommodations. Additionally, certified disabled individuals might rely more on social welfare programs or disability allowances, reducing the economic necessity to participate in the labour force. This combination of structural, social, and economic factors contributes to reduced labour participation.

The variable 'Disability allowance' has an odds ratio of 0.870, however, the relatively high standard error (0.222) indicates that this result is not statistically significant, suggesting that the observed relationship could be due to random variation rather than a consistent effect. The negative association might reflect that individuals receiving disability allowances could have more severe disabilities or fewer incentives to join the labour force. These findings highlight the need for further research to better understand the role of disability allowances in influencing labour market participation.

Table 3: Estimates of Logistic Regression Model – Odds ratios

Variables	Model 1	Model 2	Model 3	Model 4
Age	1.151***	1.154***	1.161***	1.162***
	(0.0113)	(0.0114)	(0.0119)	(0.0119)
Age-squared	0.998***	0.998***	0.998***	0.998***

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	(0.000105)	(0.000106)	(0.000110)	(0.000110)
Female	0.0311***	0.0304***	0.0287***	0.0285***
	(0.00141)	(0.00139)	(0.00139)	(0.00138)
Marital status:				
Never married (base)				
Married	4.700***	4.738***	5.433***	5.313***
	(0.379)	(0.385)	(0.459)	(0.451)
Widow/Widower	4.679***	4.667***	5.608***	5.504***
	(0.470)	(0.472)	(0.590)	(0.579)
Divorced	3.751***	3.416***	4.496***	4.416***
	(0.942)	(0.863)	(1.192)	(1.171)
Province:				
KPK (base)				
Punjab		1.433***	1.324***	1.320***
		(0.0674)	(0.0650)	(0.0649)
Sindh		1.097	1.013	1.010
		(0.0616)	(0.0589)	(0.0588)
Balochistan		1.063	0.954	0.963
		(0.0808)	(0.0746)	(0.0754)
Urban		0.676***	0.596***	0.596***
		(0.0279)	(0.0263)	(0.0263)
Education:				
No education (base)				
Primary			1.255***	1.258***
			(0.0640)	(0.0642)
Middle			1.331***	1.330***
			(0.0880)	(0.0880)
Secondary			1.191***	1.199***

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			(0.0705)	(0.0710)
Higher			1.853***	1.861***
			(0.188)	(0.189)
Ln (household income)			1.446***	1.445***
			(0.0190)	(0.0190)
Certified disability				0.715***
				(0.0875)
Disability allowance				0.870
				(0.222)
Constant	0.104***	0.0895***	0.00198***	0.00202***
	(0.0184)	(0.0162)	(0.000460)	(0.000470)
Observations	23,443	23,443	23,443	23,443

seEform in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The estimates of the logistic regression model in the form of odds ratios are presented in Figure 1. Simply put, Figure 1 depicts Model 4 from Table 3. The graph illustrates the odds ratios for various predictors of labour participation among disabled individuals based on the logistic regression model. The red vertical line at 1 represents the baseline, where odds ratios greater than 1 indicate a positive association and those less than 1 indicate a negative association. Age positively influences labour participation (odds ratio 1.2), but the effect tapers off with age-squared, indicating a nonlinear relationship. Females with disabilities are less likely to participate in labour, as shown by a significant odds ratio below 1. Marital status has a strong positive impact, with married individuals showing the highest odds of participation (around 5.5), followed by widowed and divorced individuals.

Regional effects reveal that urban residents and those from Balochistan have significantly lower odds of labour participation (odds ratios of 0.6), while Punjab has a neutral effect and Sindh shows a slightly negative association.

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Education plays a critical role, with odds ratios increasing from primary (1.3) to secondary (1.9) and higher education (1.4), suggesting that more education generally promotes participation. On the other hand, having a certified disability is associated with lower participation (odds ratio 0.72), and receiving a disability allowance has a small, insignificant negative association (odds ratio 0.87). The results as a whole though stress the influence of demographic, regional and socioeconomic factors on participation of disabled individuals in the labour force.

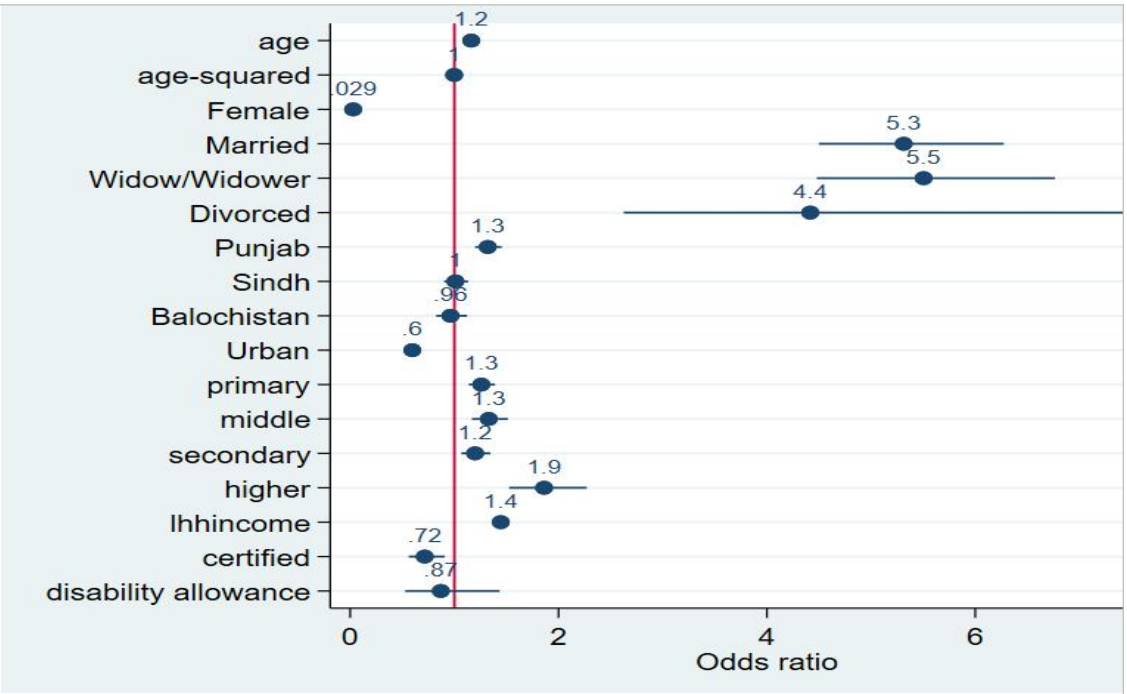

Figure 1: Coefficient plot of the covariates

Conclusion

The objective of study is to estimate the impact of various factors on the labour force participation of disabled persons, focusing on three key dimensions: demographic factors, socioeconomic factors, and contextual factors. The analysis highlights key factors influencing labour force participation among persons with disabilities, revealing complex social and economic dynamics. Age exhibits a parabolic relationship with participation, increasing during middle age and declining at older ages, reflecting life cycle patterns. Gender disparities are pronounced, with females facing significant barriers due to societal expectations,

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caregiving roles, and workplace discrimination. Marital status also plays a crucial role, as married and widowed individuals are more likely to participate due to economic responsibilities and social expectations compared to their never-married counterparts.

Geographic disparities are evident, with individuals from less developed provinces and urban areas being less likely to participate. This may stem from limited opportunities, greater competition, and systemic challenges in these regions. Education emerges as a significant enabler, with higher levels of education strongly associated with increased participation, highlighting its role in overcoming barriers to employment. Household income also positively influences participation, providing resources for skill development and reducing barriers such as access to assistive devices and transportation. Conversely, certified disabilities and reliance on disability allowances are associated with reduced participation, reflecting systemic barriers and reduced economic necessity. These findings underscore the importance of addressing structural and social inequalities to enhance labour force participation among persons with disabilities.

To enhance labour force participation among persons with disabilities, several targeted policy measures are needed. Gender disparities can be addressed through inclusive workplaces offering flexible schedules and vocational training for women with disabilities, alongside campaigns to reduce stigma. Improved infrastructure and skill development programs in less developed provinces and urban areas can mitigate regional disparities. Expanding access to quality education, inclusive learning environments, and vocational training is crucial, as education strongly enhances employability. Disability certification processes should be streamlined and linked to job placement and anti-discrimination laws to prevent stigma. Social support networks, mentorship programs, and tailored interventions for different age groups can support specific demographic needs.

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