





BMJ Open Inequalities in utilisation of essential antenatal services for women with disabilities in Pakistan: analysis of a cross-sectional demographic and health survey of Pakistan 2017–2018

Waqas Hameed ¹, Muhammad Asim ^{1,2}, Sarah Saleem ¹, Bilal Iqbal Avan ³

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¹Community Health Sciences, The Aga Khan University, Karachi, Sindh, Pakistan

²Population Research Center, University of Texas at Austin, Austin, Texas, USA

³Department of Population Health, London School of Hygiene & Tropical Medicine, London, UK

Correspondence to

Waqas Hameed;
waqas.hameed1@gmail.com

ABSTRACT

Objectives Although the number of disabled women entering motherhood is growing, there is little quantitative evidence about the utilisation of essential antenatal care (ANC) services by women with disabilities. We examined inequalities in the use of essential ANC services between women with and without disabilities.

Design, setting and analysis A secondary analysis of cross-sectional data from recent Demographic and Health Survey of Pakistan 2017–2018 was performed using logistic regression.

Participants A total weighted sample of 6791 ever-married women (age 15–49) who had a live birth in the 5 years before the survey were included.

Outcome measures Utilisation of ANC: (A) antenatal coverage: (1) received ANC and (2) completed four or more ANC visits and (B) utilisation of essential components of ANC.

Results The percentage of women who were at risk of disability and those living with disability in one or more domains was 11.5% and 2.6%, respectively. The coverage of ANC did not differ by disability status. With utilisation of essential ANC components, consumption of iron was lower (adjusted OR, aOR=0.6; $p<0.05$), while advice on exclusive breast feeding (aOR=1.6; $p<0.05$) and urine test (aOR=1.7; $p<0.05$) was higher among women with disabilities as compared with their counterparts. Similarly, the odds of receiving advice on maintaining a balanced diet was higher (aOR=1.3; $p<0.05$) among women at risk of any disability as opposed to their counterparts. Differences were also found for these same indicators in subgroup analysis by wealth status (poor/non-poor) and place of residence (urban–rural).

Conclusion Our study did not find glaring inequalities in the utilisation of ANC services between women with disabilities and non-disabled women. This was true for urban versus rural residence and among the poor versus non-poor women. Some measures, however, should be made to improve medication compliance among women with disabilities.

BACKGROUND

Over a billion people across the globe have different forms of disability, with 80% living

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ Our study used nationally representative data to determine the association between disability and utilisation of antenatal care (ANC).
- ⇒ Cluster effect and sample weighting were taken into consideration in the analysis of this study.
- ⇒ Our capacity to infer causality was constrained by the inherent drawbacks of a cross-sectional study design.
- ⇒ Our study did not present the association between each type of disability and ANC outcomes due to low percentages.
- ⇒ The study is limited by the type of measure included in the Pakistan Demographic and Health Survey (eg, duration of disability and disability status of women during pregnancy).

in low-income and middle-income countries (LMICs).¹ Individuals with disabilities are the world's largest minority, which is constantly increasing from population growth and chronic medical conditions.² The conceptualisation of disability is complicated and it varies due to its dynamic and multidimensional nature.³ While there is no unanimously agreed definition of disability,⁴ the most commonly used is provided by the United Nation, which is, 'long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder individual's full and effective participation in society on an equal basis with others'.⁵

Global awareness of disability-inclusive development is increasing. The Sustainable Development Goal 3 seeks to ensure healthy lives and promote well-being for all people at all ages.² The United Nations Convention on the Rights of Persons with Disabilities reinforces the privileges of persons with disabilities to attain the highest standard of

healthcare services without any discrimination.⁶ However, despite global commitments, individuals with disabilities often live in poverty and experience poor health due to stigma and exclusions from employment, education and access to healthcare services.^{7 8}

The number of disabled women who are entering motherhood is growing,⁹ although their ability to engage in a sexual relationship, marriage, caregiving and mothering is often questioned.^{10–12} Although women with disabilities have the same or even greater biological and social needs and legitimate rights for sexual and reproductive (SRH) education and care,¹² they face a plethora of health system challenges such as: physical inaccessibility, negative and abusive health workers' attitudes, long queues at the health facilities to seek high-quality and affordable SRH services when compared with women without disabilities.^{7 8 13–15} Apart from the health system factors, individual and community level factors such as: sociocultural and religious beliefs, low literacy level, communication barriers, negative public attitude, social stigma, sexual violence and lack of social support also play a pivotal role to access high quality reproductive health services by women with disabilities.¹⁶ However, a few studies also highlight that utilisation of maternal and reproductive health services among women with disabilities is either better or not much different from non-disabled women.^{8 17–21} By and large, there are mixed findings regarding using maternal healthcare services among women with disabilities.

Due to inequalities in and substandard quality of healthcare services, maternal and child mortality and morbidity remain a major public health concern for LMICs, particularly in South Asia.²² Among several interventions, high-quality of antenatal care (ANC) has been shown to improve maternal²³ and child²⁴ health outcomes. ANC provides a unique opportunity for birth preparedness by promoting healthy practices among pregnant women, improving nutrition, and preparing women mentally, physically and logistically for childbirth.²⁵ This care can reduce the maternal death rate by up to 20%.²³ Although there has been a shift from improving the coverage of healthcare to improving the quality of healthcare worldwide,²⁶ there is a dearth of literature on the quality of maternal care for women with disabilities.^{27 28}

Notably, women's experiences of maternity care vary according to the type of impairment,^{18 29} where women with multiple disabilities are least satisfied with the care offered to them.¹⁸ Studies also show that women with disabilities who are living in rural areas and belong to poor socioeconomic strata may face greater challenges in accessing and utilisation of maternal healthcare services.^{30 31}

Deeply rooted discriminatory attitudes and practices, as well as the lack of laws and policy enforcement, continue to violate the legitimate rights of people with disabilities.^{32–34} In addition, healthcare professionals may lack the knowledge and skills they need to provide care to pregnant women with disabilities.³³ The international

community has emphasised disability-inclusive health services by strengthening health systems to recognise and accommodate the needs of those with disabilities.^{35 36} To improve health outcomes for all women and children, there is a need to organise and deliver services that are technically appropriate, culturally acceptable, socially sensitive and equitably distributed to all women with and without disabilities.

COUNTRY CONTEXT

With a population of 207 million,³⁷ Pakistan failed to achieve optimal targets to reduce maternal and child mortality that were pledged under Millennium Development Goals 4 and 5 by the United Nations.³⁸ The country has one of the highest rates of maternal mortality in the world³⁹ and is ranked unsafe for the survival of newborns.⁴⁰ There are stark inequalities in maternal, reproductive, and child health indicators, and the situation among women who are uneducated, belong to the poorest wealth quintile and live in rural areas is far worse.^{41 42} The country is among the top 10 countries where healthcare interventions are the most inequitable.⁴¹ Although the general coverage of ANC from a skilled professional is quite high (86.2%) in Pakistan, most often all aspects of essential ANC are not included in the care provided to the pregnant women.^{42–44} Approximately 15% of child-bearing women in Pakistan live with some disability;⁴² however, there is a dearth of literature on the challenges faced by these women living with disabilities. In Pakistan, the existing laws only focus on the rights and inclusion of persons with disabilities, in general.^{45 46} However, explicit policies around SRH needs, priorities and access to SRH education and services of disabled women are limited.

RESEARCH QUESTIONS

Based on the aforementioned evidence, we hypothesise that the utilisation of essential ANC services will be lower among women with disabilities as compared with non-disabled women, women who are poor and living in the rural areas may be more deprived of these services as compared with urban and affluent segment, respectively. The specific research questions are as follows:

1. What are the levels of inequalities in the use of essential ANC services between women with and without disabilities, and by the type of disability?
2. How is the relationship between women's disability and the utilisation of essential ANC antenatal moderated by women's wealth status and place of (urban vs rural) residence?

DATA AND METHODS

Data

This study employed publicly available data from the most recent Pakistan Demographic and Health Survey collected in 2017–2018.⁴² With a stratified two-stage

sample design, the survey obtained information from a nationally representative sample of the population of Pakistan.⁴² The response rate was 96%, and in the interviewed household, 94% of ever-married women age 15–49 were interviewed.

Sample derivation

A total of 15 068 ever-married women age 15–49 were interviewed in-person at their homes in the survey. However, we reduced our sample to two levels in accordance with our study objectives and sample representativeness. At the first stage, women who resided in the Gilgit Baltistan (n=984) and Azad Jammu and Kashmir (n=1720) regions were excluded because these two regions used a separate sampling procedure and a separate weight, and could not be combined with the other regions.⁴² At the second stage, we excluded women (n=5561) who did not have a live birth in the 5 years before the survey. Consequently, we performed our analysis on an unweighted sample of 6803 women (weighted sample 6711). Information about ANC was only collected and analysed for the most recent birth. We found less than missing cases in different disability variables that replace with '0' code, indicating no disability.

Variables

Dependent variables

The utilisation of essential ANC was the outcome variable for this study. The construction of outcome variables was guided by the WHO's Integrated Management of Pregnancy and Childbirth guidelines, which detail the essential maternal health services that should be provided to women.⁴⁷ For maternal healthcare-seeking, we used two measures: (1) received ANC and (2) completed four or more ANC visits. We also created an overall measure to ascertain if the women received all the essential components of ANC.⁴⁷ These components were classified as: (1) Counselling as (A) received advice on early initiation of breast feeding, (B) received advice on exclusive breast feeding and (C) received advice on maintaining a balanced diet during pregnancy; (2) Examination as (A) blood pressure measurement, (B) blood test and (C) urine test; and (3) Treatment as (A) received two or more tetanus toxoid (TT) injections during pregnancy and (B) took iron tablets or syrup. For the overall measure of utilisation of essential components of ANC, women were coded with a '1' if they had received all eight essential ANC components and '0' otherwise.

Independent variables

A standard disability module was administered for collecting information on the six core functional domains of disability that included seeing, hearing, communication, cognition, walking and self-care. This questionnaire about disability was originally developed by the Washington Group on Disability.⁴⁸ The module was based on the framework of the WHO's International Classification of Functioning, Disability and Health. The response to

each question was classified as 0=no difficulty, 1=some difficulty, 2=a lot of difficulty or 3=cannot function at all in the specified domain. Women experiencing 'no difficulty' were considered as non-disabled; 'some difficulty' were classified as at risk of disability; and finally, 'a lot of difficulty' and 'cannot function at all' were classified as women with disability.

In accordance with the guidelines of Washington Group,⁴⁸ we constructed an ordinal measure depicting the overall status of disability following three steps: (A) women who reported 'a lot of difficulty' or 'cannot function at all' in any of the six domains were classified as women with disability; (B) of the remaining sample, women reported 'some difficulty' in one or more domains were classified as at risk of disability and (C) rest were considered as non-disabled women (ie, women who reported 'no difficulty' across all six domains).

Covariates

We included a range of covariates in our analysis that had the potential to be confounders. These included women's age in three distinct categories (age 15–24, 25–34 and 35–49), place of residence (urban/rural), women's education (no formal education/any formal education), women with first pregnancy–primigravida (yes/no) and wealth quintile (poorest, poorer, middle, richer, richest). The wealth index was computed by the DHS programme with principal component analysis.⁴⁹

Effect modifiers

To develop a deeper understanding of the relationship between the status of functional disability and ANC, we performed subgroup analysis by wealth status and place of residence, and assessed if the disability–ANC relationship differed by place of residence and socioeconomic status. The wealth quintile variable was dichotomised into poor and non-poor, with women belonging to 'poorest' or 'poorer' quintiles grouped and coded as '0', and the 'middle', 'richer' and richest' grouped and coded as '1'. Similar categorisation of wealth quintile has also been reported in other researches.^{50 51}

Statistical analysis

We performed the statistical analyses in different phases: descriptive, bivariate and multivariate analysis. Descriptive analysis was used to describe the socio demographic characteristics of the sample by means, SD, frequencies and percentages. We estimated the percentage (95% CIs) of overall disability and for each of the six domains of functional disability, and the percentage (95% CIs) utilisation of each essential ANC component. Next, we used Pearson's χ^2 to test if the percentage of disability varied by the wealth status and place of residence.

Second, we ran the bivariate analysis with the Pearson's chi-square test to determine the crude association between utilisation of ANC and the women's disability status.

In the third phase, we fitted separate multivariate logistic regression models to examine the relationship between disability and each ANC outcome in the overall sample, and then by place of residence (urban/rural) and wealth status (poor/non-poor). A series of models were fit separately on the full dataset, and the urban–rural and poor–non-poor subgroups. Finally, to ascertain the role of place of residence and wealth status as effect modifiers, we developed separate logistic regression models to test interactions of the disability measures with place of residence (urban/rural) and wealth status (poor/non-poor). The multivariate models also accounted for other covariates such as age, education, place of residence, primigravida and wealth quintile to produce adjusted ORs (aOR).

The data were analysed with Stata V.16.0 (StataCorp). All analyses were adjusted for the complex survey design, strata, primary sampling units (clusters) and probability sampling using individual weights. We used `svy:` commands as a prefix for cross-tabulations and logistic regression models. In the survey settings, we used ‘singleunit(centred)’ option, which specifies that strata with a single Primary Sampling Unit be centred at the grand mean instead of stratum mean. P values of <0.05 were considered significant.

The method section is organised in accordance with Preferred Reporting items for Complex Sample Survey Analysis guidelines.⁵²

Patient and public involvement

No patient involved.

RESULTS

Characteristics of study population

Table 1 shows the background characteristics of the 6711 women age 15–49 who had a live birth in the 5 years before the survey for overall sample and according to the disability status. Overall, nearly two-thirds (66.5%) of the women lived in rural areas. The mean age of women was 29.6 (SD=6.4) with more than half (55.5%) between age 25–34. Approximately half (47.9%) of the women had no formal education, and one in five women (19.9%) was primigravida. The segregated results showed that women with disabilities are relatively older, non-primigravida and belonged to poorer wealth quintile as opposed to their counterparts.

Status of functional disability

Figure 1 presents the percentage of overall functional disability and by each domain. About 11.5% (95% CI

Table 1 Sociodemographic characteristics of women age 15–49 with a live birth in the 5 years before the survey

Characteristics	Women without disabilities		Women at risk of any disability		Women with any disabilities		Overall sample	
	n	n	N %	%	n	%	n	%
Place of residence (p=0.44)								
Urban	1912	33.2	282	36.4	54	31.3	2248	33.5
Rural	3852	66.8	492	63.6	119	68.7	4463	66.5
Women's age (p≤0.000)								
15–24	1429	24.8	92	11.9	25	14.2	1545	23.0
25–34	3241	56.2	399	51.6	85	49.2	3725	55.5
35–49	1094	19.0	283	36.6	63	36.6	1440	21.5
Mean (SD)	28.9	(6.1)	32.0	(6.5)	32.3	(6.8)	29.6	(6.4)
Education (p=0.1486)								
No formal education	2775	48.1	340	44.0	97	56.0	3212	47.9
Any formal education	2989	51.9	434	56.0	76	44.0	3499	52.1
Primigravida (p≤0.001)								
Yes	4542	78.8	676	87.3	156	90.3	1337	19.9
No	1222	21.2	98	12.7	17	9.7	5374	80.1
Wealth quintile (p≤0.002)								
Poorest	1278	22.2	125	16.1	42	24.1	1444	21.5
Poor	1072	18.6	195	25.2	32	18.5	1299	19.4
Middle	1151	20.0	175	22.7	45	25.7	1371	20.4
Richer	1136	19.7	175	22.6	39	22.3	1349	20.1
Richest	1127	19.6	105	13.5	16	9.4	1248	18.6
Total	5764	100.0	774	100.0	173	100.0	6711	100.0

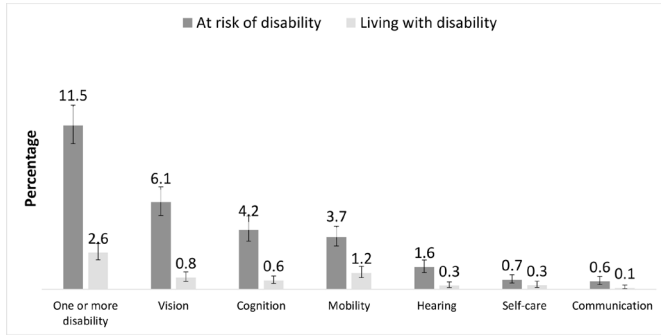


Figure 1 Percentage distribution of women age 15–49 years with a live birth in the 5 years before the survey who are at risk and living with any functional disability, according to the domains (n=6711).

10.3% to 13.0%) of the women had at risk of disability in one or more domains, while 2.6% (95% CI 2.1% to 3.2%) were living with disability (either have a lot of difficulty or cannot function at all) in at least one of the specified domains. With regard to the risk of disability, the most prevalent forms of functional disabilities were vision (6.1%, 95% CI 5.2% to 7.2%), cognition (4.2%, 95% CI 3.4% to 5.2%), walking (3.7%, 95% CI 3.0% to 4.4%) and hearing (1.6%, 95% CI 1.2% to 2.1%), while fewer than 1% were at risk of disability in the domain of self-care and communication. In terms of the experiencing disability, the most commonly cited domain was walking disability at 1.2% (95% CI 0.8% to 1.6%). The percentage of women living with disability in other domains was less than 1%.

A comparison of functional disability between urban and rural, and poor and non-poor segments of the population is shown in table 2. The percentage of functional disability does not differ significantly according to the place of residence or wealth status of the household. The only exception was that the women who live in urban areas (5.0%) and those who are non-poor (4.4%) had significantly higher percentage of walking

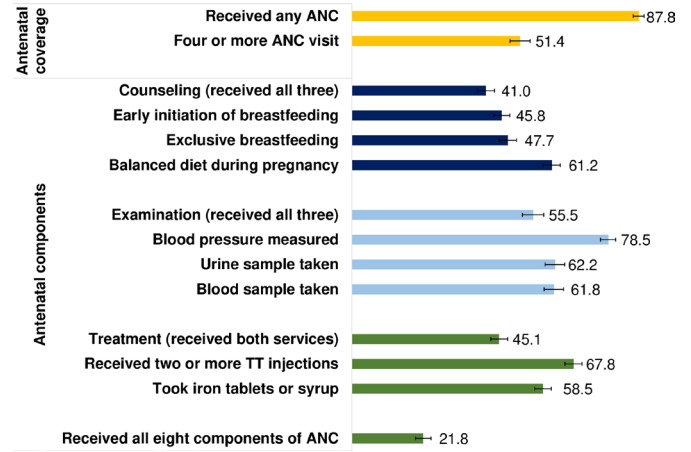


Figure 2 Utilisation of essential ANC components among women age 15–49 with a live birth in the 5 years before the survey. ANC, antenatal care.

disability as compared with women living in rural areas (3.0%) and those who are poor (2.6%), respectively.

Utilisation of essential antenatal services

Figure 2 presents ANC coverage and the receipt of essential ANC components among the sampled women. Nearly 9 in 10 women received any ANC and half (51.4%) completed four or more ANC visits. Three in five (61.2%, 95% CI 58.5% to 63.8%) women reported receiving advice on maintaining a balanced diet during pregnancy, while fewer than half received counselling on the early initiation of breast feeding (45.8%, 95% CI 43.3% to 48.3%) and exclusive breast feeding (47.7%, 95% CI 45.1% to 50.4%). About 41% (95% CI 38.4% to 43.6%) received counselling on all three components. With ANC visits, approximately 78.5% (95% CI 76.1% to 80.7%) had their blood pressure checked, while urine and blood samples were taken from approximately three in five women. Just over half (55.5%, 95% CI 52.2% to 58.7%) of the women reported receiving all

Table 2 Proportion of functional disability among women who had a live birth in 5 years before the survey, according to wealth status and place of residence

Characteristics	Overall disability		Vision		Cognition		Mobility		No of women
	At risk of any disability	With any disability	At risk	Disabled	At risk	Disabled	At risk	Disabled	
Pooled estimates									
Percentage	11.5	2.6	6.1	0.8	4.2	0.6	3.7	1.2	6711
Wealth status									
Poor	11.7	2.7	6.4	0.8	4.8	0.6	2.6	1.2	2743
Non-poor	11.5	2.5	6.0	0.9	3.8	0.7	4.4	1.2	3968
P value	0.94		0.86		0.34		0.04		
Place of residence									
Urban	12.5	2.4	6.8	0.6	3.2	0.9	5.0	1.1	2248
Rural	11.0	2.7	5.8	0.9	4.7	0.5	3.0	1.2	4463
P value	0.48		0.40		0.09		0.02		



three examination components. Fewer than half of the women (45.1%, 95% CI 42.5% to 47.7%) received the recommended doses of TT and consumed iron tablets or syrup during pregnancy. Only one in five women (21.8%, 95% CI 19.5% to 24.2%) received all eight components of ANC during pregnancy.

Inequalities in utilisation of essential ANC services between women with and without disability

Table 3 shows the results of the overall analysis from bivariate and multivariate logistic regression analysis in the form of crude percentages and aORs. Column 2 in the table shows the percentage of outcomes among women with disability, at risk of disability and non-disabled women. These models were adjusted for the range of covariates as described in the analysis section above. The overall measures of disability showed no association with the ANC coverage indicators. However, we found a positive association between disability status and uptake of certain ANC components. Women with disability in at least one domain had 1.7 times the odds (AOR 1.7, 95% CI 1.0 to 2.7; $p < 0.05$) of taking a urine test, and 1.6 times the odds (AOR 1.6, 95% CI 1.1 to 2.4; $p < 0.05$) of receiving advice of about exclusive breast feeding as opposed to the non-disabled women. Similarly, as compared with non-disabled women, those women who are at risk of disability in one or more domains had 30% (AOR 1.3, 95% CI 1.0 to 1.7; $p < 0.05$) greater odds of receiving advice on maintaining a balanced diet during pregnancy. The only exception was that women with disability in one or more domain were 40% less likely to consume iron tablets or syrup (AOR 0.6, 95% CI 0.4 to 0.9) as compared with their counterparts.

The results of subgroup analysis from bivariate and multivariate logistic regression analysis are presented in online supplemental file 1, the key findings, however, are narrated here. With the exception of the use of iron tablets, none of the interaction terms in the full model was found to be significant, which suggests that the relationship between disability and utilisation of ANC does not differ by wealth status and place of residence. Women with disabilities had significantly lower odds of consuming iron tablets or syrup as compared with their counterparts both in rural (AOR 0.54, 95% CI 0.3 to 0.8; $p < 0.05$) and poor (AOR 0.32, 95% CI 0.2 to 0.7; $p < 0.01$) segment of population. The similar relationship consumption of iron tablets or syrup held true for the measure of t risk of disability in one or more domains (AOR 0.72, 95% CI 0.5 to 1.0; $p < 0.05$) both in non-poor segments of population and those living in urban areas (AOR 0.67, 95% CI 0.5 to 1.0; $p < 0.05$).

Among the poor segment of the population, women at risk of disability in one or more domain had a significantly greater (AOR 1.6, 95% CI 1.1 to 2.2; $p < 0.05$) odds of receiving ANC and had 60% (AOR 1.6, 95% CI 1.2 to 2.2; $p < 0.05$) greater odds of receiving advice on maintaining a balanced diet during pregnancy as opposed to their counterparts. Similar, in non-poor segment of population,

Table 3 Inequalities in the uptake of essential ANC services between women with and without disabilities

Variables	Full dataset	
	Percentage of outcome	AOR (95% CI)
ANC coverage		
Received ANC (Ref. non-disabled)	87.8	1
At risk of disability in one or more domains	89.5	1.3 (0.9 to 1.8)
Disability in one or more domains	88.2	1.4 (0.7 to 2.7)
4+ANC visits (Ref. non-disabled)	51.4	1
At risk of disability in one or more domains	48.9	0.9 (0.7 to 1.2)
Disability in one or more domains	54.1	1.4 (0.9 to 2.3)
Treatment		
Received two or more tetanus toxoid injections (Ref. non-disabled)	67.8	1
At risk of disability in one or more domains	70.8	1.2 (0.9 to 1.5)
Disability in one or more domains	69.8	1.4 (0.8 to 2.3)
Took iron tablets or syrup (Ref. non-disabled)	59.2	1
At risk of disability in one or more domains	56.0	0.9 (0.7 to 1.1)
Disability in one or more domains	45.6*	0.6 (0.4 to 0.9)*
Examination		
Blood pressure measured (Ref. non-disabled)	78.5	1
At risk of disability in one or more domains	78.3	1.0 (0.8 to 1.3)
Disability in one or more domains	77.7	1.1 (0.7 to 1.9)
Urine sample taken (Ref. non-disabled)	62.2	1
At risk of disability in one or more domains	59.7	0.9 (0.7 to 1.2)
Disability in one or more domains	68.4	1.7 (1.0 to 2.7)*
Blood sample taken (Ref. non-disabled)	62.1	1
At risk of disability in one or more domains	60.6	0.9 (0.7 to 1.2)
Disability in one or more domains	57.4	1.0 (0.6 to 1.6)
Counselling		
Advice on early initiation of breast feeding (Ref. non-disabled)	45.8	1

Continued

Table 3 Continued

Variables	Full dataset	
	Percentage of outcome	AOR (95% CI)
At risk of disability in one or more domains	46.4	1.0 (0.8 to 1.3)
Disability in one or more domains	49.9	1.4 (0.9 to 2.2)
Advice on exclusive breast feeding (Ref. non-disabled)	47.7	1
At risk of disability in one or more domains	48.1	1.0 (0.8 to 1.3)
Disability in one or more domains	54.8	1.6 (1.1 to 2.4)*
Advice on maintaining balanced diet during pregnancy (Ref. non-disabled)	60.4	1
At risk of disability in one or more domains	66.3	1.3 (1.0 to 1.7)*
Disability in one or more domains	62.1	1.3 (0.8 to 2.0)
Received all essential ANC components (Ref. non-disabled)	22.1	1
At risk of disability in one or more domains	19.8	0.9 (0.7 to 1.1)
Disability in one or more domains	20.8	1.1 (0.6 to 2.0)

*p<0.05

women with disability in one or more domains were twice as likely to have their urine sample taken (AOR 2.1, 95% CI 1.0 to 4.1; $p<0.05$) and were given advice on exclusive breast feeding (AOR 1.8, 95% CI 1.1 to 3.0; $p<0.05$) as opposed to their counterparts. We observed similar findings in the urban-rural subgroup analysis. Among the rural segment of population, women who have at risk of disability in one or more domains had 41% (AOR 1.41, 95% CI 1.1 to 1.9; $p<0.05$) greater odds of receiving advice on maintaining a balanced diet during pregnancy.

DISCUSSION

Women with disabilities have been an invisible population in maternity care and reproductive health. Globally, there is a dearth of empirical literature on the maternal and reproductive health needs of women with disabilities, particularly in LMICs. Our study is one of the first of its kind to examine inequalities in the utilisation of essential ANC services between women with and without disabilities in Asia. This study found that a substantial proportion (11.5%) of women of childbearing age have some level of difficulty in at least one domain of disability, while 2.6% have a lot of difficulty or cannot function at all. A multicountry study conducted in Africa had reported the

percentage of functional disabilities for women age 15–39 and 40–49. Among women age 15–39, the percentage of any severe disability was estimated to be around 0.5%–1.3% and 5.9%–7.6% for any moderate or severe disability, while among women age 40–49, the percentage ranged from 1.2%–3.8% to 15.3%–21.9%, respectively.⁵³ The percentage of disability among women of reproductive age in Pakistan is similar to other LMICs. In contrast, studies from the USA and UK reported that 12%⁵⁴ and 6.1%⁵⁵ of women of reproductive age are disabled (any disability), respectively. This indicated that the percentage of disability among women of childbearing age in Pakistan is relatively lower than in high-income countries. Consistent with trends in other countries,⁵³ the most common forms of functional disabilities were related to vision (at risk=6.1%, disabled=0.8%), walking (at risk=3.7%, disabled=1.2%) and cognition (at risk=4.2%, disabled=0.6%), while difficulty in communicating was the least prevalent.

Our study revealed that women with disabilities were relatively older and non-primigravida as opposed to their counterparts. These findings are consistent with other countries such as Nepal⁵⁶ and England.¹⁸ We observed no clear trend of disability with wealth status. However, some studies have found that poor people are more likely to have disability due to factors such as ill health, malnourishment, unsafe work and the inability to afford medical care that may prevent disability.^{57 58} We found no significant differences in the percentage of functional disability by urban–rural residence. The only exception was the domain of walking disability, which was more commonly found in urban areas as compared with the rural areas. One study in African countries also reported varying patterns in the percentage of urban–rural disabilities across countries.⁵³ However, another recent study from the USA found a significantly higher percentage of disability in rural settings versus the urban areas.⁵⁹ Comparisons should be made with caution because these studies reported disability for either the adult (USA) or the entire population (African countries), whereas our estimates are based on childbearing women.

Notably, in this study, 88% of women sought ANC but only 20% received all eight essential ANC components. In Pakistan, there has been a significant increase in the coverage of several maternal and newborn health-care services. However, this increase hasn't proportionally translated into reduction in maternal and neonatal mortality—primarily due to inequalities in service coverage and inconsistent quality of services.^{39 42 60} This stark difference clearly highlights a critical gap in the quality of ANC in our healthcare system, a gap that requires urgent interventions to improve the quality of healthcare services. Furthermore, understanding the underlying causes and implications of these differences require nuanced quality research using the principles of implementation research. Health inequalities including utilisation of ANC among women with disabilities are common across the globe.² However, our study could



not find major inequalities in the utilisation of ANC by disabled women in Pakistan. We found limited evidence of the association between functional disability and utilisation of ANC services. Although we were unable to locate any comparable study, this finding is in agreement with a systematic review from LMICs that found no difference in coverage of maternal health services between women with and without disabilities.⁸ The same association has also been documented in other studies conducted in India, Cameroon, Sierra Leone and UK where utilisation of maternal and reproductive health services were not different in women with and without disability.^{18–21 55} In contrast, some studies from African region (Ghana, Uganda and Senegal) and rural Pakistan did identify a range of challenges faced by women with disabilities in accessing reproductive health services.^{31 61–63} This mixed evidence in inequalities with disabled women requires in-depth exploration so as to understanding why women with disabilities received discriminatory care in one setting and not in other settings. The rights of people living with disabilities are reflected in national policies and legislations which covers a comprehensive range of facilities and services for people with disabilities—from prenatal care to the advanced levels of healthcare. For instance, the policy proclaimed that disabled people are equally entitled to the opportunities as other non-disabled have in all spheres of life. However, implementation of these policies to ensure provision of disability-inclusive services is identified as a challenge.^{63–65}

We found significant underutilisation of iron tablets or syrup by women with disability as compared with their counterparts. Among all the ANC components, consumption of iron tablets/syrup relies on the women's choice to take the iron rather than receiving a prescription by a service provider. This suggests that women with disabilities tend to struggle adhering to a provider's suggestion to take iron tablets/syrup on their own. This was suggested in another study that found lower adherence among people with disabilities.⁸ It may also be possible that fewer women with disability were prescribed medication by their service providers. From the programmatic perspective, we suggest that during consultations, service providers might also inform the accompanying person or other members of household about the medication and encourage the women to take their medication.

In some cases, women with certain functional disabilities have reported higher utilisation of ANC components such as advice on exclusive breast feeding and maintenance of a balanced diet during pregnancy as compared with non-disabled women. This could be due to the fact that in general, women with disabilities are considered high risk during their pregnancy¹¹ and require more ANC and medical examinations than non-disabled women.⁶⁶ This could also be explained by sympathetic behaviour of healthcare providers towards women with disabilities.⁶³ It is also pertinent to note that, in rare instances, this sympathetic behaviour may be perceived as patronising by women when they desire to be cared for in a similar,

if not identical, manner to those without disability. This could lead to a sense of being singled out and labelled as high risk on account of their disability when it is not medically indicated.⁶⁷ A study from Nepal also found that the attitude of healthcare providers towards the disabled was negative and that the providers had limited knowledge and skills about providing services for the disabled. Few participants reported that the attitude of healthcare providers was kind, respectful, caring or helpful towards women with disabilities.⁶⁸ Furthermore, women living with disabilities in Pakistan receive social and economic support from family members, neighbours and society, which may encourage them to seek better ANC. Redshaw *et al* reported that women with disabilities in the UK use maternity services more than non-disabled women and had sufficient access and involvement in maternity care services.¹⁸ Thus, there are conflicting arguments about the health service utilisation by women with disabilities. When there is a good health infrastructure, women with disabilities may benefit even more from health systems than women with no disabilities. We noticed that this trend of higher utilisation of ANC services was primarily found in ANC counselling, in the overall analysis as well as among the poor population and those who reside in the rural areas. This pattern of favourable care for women living with disabilities could also be attributed to the active involvement of community health workers (officially called the lady health workers (LHWs)) who are responsible for providing basic maternal and child healthcare services (including ANC counselling) during their routine household visits.⁶⁹ The LHWs are residents of the same community and can relate to other women and navigate local norms, languages and social relationships more effectively than outsiders.⁷⁰

Strengths and limitations

To the best of our knowledge, this is the first study that specifically examined the relationship between disability and utilisation of ANC services, particularly among LMICs. The results are based on the most recent national survey in Pakistan. Our study presents a comprehensive analysis of the disability–ANC relationship that used numerous independent and dependent variables, and performed subgroup analyses.

Our study has some limitations. First, since the analysis used cross-sectional data, we cannot draw inferences about causal relationships between disability and ANC. Second, since we excluded two regions because their use of a different sampling frame, our findings cannot be generalised to the excluded regions, and they are not representative of Pakistan as a whole. The few significant disability–ANC associations in the subgroup analyses should be interpreted with caution because the unweighted cell count was less than 25 or 50. Moreover, we did not include the association between each domain of any disability (eg, vision, walking and cognition) with ANC outcomes due to low

percentage. Furthermore, the survey did not collect information on length of disability hence it was not possible to ascertain whether a woman was disabled during the antenatal period. Finally, the focus of our study was utilisation of essential ANC services, while the interpersonal aspects of care such as the social and emotional support extended to women by the service providers were not included and are also important to consider.

CONCLUSIONS

Pakistan has a considerable population of disabled women in reproductive age. The percentage of disability does not differ linearly by wealth quintile (highest among poorest and lowest among richest) or urban–rural geographies. Overall, the proportion of effective ANC coverage is very low and requires urgent measures for quality improvement. Our analyses indicate that the utilisation of essential ANC services among women with disabilities is not different or lower than non-disabled women. This pattern is seen for urban-rural geographies and among the poor-non-poor segments of the population. It seems that the country's health system, to a great extent, is responsive to the needs of women with disabilities for ANC services. However, adherence to medication (in this study, iron tablets/syrup) may be challenging for women with disabilities and could be improved by engaging a companion from same household to encourage compliance. Moving forward, there is a need in Pakistan to conduct qualitative studies that enhance our understanding of how our health system is meeting the unique needs of women with disabilities, to develop greater insights into how the psychosocial needs of women with disabilities are addressed during the provision of care, and to replicate disability-inclusive best practices in a broader context.

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ORCID iDs

Waqas Hameed <http://orcid.org/0000-0002-8100-9474>

Muhammad Asim <http://orcid.org/0000-0002-8193-124X>

Sarah Saleem <http://orcid.org/0000-0002-6797-8631>

Bilal Iqbal Avan <http://orcid.org/0000-0003-4531-4508>

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