



## Socioeconomic Impact of Tuberculosis in District Swabi, Pakistan:

### A Quantitative Study

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### Abstract

*This article examined patients' perceptions of the impact of Tuberculosis (TB) on their socioeconomic lives and analyzed whether effects differ by gender. The data were collected from 100 TB patients through simple random sampling. Chi-square and Kendall's Tau-b tests were used to examine the association among variables. The association of patients' perceptions was found to be significant and positive, with TB patients being stigmatized ( $P < 0.05$ ,  $T_b = 0.414$ ), socially isolated ( $P < 0.05$ ,  $T_b = 0.139$ ), and family members avoiding meals with the TB patients ( $P < 0.05$ ,  $T_b = 0.363$ ). Furthermore, the association of patients' perception was found significant and positive with TB, adding financial burden on the family ( $P < 0.05$ ,  $T^b = 0.223$ ), patients borrow money for treatment ( $P < 0.05$ ,  $T^b = 0.360$ ), and sell the productive assets ( $P < 0.05$ ,  $T^b = 0.132$ ). The results also showed that, after controlling for patients' gender, the association between patients' perceptions and the social impacts of TB is significant ( $P < 0.05$ ) and more negative for females than for males (for male TB = -0.272, for female TB = -0.324). Similarly, after controlling for patients' gender, the association between patients' perceptions and the economic impacts of TB was significant ( $P < 0.05$ ) and more negative for females than for males (for male TB = -0.242, for female TB = -0.332). The results concluded that the adverse impacts of TB were higher on females than on males.*

### Keywords

Tuberculosis (TB), Social Impact, Economic Impact, Gender, Swabi, Pakistan

### Introduction

This study examine the socioeconomic impact of tuberculosis (TB) in distric Swabi Pakistan. The study specifically focused on to examine the socioeconomic impact of TB on patients. Furthermore it assessed the association between the socioeconomic impacts of TB on the basis of gender. Social impact in this study mean stigmatization and less social support from family members, social circle and community while economic factor refer to financial burdon on the family and wage loss. Although the causative organism was discovered more than a century ago, and almost 100% regimens are at hand, the issue of tuberculosis has not been solved much. The fact that the socio-economic impact of the disease was poorly defined is one of the causes of this. It is a relatively recent development that there has been research conducted to determine the socio-economic cost of diseases like tuberculosis. This burden will be clearly understood and this understanding will assist the planners to give sufficient priority in the distribution of funds (Rajeswari *et. al.*, 1999). The literature defines that socioeconomic impact is the direct or indirect impact which change the quality of life, health, and social interactions of people as well as the change in

income, employment, working abilities (Easterbrook *et. al.*, 2020). These socioeconomic status affect the lives of TB patient broadly.

Tuberculosis (TB) is a chronic infectious disease caused primarily by Mycobacterium Tuberculosis (Daniel, 2006). Lungs are the primary site of infection, but it spread to other organs such as, brain, kidneys, bones, and lymph nodes, particularly when the immune system is weakened (Knechel, 2009). Tuberculosis is contagious it spreads from one person to another. People with active TB in their lungs cough, spit, speak, or sneeze, thereby transmitting the infection to others (CDC, 2012). Close contact with people with infectious diseases increases the chances of spreading. Similarly, people living in densely populated areas with limited access to light, fresh air, adequate food, and clean water are at greater risk of infection. Moreover, TB spreads in resource-poor settings worldwide (Dubos, 1952). Despite its severity, TB is both preventable and curable. Preventive measures include Bacillus Calmette–Guérin (BCG) vaccination, early detection, contact tracing, adequate ventilation, and infection control practices within healthcare settings (Raviglione & Sulis, 2016). Standard treatment involves a multidrug regimen of first-line agents, including isoniazid, rifampicin, pyrazinamide, and ethambutol (Nahid *et al.*, 2016). The treatment duration is typically 8 months, although it may vary depending on disease severity (Nahid *et al.*, 2016).

Despite the availability of an effective cure, TB patients experience strong social stigma in many parts of the world due to the ‘discrediting’ status they receive from family and community (Courtwright & Turner, 2010; Juniarti & Evans, 2011). Furthermore, it imposes substantial economic burdens on patients and their households. A local Bangladeshi synonym for Tuberculosis is “Rajer rog,” “the King’s disease,” since it is a disease that only Kings can afford to suffer (Croft & Croft, 1998). Even when anti-TB drugs and basic diagnostic services are provided free through national programmes, the direct non-medical costs, such as transport to clinics, additional diagnostics, and supplemental nutrition, healthy food frequently constitute a significant share of household expenditures (Tanimura *et al.*, 2014).

Many studies have discussed the socioeconomic impact of Tuberculosis on patients. However, limited literature is available in Pakistan, specifically in the district of Swabi, regarding the socioeconomic impact of Tuberculosis based on gender (male, female). Khan *et al.* (2019) revealed that in Pakistan, gender norms restrict women’s mobility and decision-making power, intensifying their vulnerability. Therefore, this study aims to quantify the gendered vulnerability to the socioeconomic impacts of TB.

### **Theoretical Framework**

The analysis in this study is strengthened by the social determinants of health (SDH) model (Solar & Irwin, 2010) and was refined through the tuberculosis poverty social exclusion Cycle Model (WHO, 2011). This integrated framework guided the analysis of how Tuberculosis emerges from and perpetuates adverse social and economic conditions. The SDH states that health outcomes are determined by the structural characteristics of society, such as socioeconomic position (income, education, occupation) and gender, and that TB also has implications for the socioeconomic aspects of survivors' lives. SDH guided the analysis in this study on how the socioeconomic and gender contexts of TB survivors are influenced by this disease. The analysis is also strengthened by the fact that poverty, low education, and gender inequality are structural drivers that increase vulnerability to infection, delay seeking care, and worsen socioeconomic outcomes (Solar & Irwin, 2010; Lonroth *et al.*, 2009). Overcrowding, poor nutrition, lack of income security, distance to clinics, quality care, stigma, social exclusion, and community discrimination not only determine exposure to TB but also shape the extent of economic and social burden (Lonroth *et al.*, 2009).

### **Literature Review**

According to the WHO Global Tuberculosis Report (2019), an estimated 10.0 million people developed TB worldwide in 2018, and 1.5 million people died from the disease. Tuberculosis remained one of the top 10 causes of death globally and the leading cause of death from a single infectious agent. The disease burden was concentrated in a few high-burden countries. India, China, Indonesia, the Philippines, Pakistan, Nigeria, Bangladesh, and South Africa accounted for two-thirds of global TB cases (WHO, 2019).

### **Awareness about Tuberculosis**

Health literacy refers to an individual’s ability to search for, understand, and apply health information when making decisions about their health. Study revealed that educated people

were more aware of health problems, know more about the availability of health care services, and utilize the information more effectively than non-educated (Onasoga *et al.*, 2012). Studies from Pakistan indicate that public awareness of TB as a curable and transmissible disease is relatively high, attributable to health campaigns (Mushtaq *et al.*, 2011). However, awareness does not always translate into accurate knowledge; research in Khyber Pakhtunkhwa shows that, although most respondents recognized TB as curable, only a minority understood its proper mode of transmission (Ali *et al.*, 2019). That's why low levels of education and poor health literacy contribute to delayed health-seeking behaviour. For instance, in rural and underserved populations, TB is often misunderstood as a curse, hereditary illness, or divine punishment (Hoa *et al.*, 2003; Somma *et al.*, 2008). These beliefs reduce the likelihood of early detection and increase the social stigma attached to the disease. Moreover, studies in India and Pakistan revealed that educated women are more likely to recognize TB symptoms, seek early care, and adhere to the full course of treatment (Atre *et al.*, 2004).

### **Poverty**

Poverty is both a direct and indirect catalyst for Tuberculosis. Indirectly, it increases susceptibility by fostering conditions that facilitate transmission, such as overcrowded housing, poor nutrition, and inadequate access to sanitation. Directly, poverty limits individuals' access to preventive services, timely diagnosis, and proper treatment (Hargreaves *et al.*, 2011). The World Health Organization, therefore, describes TB as a "disease of poverty" (WHO, 2010; Lönnroth *et al.*, 2009). Overcrowding, malnutrition, and weak health systems are consistently found to amplify TB risk (Lienhardt, 2001; Siroka *et al.*, 2016). In Pakistan, households with poor income security are particularly vulnerable, and treatment expenditures often drive families deeper into poverty (Uplekar *et al.*, 2015). A systematic review by Siroka *et al.* (2016) found that household poverty increases the odds of having TB by 1.5 to 2 times across various settings. Furthermore, economic shocks such as job loss or displacement have been linked to treatment interruption and TB recurrence (Wingfield *et al.*, 2014). The close link between poverty and Tuberculosis has led many to think that TB is exclusively a disease of the poor. Several recent studies of the socioeconomic characteristics of TB patients throw doubt on this view. Researchers in India found Tuberculosis to be present among all strata of society, although prevalence was highest among people with low incomes (Ramachandran *et al.*, 1997). The World Health Organization (2013) identified undernutrition as the leading risk factor for TB globally. This link is particularly evident in South Asia and Sub-Saharan Africa, where food insecurity is prevalent. Low BMI (body mass index) is a strong predictor of TB incidence, with individuals having a BMI below 18.5 being at three times higher risk of TB (Cegielski & McMurray, 2004).

### **Economic Impact**

The economic burden of TB is considerable. A study in South Africa revealed that residents in informal housing were five times more likely to contract TB than those in formal housing (Mathema *et al.*, 2017). Similar trends have been noted in Karachi, Pakistan, where slum dwellers have a disproportionate TB burden due to cramped living conditions (Miandad *et al.*, 2014). Patients spent an average of US\$ 130 before reaching the TB clinic. This is almost 20% of the average Bangladeshi household's annual income (Croft & Croft, 1998). Indirect costs are often larger than direct ones. TB frequently leads to prolonged periods of illness and convalescence. During active disease and sometimes during extended recovery, patients lose wages or productive time (Lönnroth *et al.*, 2009). Tanimura *et al.* (2014) argue that the financial toll of TB can consume over half of a household's annual income in many developing countries. Similarly, Barter *et al.* (2012) note that the costs, such as transportation and lost income, often outweigh medical expenses, and in Pakistan, where a large proportion of the workforce relies on daily wages, the loss of earning capacity can devastate whole families (Khan *et al.*, 2019). For households dependent on daily wages or informal-sector income, even a short interruption can cause immediate food insecurity and force them to adopt coping strategies such as selling productive assets, withdrawing children from school, or taking high-interest loans (Lönnroth *et al.*, 2009).

### **Social Impact**

Despite the availability of an effective cure, TB patients experience strong social stigma in many parts of the world due to the 'discrediting' status they receive from family and community (Courtwright & Turner, 2010; Juniarti & Evans, 2011). People go to great lengths to avoid an infected person (Somma *et al.*, 2008). When a person in a family is diagnosed with TB, they may be subjected to a form of

social exclusion (Scambler, 1998). The illness may lead to separations in familial and social relationships (Johansson et al., 2000). Evidence from Ethiopia, India, and Bangladesh similarly highlights how stigma drives patients into isolation, depression, and concealment of their illness (Datiko & Lindtjörn, 2009; Somma et al., 2008). Chang and Cataldo (2014) further emphasize that stigma directly undermines timely treatment and adherence, worsening health outcomes.

Gendered impacts are particularly severe. The majority of men reported that their family had accepted their disease, while women, especially in rural areas, face rejection (Ramachandran et al., 1997). Women are in the most disadvantaged position due to a lack of autonomy and economic dependence (Hussain, 2020). In addition, 69% of rural women said they could not discuss the disease with their neighbors (Ramachandran et al., 1997). Studies confirm that women diagnosed with TB often face abandonment, reduced marriage prospects, and diminished access to care (Long et al., 1999; Karim et al., 2011). In patriarchal societies such as Pakistan, gender norms restrict women’s mobility and decision-making power, intensifying their vulnerability (Khan et al., 2019). TB has been linked to diminished marriage prospects, abandonment, or domestic violence. Women may be barred from cooking or caring for children, which undermines their social roles and economic autonomy. The fear of such outcomes can deter women from testing and treatment (Somma et al., 2008).

**Research Methodology**

This study was conducted under quantitative research protocols, examining patients’ perceptions of the impact of Tuberculosis (TB) on their socioeconomic lives and differences in impact by gender. Eligible participants of the study were tuberculosis patients (both male & female, residential of Swabi) who visited outpatient department to seek health care services. The study was conducted in the semi tropical areas of district Swabi. Using a simple random sampling technique, the data were collected from 100 patients in Kalokhan TB Health Center, Sehatmand Zindagi Center Swabi and TB Health Center Shahmansoor through a structured questionnaire (Phellas et al., 2011). There were 127 TB patients registered in these TB centers during the year 2020. Based on this population the required sample size for a target population of 127 was worked out as 100 (Chaudhry, 2009). On this ground the data was obtained from 100 TB patients. The questionnaire was comprised of two sections. The first section included questions about the respondent’s knowledge about Tuberculosis, while the second section was composed of questions about the socioeconomic impact of Tuberculosis on the participants’ lives. The collected data were managed in SPSS, and descriptive analyses were initially conducted. After univariate analysis using descriptive statistical techniques, bivariate analysis was carried out using the chi-square test and Kendall’s Tau-b test. Ethical protocols were followed while contacting the human subjects. Participants’ safety, confidentiality, and integrity were ensured. Participants’ informed consent was also taken before they were contacted.

**Analysis and Discussion**

Data were analyzed in two steps. In the first step, frequencies and percentages were calculated, and in the second step, the chi-square test was applied to examine the association between tuberculosis and the socioeconomic impact on participants’ lives. Furthermore, in bivariate analysis, the independent variable (Perception towards TB) was cross-tabulated with the dependent variables (social impacts of TB and Economic Impacts of TB) after controlling for respondents’ gender.

**Univariate analysis**

**Table 1: Respondents' Social Demographic Information**

<b>Age</b>	<b>Frequency</b>	<b>Percentage</b>
15-25	23	23.0
26-35	43	43.0
36-45	29	29.0
Above45	5	5.0
<b>Gender</b>		
Male	44	44.0
Female	56	56.0
<b>Education</b>		
Illiterate	69	69.0
Metric	18	18.0
Intermediate	8	8.0
Bachelor	5	5.0
<b>Family Type</b>		
Nuclear	55	55.0

Joint	45	45.0
<b>Marital Status</b>		
Married	78	78.0
Unmarried	22	22.0
<b>Monthly Income</b>		
5000-15000	80	80.0
16000-30000	20	20.0
<b>Employment Status</b>		
Employed	46	46.0
Unemployed	54	54.0

The demographic profile of the study participants highlights several key characteristics relevant to the understanding of Tuberculosis (TB) prevalence in the selected population. The age distribution shows that most respondents (43%) were between 26 and 35 years old, followed by 29% in the 36 to 45 years age bracket. Moreover, 23 percent were aged 15-25, and only 5 percent were aged 45 or older. These results indicate that Tuberculosis is prevalent in the middle-aged groups (2645 years) than in the young or the elderly populations. Regarding gender, 56% of respondents were women and 44% were men, suggesting the study was slightly more female-dominated. On the aspect of educational background, a large percentage of the participants (69%) were illiterate. In the meantime, 18% had completed matriculation, 8% had completed intermediate-level education, and only 5% were bachelor's degree holders. These findings underscore that low literacy is a dominant characteristic of TB patients in the research region.

Family structure was also evaluated, and the information indicates that 55% of respondents lived in nuclear families, while the remaining 45% lived in joint families. The results for marital status indicate that the majority of respondents (78) were married, and 22% were single. In terms of monthly household income, the majority of participants (80 percent) stated that their income was between PKR 5,000 and 15,000, with only one-fifth (20 percent) earning between PKR 16,000 and 30,000 per month. These figures indicate the economic fragility of most TB-struck people. This is also evident in employment status: 54 percent of respondents were unemployed, and 46 percent had some employment. Altogether, the demographic information indicates that TB in the given context is more common in the middle-aged, poor, and less-educated sectors, and females are also heavily affected by this issue, as well as people living in nuclear families.

**Table 2: Respondents Division by their Awareness and Perception towards Tuberculosis (TB)**

Statement	Agree	Disagree	Uncertain
TB is a transformable disease	85 (85%)	06 (6%)	9 (9%)
TB is a curable disease	88 (88%)	08 (8%)	4 (4%)
Female TB patients suffer more than male TB patients	78 (78%)	12 (12%)	10 (10%)
Poverty and poor living conditions increase the chances of TB	82 (82%)	10 (10%)	8 (8%)
TB patients consider themselves useless and worthless	67 (67%)	15 (15%)	18 (18%)

Findings in Table 2 revealed that most respondents took Tuberculosis seriously and considered it socially important. The percentage agreement with the statement that TB is a transmissible disease was very high (85%); only a small percentage (6%) differed, and a significant percentage (9%) was not sure. On the same note, a huge majority (88%) believed that TB is curable, with only 8% disagreeing and 4% unsure. With regard to perceptions on gender, 78 percent of the respondents thought that women TB patients are affected more than men patients, which indicates a high degree to which the gendered burden of the disease is realized. Only 12 percent held the contrary view, while 10 percent were not sure. In addition, 82% of the respondents affirmed that poverty and poor living conditions make the likelihood of TB more likely, and only 10% did not agree with the same, and 8 percent had no idea, showing the identification of socioeconomic factors in the prevalence of the disease. Lastly, 67 percent of the respondents affirmed that TB patients believe they are useless and worthless, and this means that there is a lot of social and psychological stigma attached to the disease. The smallest proportion (15) did not agree with this statement, and 18% were uncertain.

**Table 3: Social Impact of Tuberculosis on Patients**

Questions	Agree	Disagree	Uncertain
Community and family members stigmatize the TB patient	24	76	0
Family and friends avoid interaction with the patient	20	80	0
Local community avoid interaction with the TB patient	26	74	0
People keep their children away from the patient	33	67	0
Family members avoid meal together	29	70	1
The patient receive less social support	28	72	0
Women who suffer from TB are less likely to be treated than man.	24	61	15
Unmarried girls/boys face problems getting married?	42	58	0
People never marry their daughters or sons to an ex-TB patient.	8	64	28

The results of this research indicate that there are enormous social pressures that face people with Tuberculosis. In response to the question regarding the stigma and the attitude of society members, 24% of those interviewed said that they were stigmatized by their relatives and community members because of their illness. Conversely, the remaining 76% were happy with the support of their family members and communities during their illness.

When it comes to interpersonal contact, 20 percent of the respondents revealed that their family members and friends had the habit of avoiding contact with them after their diagnosis. But most of them (80%) indicated that they did not experience social exclusion, as they still received the normal levels of interaction and support from their close relatives.

Which level of stigma was also reported on the community level? In particular, 26 percent of respondents said that members of the local community did not bother interacting with tuberculosis patients. Also, 33 percent of the respondents said that their neighbors told their children not to play with them because they thought there was a danger of getting the disease or perpetuating social taboos against TB. Equally, 29 percent also indicated that family members were unable to eat with them, which is an embodiment of the subtle yet effective forms of social isolation at home.

Another issue discussed in the study was the overall level of social support among TB patients. In particular, a significant proportion of participants reported lower levels of social support than they had or expected (28). Moreover, 24 percent of the interviewees were under the impression that women with the Tuberculosis were not equally treated as men, which revealed a gender difference in terms of the social impact of the disease. Notably, Tuberculosis was regarded as a major obstacle to marriage. About 42 percent of the respondents were of the view that unmarried boys and girls with TB had challenges in marrying. Another 8 percent clearly indicated that individuals were not ready to marry their sons and daughters to those who had previously developed Tuberculosis. These observations reveal that the stigma of TB has long-running and significant effects on the social associations of patients, equality of the genders, and opportunities for life even after recovery.

**Table 4: Economic Impact on Patients**

Questions	Agreed	Disagreed	Uncertain
Expansive TB adds a financial burden on the family	85	14	1
The treatment of TB remains unaddressed most often due to financial constraints	8	91	1
The patient borrows money	51	48	1
Sell the productive assets	55	45	0
The production is decreased due to the reduced capacity for work	53	3	44
The patient is not able to continue the work even after treatment, so they became jobless forever	24	54	22

As indicated in Table.4 of this study, Tuberculosis has a major economic cost to the individuals and their families who are affected. A significant proportion (85) of the interviewees noted that the cost of tuberculosis treatment placed a substantial financial burden on their households. These financial constraints directly led to 8% of patients being unable to undergo or even begin receiving proper medical treatment. In a bid to manage economic pressure, half of the respondents reported taking a loan to cover the costs of treatment and other necessities. Also, 55 percent of respondents said they sold productive assets, including livestock, land, or working tools, to meet the financial costs of the disease. These coping mechanisms are indicative of the tremendous effects of TB on the economic security and long-term livelihoods of the household.

Economic productivity was also adversely affected by the physical damage caused by the disease. In particular, 53 per cent. Of respondents reported that their working ability was considerably diminished by the physical weakness caused by TB, leading to low productivity and income generation. Moreover, 24% of the respondents said they felt that Tuberculosis caused permanent job loss, even after the patient had healed, suggesting that the economic effects were long-lasting even after the patient was cured.

These findings highlight the multifaceted economic impact of Tuberculosis, not only through direct medical expenses and asset depletion but also via reduced labor capacity and employment opportunities.

**Bivariate Analysis**

**Table 1: Social Impacts of TB on Patients with Gender Differences**

Gender	Independent Variable	Dependent Variable	Statistics $\chi^2$ , (P-Value) & $T^b$	Statistics $\chi^2$ , (P-Value) & $T^b$ for entire table
Male	Perception towards TB	Social impacts	$\chi^2=20.324$ (0.000) $T^b=-0.272$	$\chi^2=41.693$ (0.000) $T^b = -0.329$
Female	Perception towards TB	Social impacts	$\chi^2=25.215$ (0.000) $T^b = -0.324$	

Results in Table 1 portrayed that the social impacts of TB on patients in the context of respondents' gender is negative ( $T^b= -0.272$ ) and significant ( $P=0.000$ ) for males. The association between the above-mentioned variables was also negative ( $Tb = -0.324$ ) and significant ( $P = 0.000$ ) among female respondents. The value of the level of significance and  $T^b$  for the entire table indicates a significant, negative association ( $P=0.000$  &  $Tc= -0.329$ ) between perceptions of TB and its social impacts for both genders. The higher negative  $T^b$  value for females indicates that the negative social impacts of TB on females are higher than those on males.

**Table 2: Economic Impacts of TB on Patients with Gender Differences**

Gender	Independent Variable	Dependent Variable	Statistics $\chi^2$ , (P-Value) & $T^b$	Statistics $\chi^2$ , (P-Value) & $T^b$ for entire table
Male	Perception towards TB	Economic impacts	$\chi^2=28.788$ (0.000) $T^b = -0.242$	$\chi^2=58.891$ (0.000) $T^b = -0.321$
Female	Perception towards TB	Economic impacts	$\chi^2=27.786$ (0.000) $T^b = -0.332$	

Results in Table 2 highlighted that portrayed that the influence of TB on the economic impacts of TB on patients in the context of respondents gender is negative ( $T^b= -0.242$ ) and significant ( $P=0.000$ ) for males. The association of the above said variables was also negative ( $T^b= -0.332$ ) and significant ( $P=0.000$ ) for female respondents. The value of the level of significance and  $T^b$  for the entire table show a significant and negative association ( $P=0.000$  &  $T^b = -0.321$ ) between perception towards TB and economic impacts of TB for both genders. The higher negative  $T^b$  value for female indicated that the negative economic impacts of TB on female gender are higher than male.

**Table 3: Association Between Perception Towards TB and Social Impacts**

Dependent variable (Social Impacts)	Independent variable	Statistics- $\chi^2$ , (P-Value) & $T^b$
Community and family members stigmatize the TB patient	Perception towards TB	$\chi^2=136.025$ (0.000) $T^b = 0.414$
Family and friends avoid interaction with the patient	Perception towards TB	$\chi^2=12.092$ (0.003) $T^b = 0.139$
Local community avoid interaction with the TB patient	Perception towards TB	$\chi^2=11.918$ (0.011) $T^b = 0.079$
People keep their children away from the patient	Perception towards TB	$\chi^2=48.895$ (0.000) $T^b = 0.346$
Family members avoid meal together	Perception towards TB	$\chi^2=105.633$ (0.000) $T^b = 0.363$
The patient receive less social support	Perception towards TB	$\chi^2=43.283$ (0.001) $T^b = 0.214$
Women who suffer from TB are less likely to be treated than man.	Perception towards TB	$\chi^2=31.09$ (0.000) $T^b = 0.122$

Unmarried girls/boys face problems getting married?	Perception towards TB	$\chi^2=16.773(0.002)$ $T^b = 0.042$
People never marry their daughters or sons to an ex-TB patient	Perception towards TB	$\chi^2=43.283(0.000)$ $T^b = 0.414$

Results in the above table portrayed that the association of perception towards TB was found significant (P=0.000) and positive ( $T^b=0.414$ ) with Community and family members stigmatizing the TB patient. Furthermore, the results for family and friends avoiding interaction with the patient were significant (P=0.003) and positive ( $T^b=0.139$ ) with perception towards TB.

Furthermore, a significant (P=0.011) and positive ( $T^b =0.079$ ) association was detected between Perception towards TB and the Local community's avoidance of interaction with the TB patient. In addition, the results showed that people kept their children away from the patient, and Perception towards TB was found to be highly significant and positive (P=0.000,  $T^b=0.346$ ).

Moreover, the association between perception towards TB and Family members avoid meal together was found to be significant (P=0.000) and positive ( $Tb = 0.363$ ). Furthermore, the results for the patient receiving less social support were significant (P=0.001) and positive ( $Tb =0.214$ ) with regard to perception towards TB.

In addition, a significant (P=0.000) and positive ( $T^b =0. 122$ ) association was detected between Perception towards TB and Women who suffer from TB are less likely to be treated than man. In addition, the results of Unmarried girl/boy faces problems to get married and Perception towards TB was found highly significant and positive (P=0.002,  $T^b=0. 042$ ). In addition, a significant (P=0.000) and positive ( $T^b =0. 414$ ) association was detected between Perception towards TB and People never marrying their daughter or son to an ex-TB patient.

**Table 4: Association Between Perception Towards TB and Economic Impacts**

Dependent variable (Social Impacts)	Independent variable	Statistics- $\chi^2$ , (P-Value) & $T^b$
Expansive TB adds financial burden on the family	Perception towards TB	$\chi^2=126.025(0.001)$ $T^c=0.223$
The treatment of TB remains unaddressed most often due to financial constrain	Perception towards TB	$\chi^2=11.092 (0.003)$ $T^c=0.319$
The patient borrows money for treatment	Perception towards TB	$\chi^2=13.918 (0.011)$ $T^c=0.360$
The patient sell the productive assists for treatment	Perception towards TB	$\chi^2=38.895 (0.000)$ $T^c=0.132$
The production is decreased due to the reduce capacity of work	Perception towards TB	$\chi^2=101.633(0.001)$ $T^c=0.169$
The patient are not able to continue the work even after treatment so they became jobless forever	Perception towards TB	$\chi^2=45.283(0.000)$ $T^c=0.271$

Results in the above table portrayed that the association of perception towards TB was found significant (P=0.001) and positive ( $T^b =0.223$ ), with Expansive TB adding a financial burden on the family. Furthermore, the results of the treatment of TB remain unaddressed most often due to financial constraints, which was found significant (P=0.003) and positive ( $T^b=0.319$ ) with perception towards TB. Furthermore, a significant (P=0.011) and positive ( $T^b =0.360$ ) association was detected between Perception towards TB, and patients borrowing money for treatment. In addition, the results of patient self-assessments for treatment and Perception towards TB were found highly significant and positive (P=0.000,  $T^b=0.132$ ).

Moreover, the association between perception of TB and decreased production was significant (P=0.001) and positive ( $Tb = 0.169$ ), due to reduced work capacity. Furthermore, the results of patients cannot continue the work even after treatment, so they became jobless forever, which was found significant (P=0.001) and positive ( $T^b=0.271$ ) with perception towards TB.

**Discussion**

The study examined the socioeconomic impact of Tuberculosis (TB) on patients in District Swabi using the Social Determinants of Health (SDH) framework and the Tuberculosis Poverty Social Exclusion Cycle Model. The results indicate the multidimensional nature of the burden of TB, which indicates that it is strongly interrelated with poverty, gender inequality, stigma, and economic vulnerability. The findings are consistent with both national and international evidence and reiterate the impression that TB is not merely a biomedical issue but also a complex social and economic

problem. The results of the perception survey showed that most respondents (85%) were aware that TB is a transmissible disease, with 88% believing it is curable. These are findings that are supported by national and international evidence. For example, Mushtaq et al. (2011) showed that the same awareness trends are observed in Punjab, Pakistan, where most respondents were correct in stating that TB is contagious and treatable. More recent data from rural Khyber Pakhtunkhwa show that although 96% of participants reported that TB is curable, only a quarter could correctly explain how it is transmitted, indicating knowledge gaps (Ali et al., 2019). However, other Asian contexts with studies indicate the opposite: higher transmission awareness. As an illustration, research in Pakistan and other developing nations shows that the rate of understanding how to transmit and treat TB has risen, thanks to public health programs (Mushtaq et al., 2011). But the knowledge is not enough, since the patient experience is still affected by the stigma and socioeconomic barriers. The statistical analysis and research carried out by the current study and the international research demonstrated that a considerable percentage (78) of the respondents believed that female TB patients are more affected than males. Some examples include the results of Long *et. al.* (1999), who discovered that women with TB are likely to experience increased stigmatisation, fewer opportunities for marriage, and less access to care, especially in patriarchal societies. The situation in Pakistan complicates the vulnerability of women; due to gender norms, their mobility and freedom to make decisions are limited (Khan *et. al.*, 2019). The current results thus bring to the fore that TB heavily impacts women disproportionately both economically and socially.

The paper also established that poverty and poor living conditions predispose people to TB, since 82% of the respondents affirmed this. This conclusion is consistent with the World Health Organization's view that TB is a disease of poverty (WHO, 2010; Lonnroth et al., 2009). As it has been demonstrated in low- and middle-income countries, the risk of TB is significantly increased by overcrowding, malnutrition, and lack of access to healthcare (Lienhardt, 2010; Siroka *et. al.*, 2016). Pakistan has a high number of rural households whose income security is low, and TB treatment usually leads to further poverty (Uplekar *et. al.*, 2015). The adverse economic impact in the form of borrowing money, selling productive assets, and unemployment in the long run, also reported in the present study, is also similar to the findings reported by Tanimura *et. al.* (2014), who estimated the economic cost of TB in developing countries to be greater than half of the annual household income.

Notably, the research showed strong gender disparities in socioeconomic outcomes. The statistical analysis showed that female patients experience worse negative social and economic outcomes than males. This echoes Barnhoorn and Adriaanse's (1992) earlier writing on gendered stigma, but also more recent findings that women are more likely to be abandoned, divorced, or even locked out of marriage opportunities on the diagnosis of TB (Courtwright & Turner, 2010; Karim *et. al.*, 2011). In the current research, the respondents have attested that unmarried girls or boys have trouble when getting married and that most of them concurred that families would not want to get married to families with a history of TB. This kind of perception contributes to social exclusion, thereby hindering the reintegration of patients even after recovery. These dynamics explain the continuation of the poverty TB cycle, with health shocks creating economic deprivation as well as social marginalization.

Another validation of stigma at different levels was evident in the results. According to the respondents, patients with TB are shunned by their family members and friends, ostracized by society, and even denied a chance to have a meal with others. A comparable study has been conducted in Ethiopia (Datiko & Lindtjorn, 2009), India (Courtwright & Turner, 2010), and Bangladesh (Somma *et. al.*, 2008), where stigma as a concept has resulted in isolation, depression, and hiding of the disease. The current research extends this information by statistically demonstrating that negative perceptions and signs of stigma are significantly related. This stigma is not only a social issue, but it also contributes to the delay in treatment and low adherence, which only aggravates outcomes (Chang & Cataldo, 2014). Therefore, the issue of stigma needs to be addressed in the focus of TB control.

On the economic dimension, the results point to extreme implications. The respondents affirmed that TB is a financial burden because of treatment costs, borrowing, the sale of assets, and a lack of productivity. This tendency has been supported by international evidence, which shows that TB patients not only have to spend direct money to treat the disease but also incur indirect costs such as transportation, loss of employment, and income (Barter et al., 2012; Tanimura et al., 2014). The loss of a worker's earning capacity has devastating effects in a country where many workers depend

on daily earnings, such as in Pakistan (Khan et al., 2019). The current research also showed that some patients remain unemployed despite the healing process, indicating long-term economic exclusion. This is consistent with the research in India and sub-Saharan Africa, where the TB survivors still have lower employability and lower wages than their non-infected counterparts (Wingfield *et. al.*, 2016; Rajeswari *et. al.*, 1999).

These findings, however, confirm the combined theoretical approach used in this research. The SDH framework identifies the TB vulnerability determinants of poverty, gender, and education, whereas the TB poverty-exclusion model describes how the disease reinforces deprivation cycles. TB is not just a health problem in District Swabi, as is the case in most developing areas, but also a socioeconomic trap. The negative correlations between perception, stigma, and socioeconomic outcomes reported in this paper provide empirical evidence of the reinforcing cycle described by Lonroth et al. (2009). This has direct implications for policy interventions that must address not only biomedical treatment but also socioeconomic support, stigma reduction, and gender-sensitive programming.

### Conclusion

Tuberculosis (TB) is a chronic infectious disease caused primarily by the bacterium *Mycobacterium tuberculosis*. TB has adverse effects both on the TB patients and on the patients' families. The current study was carried out to examine patients' perceptions of the socioeconomic effects of TB. The study concluded that TB patients are socially isolated as people avoid interaction with the patient; family members avoid meal together with the TB patients. Moreover, the patients are stigmatized by family members and community, people never marry their daughter or sons to TB patient. Further, the study findings illustrate that due to long term treatment of TB adds financial burden on the family. The TB patients borrow money for treatment. It was also concluded from the study findings that the patient sold the productive assets for his/her treatment, and due to TB disease the productivity of the TB patients decreased due to the reduce capacity of work. Additionally, the study findings illustrate that the adverse socioeconomic effects of TB on female patients are higher than male gender. The study provides evidence that Tuberculosis has a significant socioeconomic impact in relation to stigma, social isolation, and economic burden. Patients had reduced productivity, often sold off their personal property to pay for treatment, and relied on external support sources. Women experience more negative outcomes than men. In order to account for the gender implications and provide effective support mechanisms, more consideration needs to be given to the collective implications of the disease in terms of the social hampers and income lost due to Tuberculosis.

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