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Physical health problems encountered in tobacco field weeding and topping operations

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Abstract

Tobacco cultivation exposed agricultural workers to numerous occupational health hazards due to continuous contact with tobacco plants, nicotine-rich leaves, dust, moisture, and agrochemicals. The present study was conducted to assess the physical health problems experienced by female tobacco field workers during weeding and topping activities. An exploratory research design was adopted for the study. A purposive sampling technique was used to select the respondents from Bhadradi Kothagudem in Telangana. Respondents were randomly selected from each village, thereby constituting a total sample of 100 respondents. Data were collected through a structured interview schedule and analyzed using frequencies, percentages, and mean scores. The findings revealed that topping was comparatively more hazardous than weeding, as indicated by higher mean scores across almost all categories of health problems. Skin-related problems emerged as the most severe, followed by respiratory and digestive disorders. Symptoms such as skin irritation, numbness, dryness of skin, wheezing, chest tightness, bitter taste, and increased salivation were highly prevalent among the respondents. General health problems, particularly gastric disorders and high blood pressure, were also commonly reported. The study concluded that prolonged occupational exposure and poor working conditions significantly affected the health status of tobacco field workers and highlighted the need for protective clothing, health awareness, and improved occupational safety measures.

Keywords: Flue cured Virginia (FCV) tobacco, physical health problems, weeding and topping

Introduction

Tobacco occupies a unique position in Indian agriculture scenario. Though the area under this crop is relatively small i.e., 0.45 million ha with annual production of 815 million kg of cured leaf, out of which 300 million kg is Flue cured Virginia (FCV) tobacco. Globally, several investigations were carried out to identify alternative crops for tobacco cultivation. However, existing studies indicated that farmers found it difficult to shift from tobacco to alternative crops because tobacco cultivation was perceived as economically profitable and comparatively secure in monetary terms (Teja, et.al., 2016) ^[1]. Despite its economic significance, tobacco cultivation exposed agricultural workers to numerous occupational health hazards. Tobacco farming posed serious health risks due to

continuous exposure to nicotine-rich leaves and nicotine-containing plant materials. Nicotine was considered a highly toxic substance that could be easily absorbed through human skin upon contact. The risk became more severe during the early morning hours when moisture in the atmosphere formed dew on tobacco leaves. Since nicotine was water-soluble, it dissolved in the dew present on the leaves, thereby increasing dermal absorption among workers engaged in harvesting operations. The absorbed nicotine spread throughout the body and affected the nervous system, including the brain. Activities such as topping, harvesting, and cutting mature tobacco plants further intensified workers' exposure to nicotine. Workers handling wet tobacco leaves were particularly susceptible to a condition known as Green Tobacco Sickness (GTS), which was

recognized as an acute form of nicotine poisoning caused by dermal absorption of nicotine from wet tobacco leaves (Ali, et.al., 2022) ^[2]. The present study focused on exploring physical health problems experienced by female tobacco field workers while performing weeding and topping activities.



Weeding Activity



Topping Activity

Materials and Methods

Bhadradi Kothagudem from Telangana was purposively selected as tobacco cultivation was being carried out in the district at present. Within the district, Aswaraopeta Mandal and Dammipeta Mandal were purposively selected for the study. From each mandal, fifty sample was selected. Thereby constituting a total sample of 100 respondents for the study. Same 100 female respondents were involved in both weeding and topping activities.

An interview schedule was developed to collect information related to the availability, accessibility, and control over resources and assets among the respondents. To assess the health problems faced by tobacco field workers, a Likert scale was employed. The scale measured the frequency of health problems through response categories such as “Always,” “Frequently,” “Sometimes,” and “Never,” which were assigned numerical values of 4, 3, 2, and 1, respectively. In addition, the occurrence of health problems was assessed using dichotomous responses of “Yes” and “No,” which were assigned scores of 2 and 1, respectively. The collected data were systematically analyzed using

appropriate statistical tools such as frequencies, percentages, and mean scores to interpret the responses of the respondents.

Results and Discussion

The data presented in Table 1 reveal significant variations in the prevalence and severity of physical health problems experienced by female respondents during tobacco field weeding and topping activities.

Skin problems emerged as the most dominant category, ranking first in both weeding (Mean = 2.22) and topping (Mean = 3.24). In weeding, dryness of skin, numbness, and skin discoloration were the most common issues. In topping, symptoms such as numbness, tingling sensation, skin irritation, and dryness were reported with higher severity. This clearly indicates that dermal exposure to tobacco leaves plays a major role in causing skin-related health problems, particularly during topping where handling of leaves is intensive and prolonged (Sujoso *et al.*, 2020) ^[3].

The p-value is far less than 0.01, showing a highly significant difference between weeding and topping operations with respect to skin problems. Topping workers experienced significantly greater skin-related disorders such as skin rash, irritation, numbness, dryness, and discoloration. This indicates that topping work has a strong association with skin related health problems.

Respiratory health problems ranked second in both weeding (Mean = 2.52) and topping (Mean = 3.26). During weeding, symptoms such as wheezing and chest tightness showed relatively higher mean values, indicating moderate respiratory strain. However, in topping, symptoms like chest tightness, sneezing, wheezing, and cough exhibited higher mean scores, reflecting increased exposure to tobacco dust, leaf particles, and possibly agrochemical residues. The higher prevalence during topping indicates that workers are more exposed to airborne irritants due to closer and prolonged handling of tobacco leaves (Moyo *et al.*, 2023) ^[4]. The p-value is greater than 0.05, there is no statistically significant difference between weeding and topping workers regarding respiratory health problems. Although topping workers reported slightly higher respiratory symptoms, the variation is not significant statistically.

Digestive health problems ranked third in both weeding (Mean = 2.13) and topping (Mean = 2.87). Bitter taste and increased salivation recorded the highest mean scores among digestive issues, followed by stomach ache and indigestion. Lower mean scores were observed for diarrhea, bloating, anorexia, and vomiting. The higher prevalence of bitter taste and salivation suggests possible ingestion or inhalation of nicotine residues during work, which appears to be more pronounced in topping (Fotedar and Fotedar, 2017) ^[5].

The p-value is less than 0.01, indicating a highly significant difference between weeding and topping workers in digestive health problems. Topping workers reported higher levels of stomach ache, indigestion, bitter taste, vomiting, and other digestive disorders, suggesting greater exposure to harmful tobacco-related substances during topping operations.

Central nervous system problems ranked fourth in weeding (Mean = 2.86) and fifth in topping (Mean = 3.40). Among these, tiredness and headache were the most prominent

symptoms in both activities, with noticeably higher mean scores in topping. Dizziness and nervousness were also reported to a considerable extent. This suggests that physical exertion, repetitive movements, and environmental stressors such as heat contribute to neurological fatigue, which is more pronounced during topping operations (Paul *et al.*, 2019) [6].

The p-value is greater than 0.05, indicating no significant association between the type of work operation and central nervous system problems. Both groups experienced similar levels of headache, dizziness, tiredness, and nervousness.

Eye-related problems were ranked fifth in weeding (Mean = 2.16) and fourth in topping (Mean = 3.28). In weeding, blurred vision and itchy eyes were moderately reported, whereas in topping, higher mean scores were observed for itchy eyes, blurred vision, and runny eyes. This indicates that direct contact with tobacco leaves and exposure to fine dust and irritants during topping increase the risk of ocular discomfort (Kumar *et al.*, 2023) [7].

As the p-value exceeds 0.05, there is no statistically significant difference between weeding and topping workers in relation to eye problems. Eye irritation and related symptoms were observed in both operations at comparable levels.

General health problems ranked fifth in weeding (Mean = 2.01) and sixth in topping (Mean = 2.70). Dehydration due to heat was the most significant issue in both activities, with a notably higher mean score in topping. Fever was moderately reported, while hearing loss was negligible in both activities. These findings highlight the influence of environmental conditions, especially heat stress, on the general health of workers (Cazé *et al.*, 2018) [8]. The findings clearly indicated that problems faced during topping activity ranked high compared to weeding activity.

The p-value is greater than 0.05, there is no statistically significant difference between weeding and topping workers regarding general health problems such as fever, dehydration, and hearing loss.

Table 1: Physical health problems faced by the respondents in tobacco field weeding and topping activities

Physical health problems	Weeding							Topping							Chi Square test Value	P Value		
	Female (N=100)							Female (N=100)										
	4 (A)	3 (F)	2 (S)	1 (N)	Total score	Mean	Rank	4 (A)	3 (F)	2 (S)	1 (N)	Total score	Mean	Rank				
Respiratory Health Problems																		
Shortness of breathing while working in TF (Tobacco Field)	5	32	60	3	237	2.37	2	30	70	-	-	330	3.3	2	9.2217	0.2371		
Running of Nose	5	39	55	1	248	2.48		33	67	-	-	333	3.33					
Wheezing	-	98	2	-	298	2.98		34	66	-	-	334	3.34					
Chest Tightness	-	97	3	-	297	2.97		35	65	-	-	335	3.35					
Cough	6	38	56	-	250	2.50		34	66	-	-	334	3.34					
Dryness of Throat	6	40	54	-	252	2.52		34	64	2	-	332	3.32					
Asthma	1	18	55	26	194	1.94		17	46	37	-	280	2.80					
Sneezing	4	39	54	3	244	2.44		35	65	-	-	335	3.35					
Total					2020	2.52		2					2613				3.26	2
Central Nervous System Problems																		
Headache	28	63	9	-	319	3.19	4	71	29	-	-	371	3.71	5	2.7362	0.6029		
Dizziness	26	47	26	1	298	2.98		62	36	2	-	360	3.60					
Nervousness	24	40	33	3	285	2.85		32	56	12	-	320	3.20					
Fainting	3	23	45	29	200	2.00		12	47	41	-	271	2.71					
Tiredness	35	59	6	-	329	3.29		80	20	-	-	380	3.80					
Total					1431	2.86	4					1702	3.40	5				
Eye Problems																		
Runny eyes/tearing	1	21	70	8	215	2.15	5	36	61	3	-	333	3.33	4	6.2528	0.2824		
Blurred vision	3	58	37	2	262	2.62		38	60	2	-	336	3.36					
Itchy eyes	2	25	65	8	221	2.21		38	61	1	-	337	3.37					
Redness in eyes	-	17	70	13	204	2.04		37	58	5	-	332	3.32					
Secretions in eyes	-	13	72	15	198	1.98		37	60	3	-	334	3.34					
Pain in eyes	-	13	71	16	197	1.97		29	43	28	-	301	3.01					
Total					1297	2.16	5					1973	3.28	4				
Skin Problems																		
Skin rash	-	6	77	17	189	1.89	1	29	70	1	-	328	3.28	1	42.934**	0.00000222		
Skin burning	-	12	71	17	195	1.95		36	62	2	-	334	3.34					
Tingling	1	57	30	12	247	2.47		49	50	1	-	348	3.48					
Skin Irritation	-	7	75	18	189	1.89		48	50	2	-	346	3.46					
Skin infection	-	2	73	25	177	1.77		38	46	16	-	322	3.22					
Skin Injuries	-	3	60	37	166	1.66		11	39	49	1	260	2.60					
Numbness	3	65	31	1	270	2.70		53	43	4	-	349	3.49					
Skin Discoloration	3	65	31	1	270	2.70		56	44	-	-	356	3.56					
Dryness of skin	4	66	27	3	271	2.71		50	46	4	-	346	3.46					
Redness in hands and legs	2	58	33	7	255	2.55		13	33	54	-	259	2.59					
Total					2229	2.22		1					3248				3.24	1

General health problems																
Fever	-	39	61	-	239	2.39		30	69	1	-	329	3.29		4.523	0.1041
Dehydration of body due to heat	1	64	35	-	266	2.66		81	18	1	-	380	3.80			
Hearing loss due to machinery sound	-	-	-	100	100	1.00		-	-	-	100	102	1.02			
Total					605	2.01	5					811	2.70	6		
Digestive health problems																
Stomach-ache	-	18	82	-	218	2.18		35	61	4	-	331	3.31		20.55**	0.00
Indigestion	-	27	62	11	216	2.16		40	50	10	-	330	3.30			
Increased salivation	7	75	18	-	289	2.89		56	41	2	-	351	3.51			
Bitter taste	47	48	5	-	342	3.42		65	35	-	-	365	3.65			
Diarrhea (loose motions)	-	3	64	33	170	1.70		7	26	64	3	237	2.37			
Bloating(Swelling in Abdomen)	-	2	49	49	153	1.53		6	24	67	3	233	2.33			
Anorexia (Eating disorder)	-	1	41	58	143	1.43		6	24	67	3	233	2.33			
Vomiting	-	9	55	36	173	1.73		6	10	78	6	216	2.16			
Total					1704	2.13	3					2296	2.87	3		

4-Always, 3-Frequently, 2- Sometimes and 1-Never

The table 2 presents the distribution of respondents according to general, cardiovascular, and gynecological health problems experienced during tobacco field weeding and topping activities. The interpretation indicates that the pattern of health problems remains almost identical across both activities, suggesting that these conditions may not be activity-specific but rather related to overall health status and long-term occupational exposure.

General health problems ranked first in both weeding and topping, with a mean score of 1.20. Among these, gastric problems recorded the highest prevalence (Mean = 1.52), indicating that more than half of the respondents experienced gastric-related issues. In contrast, diabetes (Mean = 1.06) and thyroid disorders (Mean = 1.02) were reported by only a small proportion of respondents. The higher occurrence of gastric problems may be associated with irregular food habits, exposure to nicotine residues, and

occupational stress conditions

Cardiovascular health problems ranked second, with a mean score of 1.07 in both activities. High blood pressure (Mean = 1.15) was reported by a moderate proportion of respondents, whereas heart stroke had the lowest possible mean score (1.00), indicating no reported cases among the sample. This suggests that while hypertension may be emerging among workers, severe cardiovascular events are rare within the study group (Shahzad *et al.*, 2021)^[9].

Gynaecological problems ranked third, with a mean score of 1.02 in both weeding and topping. Termination of pregnancy was reported by only a very small number of respondents (Mean = 1.02), indicating minimal prevalence (Ravi *et al.*, 2024)^[10]. This low reporting may reflect either genuinely low incidence or possible underreporting due to social and cultural sensitivities.

Table 2: Distribution of the respondents according to the general, cardio Vascular and gynec health problems faced in tobacco field weeding and topping activities

Physical health problems	Weeding					Topping					Chi Square Value	P Value
	Female (N=100)					Female (N=100)						
General health problems	2 (Y)	1 (N)	Total score	Mean	Rank	2 (Y)	1 (N)	Total score	Mean	Rank	0	1
Diabetes	6	94	106	1.06		6	94	106	1.06			
Thyroid	2	98	102	1.02		2	98	102	1.02			
Gastric	52	48	152	1.52		52	48	152	1.52			
Total			360	1.20	1			360	1.20	1		
Cardio Vascular health problems												
High blood pressure	15	85	115	1.15		15	85	115	1.15		0	1
Heart Stroke	-	100	100	1.00		-	100	100	1.00			
Total			215	1.07	2			215	1.07	2		
Gynic problems												
Termination of Pregnancy	2	98	102	1.02		2	98	102	1.02		0	1
Total			102	1.02	3			102	1.02	3		

General health problems (diabetes, thyroid, gastric problems), cardiovascular health problems (high blood pressure and heart stroke) and gynecological problems (termination of pregnancy) the calculated Chi-square value was 0 with a P value = 1. This indicates that there is no significant difference between women engaged in weeding and topping activities regarding these health problems.

Conclusion

The study concluded that tobacco field workers were exposed to a wide range of occupational health hazards

during different tobacco cultivation activities. Among the various operations, topping was identified as a comparatively more hazardous activity than weeding due to greater direct contact with tobacco plants and prolonged exposure to environmental conditions. Skin-related health problems were found to be the most severe among the respondents, followed by respiratory and digestive disorders, indicating the adverse effects of continuous exposure to tobacco leaves, nicotine absorption, dust, moisture, and agrochemicals.

The findings further revealed that general health problems,

particularly gastric disorders and cardiovascular conditions such as high blood pressure, were commonly experienced by the workers. The similarity in the prevalence of these problems across different field activities suggested that chronic occupational exposure, poor working conditions, and lifestyle-related factors collectively contributed to the deteriorating health status of tobacco field workers rather than any single agricultural operation alone. The Chi-square findings showed a highly significant difference between weeding and topping operations. This indicates that female workers involved in topping are more severely affected by skin-related and digestive health disorders compared to those engaged in weeding activities.

The Chi-square analysis reveals that there is no statistically significant difference between women involved in weeding and topping activities with respect to general health problems, cardiovascular health problems, and gynecological problems, since all P values are greater than 0.05. Therefore, the type of tobacco field activity performed by women did not significantly influence the occurrence of these physical health problems.

Overall, the study highlighted the need for greater occupational health awareness, regular health monitoring, and the adoption of appropriate protective measures among tobacco field workers. The provision of suitable protective clothing, health education programs, and improved workplace safety practices may help in reducing the occupational health risks associated with tobacco cultivation activities.

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