Original Research Article

SOCIO-DEMOGRAPHIC STUDIES OF CANCER PATIENTS IN TERMS OF MEDICINAL PLANTS AS NEW RISK FACTOR AT CANCER HOSPITAL NIMRA, JAMSHORO

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Abstract: *Cancer is the third leading cause of mortality in Pakistan. Despite increased awareness about significant cancer risk factors and efforts to avoid them, cancer incidence continues to rise. This suggests that there may be other hidden physical and chemical agents responsible for cancer. Various plants used as long-term alternative medicine have recently been identified as genotoxic, capable of damaging DNA.* ***Objective:*** *This study aimed to identify medicinal plants with genotoxic potential and their association with cancer risk factors through a socio-demographic survey.* ***Methods:*** *This interview-based survey was conducted at the Nuclear Institute of Medicine & Radiotherapy (NIMRA) Cancer Hospital. The study included 109 cancer patients and was conducted over six months. Participants were categorized into four risk factor groups: other risk factors (ORF), other risk factors with medicinal plant (MP) intake (ORF+MPs), medicinal plants only (MPs), and only milk tea drinkers. Data were analyzed using descriptive statistics to determine the association between medicinal plant use and cancer incidence.* ***Results:*** *The survey revealed four risk factor categories: ORF, ORF+MPs, MPs, and tea. The highest number of cancer patients (49) were in the tea category, while the lowest (11) were in the MPs-only category. Among male cancer patients, 53% were ORF+MPs users, whereas 55% of female cancer patients were in the tea category. Most male and female MP users were older, less educated, unemployed or low-income, unmarried, and urban residents. Only 11 patients (8 female, three male) used 18 types of MPs for various health issues before their cancer diagnosis, with stomach gas being the most common problem. The duration of MP use ranged from 14 years to one month, and the interval between MP use and cancer diagnosis ranged from 10 to 1 year. Among female MP users, breast cancer was the most common, while each male MP user had different types of cancer (brain tumor, stomach cancer, and cheek cancer). The most frequently used MPs were beetroot (BR), pepper fruit (PF), and senna leaves (SL).* ***Conclusion:*** *Long-term intake of medicinal plants is more common in females and may constitute a new risk factor for cancer, particularly in individuals who do not interact with known risk factors. Genotoxicity tests on the identified medicinal plants are recommended.*

Keywords: Alternative Medicine, Cancer, Genotoxicity, Medicinal Plants, Risk Factors, Socio-Demography

Introduction

Cancer is the second biggest killer after heart disease globally (1), and in Pakistan, it is the third leading non-communicable cause of mortality (2). Formally, cancer was correlated with the aging process; nowadays, there is no age limit for cancer development. However, it is rare in children as compared to adults. At the age of 1-14, it is the second leading cause of death (3).

Cancer is caused by different reasons that are scientifically known as risk factors. These factors may act together or in sequence to cause cancer. Ten or more years often pass between exposure to risk factors and detectable cancer (4). Major reported cancer risk factors include Tobacco smoking and chewable tobacco like qivam, pati, gutka, and manpuri, alcohol consumption, betel quid containing areca nuts with fungus Aspergillums, HPV infection helicobacter pylori, Hepatitis B and C, and mutation of tumor suppressor genes (5, 6). Other risk factors like sun/ UV, pollutants, hefty metals, altered hormones, and immune conditions are also causes of cancer (7). High exposure to high-power electromagnetic radiation from sunlight and flashlights can

cause skin and blood cancer, respectively. Due to UV radiation, carcinogenic effects occur in humans; according to IARC, UV radiation induces all skin cancers, including cutaneous melanoma, basal cell carcinoma (BCC), and squamous cell carcinoma (SCC). Even overweight and disrupted sleep patterns at night are some of the risks of breast cancer. Our lifestyle and diet significantly threaten Cancer (8). Although after awareness of significant cancer risk factors, people avoid them, but still the cancer incidence increases. So, other hidden physical and chemical agents must be responsible for CA. Among such, long-term use of MPs is a possible new cancer risk. According to a World Health Organization (WHO) survey, up to 80% of the world's population depends on medicinal plant (9). Abot 36.8% of the UK and 12% of the American and Australian population rely on herbal remedies. Currently, long-term medicinal use of plants is also prominent in Korea, China, Singapore, West Asia, and many other countries (10, 11). Therefore, the present survey is an approach to get a list of medicinal plants with genotoxic potential regarding socio-demography.

Methodology

This study employed a cross-sectional, interview-based survey design to investigate the use of medicinal plants and their potential genotoxic effects among cancer patients. Conducted at the Nuclear Institute of Medicine & Radiotherapy (NIMRA) Cancer Hospital in Pakistan, the survey targeted a sample of 109 cancer patients receiving treatment at the facility.

Participants were selected based on their willingness to participate and their ability to provide informed consent. Patients unable to provide informed consent due to medical or cognitive reasons were excluded. Structured interviews were conducted using a pre-designed questionnaire that collected socio-demographic information, medical history, details of medicinal plant use, and other known cancer risk factors. Socio-demographic data included age, gender, education level, working status, marital status, and residency. The medical history section gathered information on the type of cancer, duration since diagnosis, and treatment history. The questionnaire also captured information on the types, duration, frequency, and perceived benefits of medicinal plant use, as well as other known cancer risk factors like tobacco use, alcohol consumption, and family history of cancer.

Ddata analysis was performed using SPSS software (version 25). Descriptive statistics were employed to summarize the patients' socio-demographic characteristics, medicinal plant use, and cancer risk factors. Patients were categorized into four groups based on their risk factors: other risk factors (ORF), other risk factors with medicinal plant (MP) intake (ORF+MPs), medicinal plants only (MPs), and tea consumption only. Frequencies, percentages, and cross-tabulations were used to describe the data.

TThe institutional review board of NIMRA Cancer Hospital approved the study. Before the interviews were nuts, this methodology ensured a comprehensive and ethical approach to understanding the potential genotoxic effects of medicinal plants on cancer patients, providing valuable insights for further research and public health interventions.

Results

Respondent CA patients were divided into four risk factors (Table 1). The first category was only other risk factors (ORF) (already known risk factors). The second group included another risk factor with medicinal plant usage (ORF + MPs), the third group only included medicinal plant users (MPs), and last but not least, it included only milk tea drinkers. The maximum number of CA patients was (49) in the tea category, while the minimum in MPs (was 11). The highest number of male CA patients (53%) were in ORF+MPs users, whereas the highest percentages of female CA patients (55%) were in the tea category.

The results of socio-demographic studies of male and female CA respondents are compiled in Table (2). Maximum CA patients were observed in the 41 to 60 age group (61). The highest percentage of male (77%) and female (50%) CA patients were observed in the 41-60 age groups. The majority of CA patients were uneducated (88). Most male (77%) and female (88%) CA patients belong to the un-educated category. Maximum CA patient belongs to an unemployed group (75). Based on income, the highest percentage of males (92%) were observed in the low-income category, whereas females (90.36%) were unemployed. Many CA patients belong to the married group (102). The highest percentage of males (88%) and females (95%) were observed in the married group. Many CA patients share the urban residency group (65). The highest percentage of males (54%) was scored in the rural group and females (63%) in the urban group.

The socio-demographics study of medicinal plant (MPs) user CA patients is compiled in (Table 3). The highest number of MP users (7) were in the 41-60 age group. The highest percentages of male MP users (67%) were in the 20-40 age range, whereas females (62%) were in the in41-60 age group. The most significant number of the MP users (8) had not received education. The majority of males (100%) and females (62%) were un-educated. Laymen prescribed the highest number of MP users (10). Laymen also prescribed maximum males (67%) and females (100%). Most MP users (10) were observed in the low-income group. All males (100%) and most females (88%) are low-income. A high proportion of MP users (10) were married. All males (100%) and most females (87%) were married. A maximum number of MP user CA patients (7) was urban. The highest percentage of males (67%) were inhabitants of rural areas, whereas females (75%) were urban residents.

Table 1 Risk factor categorization of Cancer parents

S. No.	Risk factor categories	Male	Female	Total
1	ORF	6	23	29
2	ORF+ MPs	14	6	20
3	MPs	3	8	11
4	Only tea	3	46	49
Total		**26**	**83**	**109**
(Another risk factor (ORF) is another risk factor with medicinal plants (ORF+MPs), but only medicinal plants (MPs).				

Table 2 Socio-demographics characteristics of overall Cancer parents (Frequency)

Characteristics	Age groups	Male (n=26)	Female(n=83)	Total
Age	20<	0	0	0
	20 to 40	6	36	42
	41 to 60	20	41	61
	61 to 80	0	4	4

		26	83	109
Education	U.E	20	68	88
	P.E.	4	6	10
	S.E.	0	5	5
	H.E.	2	4	6
	Total	26	83	109
Working status	Un-employed	0	75	75
	Low income	24	4	28
	Moderate	1	2	3
	High income	1	2	3
	Total	26	83	109
Marital Status	Married	23	79	102
	Un-Married	3	4	7
Residency	Urban	12	53	65
	Rural	14	30	44
	Total	26	83	109

(UE=Un-Educated; P.E=Primary education; S.E=Secondary Education; H.E=Higher Education; (N.U=Not Used; L.M=Lay Men).

Table 3 Socio-demographics characteristics of MPs user

Characteristics	Age Groups	Male (n=3)	Female (n=8)	Total
Age	20<	0	0	0
	20 to 40	1	3	4
	41 to 60	2	5	7
	61 to 80	0	0	0
	Total	3	8	11
Education	U.E.	3	5	8
	P.E.	0	2	2
	S.E.	0	0	0
	H.E.	0	1	1
	Total	3	8	11
Prescription	Self	1	0	1
	L.M.	2	8	10
	Hakeem	0	0	0
	Total	3	8	11
Working Status	Un-employed	3	7	10
	Low income	3	7	10
	Moderate	0	0	0
	High income	0	1	1
	Total	3	8	11
Marital Status	Married	3	7	10
	Un-Married	0	1	1
Residency	Urban	1	6	7
	Rural	2	2	4
	Total	3	8	11

(UE=Un-Educated; P.E=Primary education; S.E=Secondary Education; H.E=Higher Education;(N.U=Not Used; L.M=Lay Men).

Table 4 Profile of health problem, duration, and time interval between CA diagnosis and usage of MPs in 11 respondents

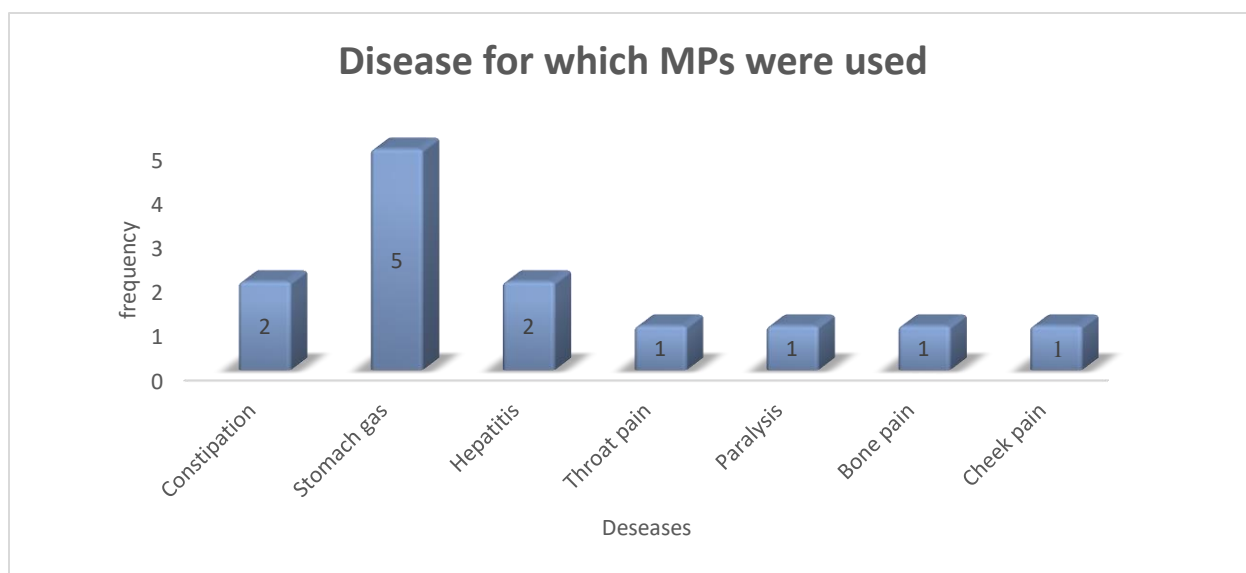| Sex	Case No.	Disease for M.P. used	Mix component	Duration of M.P. use (years)	The interval between M.P. use and CA diagnosis (years)	Type of cancer
Female	**1**	Constipation	Sana leaves, Mint leaves, cumin seed, fennel seed, Black pepper, cardamom seed, pomegranate seed	14	7	Fibroid in uterus
	2	Stomach gas	Fennel seed, Cumin seed, celery leaves, thyme seed, Senna leave	10	9	Breast cancer

	3	Stomach gas	Senna leaves, rose leaves, and Fig fruit	10	10	Bladder cancer
	4	Hepatitis	Betel root powder	6	3	Bladder CA Ovarian cancer Uterus CA
	5	Throat pain	Cinnamon seed, black cumin seed, golden shower fruit pulp, betel root powder	5	1	Cyst in pharynx
	6	Stomach problem,	Betel root	4	3	Bladder CA
		Falaj (Paralysis)	Piper fruit powder	2	2	
		Or bone pain.	Thyme seed powder and saffron-style syrup	3	1	
	7	Constipation	Fig	5	14	Breast CA
	8	Stomach problem	Fennel, Mint tablet	5	2	Breast CA
Male	**9**	Cyst and Hepatitis	Dodder stem	2	1	Brain Tumor
	10	Stomach pain	Piper fruit, golden shower fruit pulp, Senna leave	1	2	CA stomach
	11	Cheek pain	Betel root	1	1	CA cheek

Table (4) presents details of the reason, composition, and duration of medicinal plant preparations used and the type of CA patients.

Out of 83CA respondents, only eight were female, and out of 26, only three males took MPs for different health problems before cancer diagnosis. MPs were used to cure eight diseases by CA patients. Stomach gas (40%) was the most common health problem for both sexes (Figure 1). Overall, CA patients used 18 different MPs. CA patients most frequently used betel root and Senna leaves (22%). In contrast, cardamom seed, pomegranate seed, celery leaves, rose leaves, cinnamon bark, black cumin, saffron style, and dodder stem were the most utilized MPs parts by CA patients (Figure 2).

MP use was recorded in CA patients at varying time durations. The maximum duration was 14 years, and the minimum was one month. The interval between MP use and CA diagnosis is another significant part of Performa (Figure 3). The maximum interval between MP usage and CA diagnosis was ten years, and the minimum interval between MP use and CA diagnosis was one year (Figure 4). Among both sexes, eight types of cancer were recorded in the present survey. Among female MP users, breast cancer was the most common cancer recorded, whereas one case was observed for each type of cancer in males, i-e. Brain tumor, A stomach, and CA cheek (Figure 5).
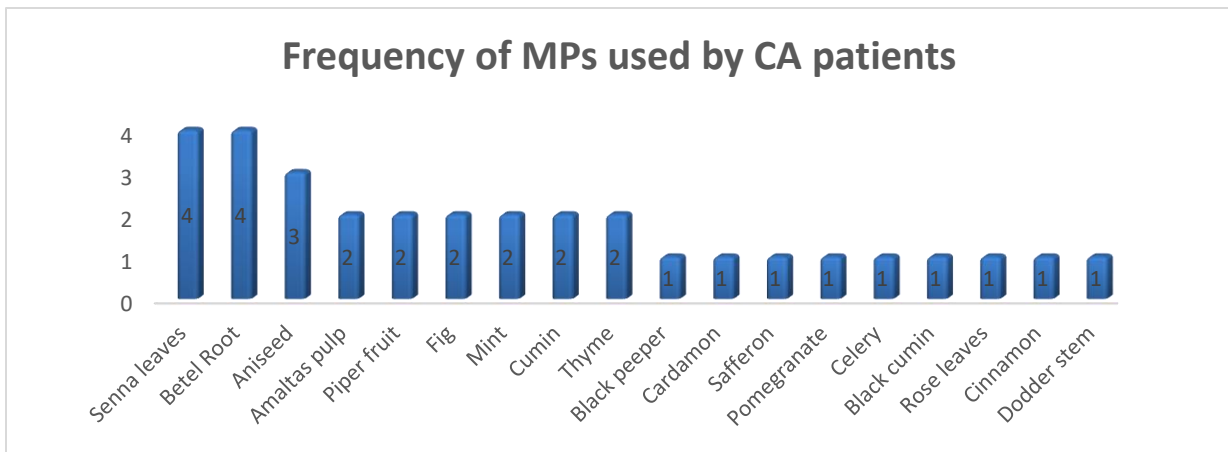
Figure 1 Disease for which MPs were used

Figure 2 Frequency of MPs used by CA patients
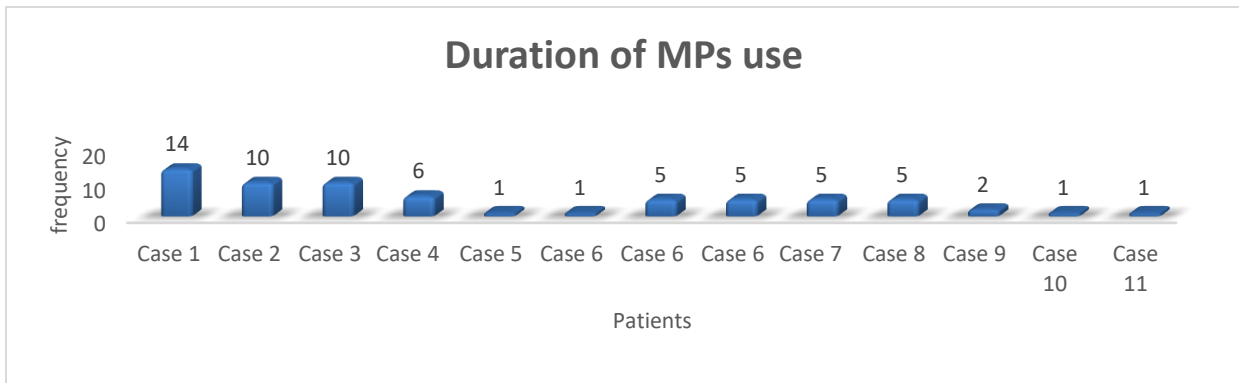

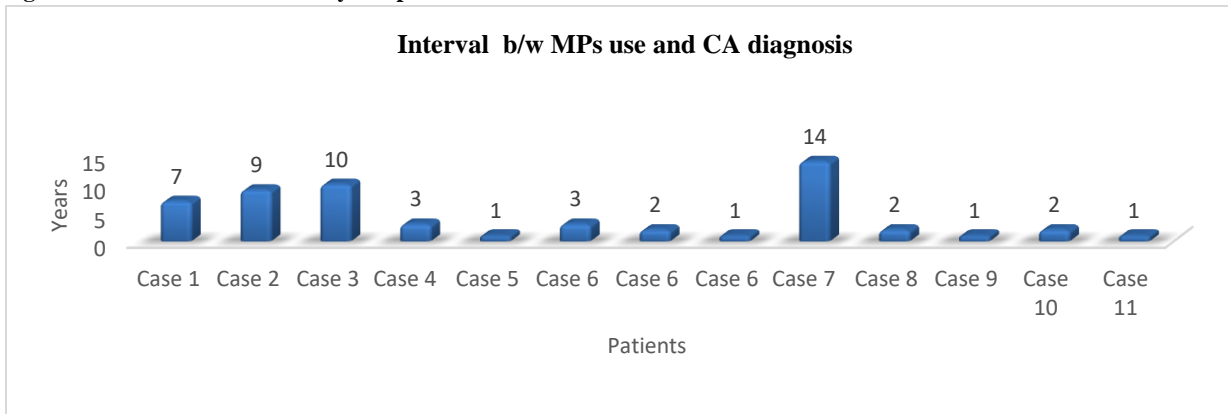**Figure 3 Duration of MPs used by CA patients**

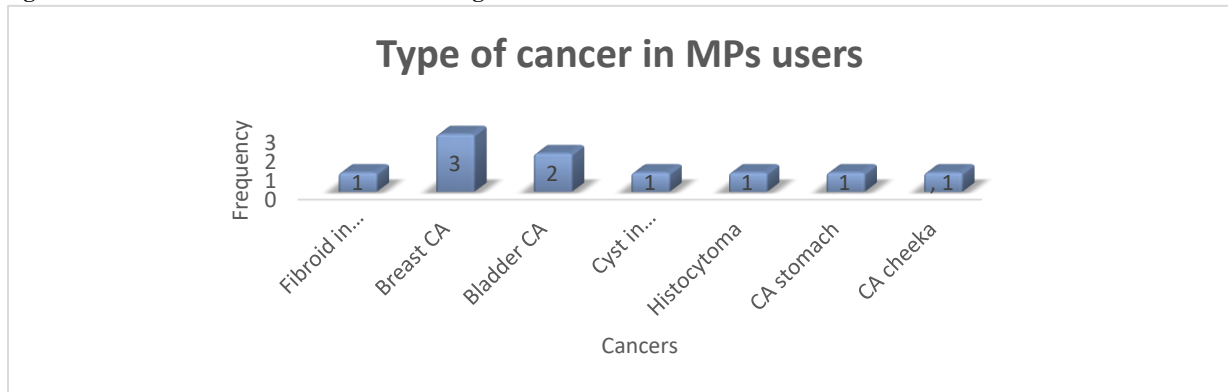**Figure 4 Interval between MP use and CA diagnosis**

Figure 5 Types of cancer in MP user

Discussion

Observed sociodemographic features, i-e, old age, low education, unemployment or low income, unmarried and resident of urban areas of registered CA patients, agreed with recent reports from Bangladesh, Switzerland, and Zimbabwe (12, 13). It could be inferred from the results that financial, cultural, and natural human needs create mental stress, leading to cellular defuncting. Many workers have supported stress as a significant factor contributing to many pathological conditions (14). In a 2008 meta-analysis of 142 prospective studies among people in Asia, Australasia, Europe, and America, stress was associated with a higher incidence of lung cancer (15, 16). A 2019 meta-analysis of nine observational studies in Europe and North America also found an association between work stress and lung, colorectal, and esophageal cancer risk (17).

The use percentage (12) of MPs by cancer patients in the present survey was within the range of MPs utilization in human beings reported in earlier research (18, 19). A previous survey also supported the socio-demographics studies on total CA respondents (109) and herbal medicine users CA patients (20). The number of CA patients, as well as the use of MPs, increases with increases in age as an influencing factor has been reported in several studies (21, 22). It is inferred from the results that proper education gives the knowledge of medicinal plants and gives the power to choose the use of MPs; therefore, a high intake of MPs decreases with increasing education (23, 24). Laymen prescribed the majority of male and female MP users. A high proportion of unemployed and low-income respondents observed in the survey reflects a dearth of money that promotes the MP's practice as it is comparatively cheaper than allopathic drugs (25-27). It is evident from the results that un-married males and females did not use the MPs; these findings were also reported in other studies (28, 29). While married, CA patients may have support from their spouse, especially their husbands or partners, which gives them the courage to use herbs; friends, neighbors, and family members also suggest these medicinal plants to those women (30-32). Especially in females, stomach gas problems after delivery are widespread that way. Most of the female respondents used these herbs for gas and constipation (www.livestrong.com). Common urbanization trends obtained in MPs, non-users, and users may be due to random chance during the survey. The second reason is that many rural migrations are used for study purposes (33). The frequency of MP usage among CA patients observed is supported by reports from Europe, Australia, and the United States (34). These findings tell us how deep-rooted herbal medicine is used in our culture and tradition (35).

Conclusion

It is concluded that long-term intake of medicinal plants is more common in females and can be a new risk factor as those patients do not interact with or consume any of the known factors. It is suggested that genotoxicity tests of enlisted plants be carried out.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department Concerned.
Consent for publication
Approved
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Not applicable

Conflict of interest

The authors declared absence of conflict of interest.

Author Contribution

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Conception of Study, Development of Research Methodology Design, Study Design,, Review of manuscript, final approval of manuscript.
Manuscript drafting.
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Study Design, Review of Literature.
SAJJAD AHMED MEMON (Principle Scientist)
Conception of Study, Final approval of manuscript.
SADIA (M. Phil Scholar)
Data entry and Data analysis, drafting article.

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