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RESEARCH ARTICLE

POINT PREVALENCE OF COLORECTAL CANCER IN A MEGA CITY OF PAKISTAN, KARACHI – A CROSS SECTIONAL STUDY

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Abstract

Background and Objective: Globally, Colorectal Cancers are also third most common cancers and fourth leading cause of death due to carcinoma. Burden of Colorectal Cancers is also high in Pakistan. The main risk factor for Colorectal Cancer is age, however, other risk factors are e.g. family history, irritable bowel disease, sedentary life-style, high visceral adipose tissues, smoking and alcohol. Hence; the main objective of current study was to determine point prevalence of Colorectal Cancers in a mega city of Pakistan, Karachi; a representative population of Pakistan. It is hypothesized that incidences of Colorectal Cancers would be higher in Karachi than rest of the country.
Materials and Methods: The retrospective cross-sectional study was conducted in Karachi. Duration of study was from January-2015 to October-2019. Data has been collected from two state-owned and four private hospitals of Karachi. Precision analysis technique was used to determine the sample size of study. Study is approved by Board of Advanced Studies & Research, University of Karachi (Reference Number: BASR/01046/Pharm.). Objective of study was explained to patients before initiation the study; informed consent was taken from each patient. S.P.S.S (Statistical-Package-for-Social-Sciences) software version 22 was used to analyze the data.
Results: Among 1,617 patients: male 54.35% (N=879); female 45.64% (N=738). Mean age of diagnosis of colorectal cancer: male 49.51±14.72 years; female 45.28±13.52 years. Significantly higher point prevalence was found in ethnicity speaking Sindhi compared with ethnicity speaking Balochi (p=0.001), Pashto (p=0.0001), Punjabi (p=0.001) and Siraiki (p=0.0001); Urdu speaking compared with Balochi speaking (p=0.0001), Pashto speaking (p=0.0001), Punjabi speaking (p=0.0001) and Siraiki speaking (p=0.0001) in male. In female; Sindhi speaking point prevalence is significantly higher than Siraiki speaking (p=0.028); Urdu speaking point prevalence is significantly higher than patients speaking Balochi (p=0.012), Pashto (p=0.002), Punjabi (p=0.002) and Siraiki (p=0.0001).
Conclusion: Allocation of resources is required at governmental and non-governmental level for early screening. National cancer registry program should also be initiated to support health policy makers for the development of counter strategies.

Keywords: Cancer, colorectal, ethnicities, genders, point-prevalence.

INTRODUCTION

Gastrointestinal Tract (GIT) carcinomas are third leading cancers in a mega city of Pakistan, Karachi[1]. Alarming situation is that, mean age of diagnosis of any type of cancer in Karachi has shifted from 51.20 years to 45.75 in male; 50 years to 44.07 in female[1]. Globally, Colorectal Cancers (CRC) is also third most common cancers and fourth leading cause of death due to carcinoma[2]. Similarly, burden of CRC is also high in Pakistan; according to a meta-analysis conducted in Northern part of Pakistan; prevalence of colorectal cancer in Pakistan is 4-6%[3]. Although CRC affects both genders; however, its incidences are more observed in male[4]. Despite such high prevalence; majority of population is unaware about screening of

CRC; population have perception that screening procedures are very expensive and facilities are scarce[5]. Sigmoidoscopy is the preferred technique for the screening purpose in Pakistan[6].

The main risk factor for CRC is age, however, other risk factors e.g. family history, irritable bowel disease (IBD), sedentary life-style, high visceral adipose tissues, smoking and alcohol consumption cannot be overlooked[7]. Recent evidence suggests that heme-iron in the processed red meat also cause CRC; the proposed mechanism behind such outcome is the production of cytotoxic heme factor, which promotes apoptosis in epithelial cells of colon and compensatory epithelial cells growth[8]. Heme also causes lipid per-oxidation; hence produce free-radicals, formation of N-nitroso compounds and ultimately initiation of CRC[8]. Although increase amount of body fat contributes as a risk for CRC; nevertheless, waist circumference is strongly associated risk factor for CRC than Body Mass Index (BMI)[9]. Crohn's disease; a type of IBD causes chronic inflammation in the large intestine; hence create microenvironment suitable for the hyperplasia of colonic epithelial cells, which leads to CRC[10].

In a clinic-pathological analysis of 348 cases of CRC; increase in tumor infiltrating neutrophils (TIN) are associated with significantly higher grade (p=0.0222) of CRC and advanced TNM (Tumor size; lymph node involvement; metastasis) stage (p=0.0346)[11]. Karachi is a mega city of Pakistan and thickly populated[12]. It is also called mini-Pakistan[13] because all ethnic groups of country live here; therefore, population of Karachi is a true representative of country population. Hence; the main objective of current study was to determine point prevalence[14] of CRC in a mega city of Pakistan, Karachi; a representative population of Pakistan. It is hypothesized that incidences of CRC would be higher in Karachi than rest of the country.

MATERIALS AND METHODS

Study Design, Place and Duration: The study design was retrospective cross-sectional; place of study was city of Karachi. Study began on January 2015 and ended on October 2019.

Sample Size of Study: Precision analysis technique was used to determine the sample size of study[15]. Although minimum sample size for sufficient power (80%) of study was 299 patients; however, study includes 1617 patients from different centers.

Ethical Approval: Study is approved by Board of Advanced Studies & Research, University of Karachi (Reference Number: BASR/01046/Pharm.). Objective of study was explained to patients before initiation the study; informed consent was taken from each patient. As per Declaration of Helsinki; it was ensured to maintain the confidentiality of patients' data[16].

Data Collection Method: Data were collected from two state-owned and four private hospitals of Karachi.

Inclusion criteria: Confirmed diagnosis of CRC by objective findings (Histologically and Cytologically), proven malignancy, age>12 years and no co-morbidities.

Exclusion criteria: Patient is preliminary diagnosed for cancer, objective findings not done, diagnosis is not confirmed, cancer with co-morbidities and children ≤12 years.

Assessment of Data: S.P.S.S (Statistical-Package-for-Social-Sciences) software version 22 was used to analyze the data. Descriptive and inferential (One-Way ANOVA: post-hoc analysis by Scheffe test) statistics were applied.

RESULTS

Among total cases; Male are 879 (54.35%) and Female are 738 (45.64%) (Figure 1) Number of cases, point prevalence and descriptive statistics of CRC in male gender. (Table 1) Number of cases, point prevalence and descriptive statistics of CRC in female gender. (Table 2) In a multiple comparison of cases of CRC by one-way ANOVA and post-hoc analysis by Scheffe test reveals significant differences in male (p=0.0001) and female (p=0.0001) genders of ethnic groups. (Table 3, and Table 4).

Table 1: Number of cases, point prevalence[14] and descriptive statistics of CRC in male gender.

Provincial Origin of Patient	Ethnic Origin of Patient	No. of cases of CRC (%)	Point Prevalence of CRC (%)	Mean Age (Years)	Standard Deviation (±SD)	Standard Error of Mean (±SEM)	% Coefficient of Variation
Sindh	Sindhi Speaking	220 (14%)	8%	49.51	±14.72	±1.042	30%
	Urdu Speaking	225 (14.49%)	8%				
Balochistan	Balochi Speaking	119 (7%)	4%				
Punjab	Punjabi Speaking	116 (6.90%)	4%				
	Saraiki Speaking	88 (5%)	3%				
Khyber Pukhtunkhuwa	Pashto Speaking	111 (6.85%)	4%				
Total Cases		879					

DISCUSSION

Incidences of cancers are increasing globally; nevertheless, situation is worst in countries like India, Pakistan, Bangladesh and Sri Lanka[17,18]. It is also a bleak reality that incidences are rising of Colorectal cancer (CRC) in Karachi, Pakistan. There is no cancer registry program at national level; hence no availability of actual magnitude of CRC.

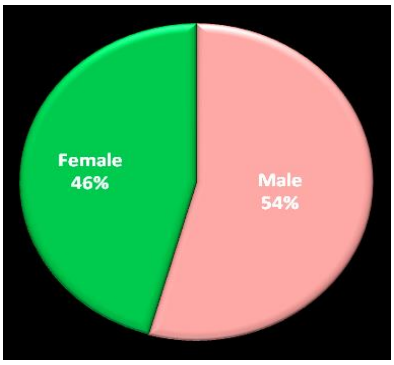

Figure 1: Gender-wise distribution of CRC .

Some institutions conducted studies based upon data available in their own medical facility and records. Current study collected the data of CRC from six biggest tertiary care hospitals of a mega city Karachi. Sample size of current study is the largest amongst all studies conducted locally[5,19,20]. The study reveals that CRC is mostly prevailing in male (54%); however, despite lower number of cases of female (46%), clinically no significant difference observed in both genders. Gender wise distribution of CRC of current study is almost similar to the findings of study conducted by Hassan *et al.*,[5] however, one study demonstrated that CRC incidences are higher in male gender[20].

The main objective of current study was to determine point-prevalence of CRC in Karachi. Based upon findings of current study; point prevalnce of CRC is highest in Sindhi (8%) and Urdu speaking (8%) male genders, followed by Balochi (4%), Punjabi (4%) and Pashto (4%) speaking; lowest prevalence found in Siraiki (3%) speaking male. Study conducted by Batool *et al.*,[20] mentioned that CRC is highly prevalent in Urdu speaking population of Karachi. According to findings of current study; mean age of diagnosis of CRC in male gender was 49.51±14.72 years, while in the study of Batool *et al.*,[20]; it was 44.43±14.02 years; this fact cannot be overlooked that study of Batool *et al.*,[20] is single centered, while current study is multi-centered.

Table 2: Number of cases, point prevalence[14] and descriptive statistics of CRC in female gender.

Provincial Origin of Patient	Ethnic Origin of Patient	No. of cases of CRC (%)	Point Prevalence of CRC (%)	Mean Age (Years)	Standard Deviation (SD)	Standard Error of Mean (SEM)	% Coefficient of Variation
Sindh	Sindhi Speaking	155 (10)	5	45.28	±13.52	±0.806	29%
	Urdu Speaking	184 (11)	6				
Balochistan	Balochi Speaking	111 (7)	3				
Punjab	Punjabi Speaking	100 (6)	3				
	Saraiki Speaking	88 (5)	3				
Khyber Pukhtunkhuwa	Pashto Speaking	100 (6)	3				
Total Cases		738					

Table 3: Multiple comparisons of number of cases by Scheffe test.

Ethnic groups comparison (Male)		*p*-value*	Interpretation/Significance
Sindhi Speaking	Urdu Speaking	0.999	Non significant differences in the cases of both ethnicity
	Balochi Speaking	0.001	Sindhi speaking cases are significantly higher than Balochi speaking
	Pashto Speaking	0.0001	Sindhi speaking cases are significantly higher than Pashto speaking
	Punjabi Speaking	0.001	Sindhi speaking cases are significantly higher than Punjabi speaking
	Siraiki Speaking	0.0001	Sindhi speaking cases are significantly higher than Siraiki speaking
Urdu Speaking	Balochi Speaking	0.0001	Urdu speaking cases are significantly higher than Balochi speaking
	Pashto Speaking	0.0001	Urdu speaking cases are significantly higher than Pashto speaking
	Punjabi Speaking	0.0001	Urdu speaking cases are significantly higher than Punjabi speaking
	Siraiki Speaking	0.0001	Urdu speaking cases are significantly higher than Siraiki speaking
Balochi Speaking	Pashto Speaking	0.999	Non significant differences in the cases of both ethnicity
	Punjabi Speaking	0.999	Non significant differences in the cases of both ethnicity
	Siraiki Speaking	0.781	Non significant differences in the cases of both ethnicity
Pashto Speaking	Punjabi Speaking	0.999	Non significant differences in the cases of both ethnicity
	Siraiki Speaking	0.927	Non significant differences in the cases of both ethnicity
Punjabi Speaking	Siraiki Speaking	0.845	Non significant differences in the cases of both ethnicity

*p-value is significant at <0.05

Table 4: Multiple comparisons of number of cases by Scheffe test.

Ethnic groups comparison (Female)		*p*-value*	Interpretation/Significance
Sindhi Speaking	Urdu Speaking	0.753	Non significant differences in the cases of both ethnicity
	Balochi Speaking	0.318	Non significant differences in the cases of both ethnicity
	Pashto Speaking	0.114	Non significant differences in the cases of both ethnicity
	Punjabi Speaking	0.115	Non significant differences in the cases of both ethnicity
	Siraiki Speaking	0.028	Sindhi speaking cases are significantly higher than Siraiki speaking
Urdu Speaking	Balochi Speaking	0.012	Urdu speaking cases are significantly higher than Balochi speaking
	Pashto Speaking	0.002	Urdu speaking cases are significantly higher than Pashto speaking
	Punjabi Speaking	0.002	Urdu speaking cases are significantly higher than Punjabi speaking
	Siraiki Speaking	0.0001	Urdu speaking cases are significantly higher than Siraiki speaking
Balochi Speaking	Pashto Speaking	0.996	Non significant differences in the cases of both ethnicity
	Punjabi Speaking	0.995	Non significant differences in the cases of both ethnicity
	Siraiki Speaking	0.890	Non significant differences in the cases of both ethnicity
Pashto Speaking	Punjabi Speaking	0.999	Non significant differences in the cases of both ethnicity
	Siraiki Speaking	0.993	Non significant differences in the cases of both ethnicity
Punjabi Speaking	Siraiki Speaking	0.993	Non significant differences in the cases of both ethnicity

*p-value is significant at <0.05

In contrast to male gender; among female, highest prevalence was found in Urdu speaking (6%), while lowest in Balochi (3%), Punjabi (3%), Siraiki (3%) and Pashto (3%) speaking. The mean age of diagnosis of CRC in female is found to be 45.28±13.52 years; therefore, it seems that in female CRC occurs at earlier age compare to male. The another study conducted in the province of Punjab reveals that CRC has similar incidences after the age of 45 years in both genders[21].

Analysis of current study for male and female genders further revealed the significance and non-significance between the different variables; these variables are ethnicity and point prevalence of CRC. When Sindhi speaking male are compared with other ethnicities male; significantly higher point prevalence was found in patients speaking Sindhi compared with patients speaking Balochi (p=0.001), Pashto (p=0.0001), Punjabi (p=0.001) and Siraiki (p=0.0001). No significant differnce of point prevalence noted with Urdu Speaking (p=0.999). Similarly when Urdu speaking compared with other ethnicities; significantly greater point prevalence noted in Urdu speaking compared with Balochi speaking (p=0.0001), Pashto speaking (p=0.0001), Punjabi speaking (p=0.0001) and Siraiki speaking (p=0.0001). Other comparisons found non-significant differences in the point prevalence. According to International Agency for Research on Cancers (IARC); colorectal, bladder, prostate, lip, oral cavity and larynx are the most prevalent cancers in adult male; while breast, ovary, oral cavity, cervix and uterine cancers are common in adult female of Pakistan[22]. Similar analysis in female gender found that Sindhi speaking point prevalence is significantly higher than Siraiki speaking (p=0.028), Urdu speaking point prevalence is significantly higher than the patients speaking Balochi (p=0.012), Pashto (p=0.002), Punjabi (p=0.002) and Siraiki (p=0.0001). Other ethnicities comparison found non-significant differences in point prevalence. According to Khaliq *et al.*,[1] in the Sindh province, CRC is third most common cancer in both genders; while Zubair *et al.*,[23] reported it is fifth most common malignancy, while in Punjab it is fifth most prevalent cancer[21]. The reason of high prevalnce could be urbanization, utilization of fast food, industrial pollution, limited availability of clean drinking water and sedentary life style[22].

Limitation of the study

Non availability of a national cancer registry program in Pakistan is a major reason for limited availability of validated data pertaining to incidences and prevalence of cancers; particularly CRC. Results of current study are based upon data collected from six institutions of Sindh province; which cannot be extrapolated for the population of whole country.

CONCLUSIONS AND RECOMMENDATIONS

Evaluation of data from six state of the art institutions of Sindh province reveals that CRC is highly prevailing; particularly in the Urdu speaking and Sindhi speaking population. It is more common in male gender.

Allocation of resources are required at governmental and non-governmental level for early screening; which may results not only in the reduction of burden of CRC but also significantly decreases the cost burden for the treatment of CRC. National cancer registry program should also be initiated to support health policy makers for the development of counter strategies.

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AUTHORS' CONTRIBUTIONS

Khaliq SA: Conceived idea, data collection and data analysis. **Fatima A:** Design the study, final drafting of manuscript and approval of final version. **Siddiqui MGU:** Literature survey, analysis of data and manuscript review. **Sheikh M:** Manuscript initial drafting and data interpretations. **Zaib-Un-Nisa A:** Literature survey and approval of the final version of manuscript. Final version of manuscript is approved by all authors.

DATA AVAILABILITY

The data supporting the findings of this study are not currently available in a public repository but can be made available upon request to the corresponding author.

CONFLICT OF INTERESTS

None of the author has any conflicts of interest.

REFERENCES

1. Khaliq SA, Naqvi SB, Fatima A. Retrospective study of cancer types in different ethnic groups and genders at Karachi. Springerplus 2013;2(1):1-6. *https://doi.org/10.1186/2193-1801-2-118*
2. Pirzada MT, Ahmed MJ, Muzzafar A, Shah MF, Khattak S, Syed AA, *et al*. Rectal carcinoma: Demographics and clinicopathological features from Pakistani population perspective. Cureus 2017; 9(6):1375-80. *https://doi.org/10.7759/cureus.1375*
3. Idrees R, Fatima S, Abdul-Ghafar J, Raheem A, Ahmad Z. Cancer prevalence in Pakistan: Meta-analysis of various published studies to determine variation in cancer figures resulting from marked population heterogeneity in different parts of the country. World J Surgical Oncol 2018;16(1):1-11. *https://doi.org/10.1186/s12957-018-1429-zS*
4. Irfan T, Zafar A, Hafiz MY. Current patterns of colorectal carcinoma: Retrospective evaluation of cases. ARC J Cancer Sci 2018;4(2):14-7.
5. Hasan F, Shah SMM, Munaf M, Khan MR, Marsia S, Haaris SM, *et al*. Barriers to colorectal cancer screening in Pakistan. Cureus 2017; 9(7):1477-84. *https://doi.org/10.7759/cureus.1477*
6. Deen KI, Silva H, Deen R, Chandrasinghe PC. Colorectal cancer in the young, many questions, few answers. World J Gastro Oncol 2016;08(06):481-8.
7. Mármol I, Sánchez-de-Diego C, Pradilla Dieste A, Cerrada E, Rodriguez Yoldi MJ. Colorectal carcinoma: A general overview and future perspectives in colorectal cancer. Int J Mol Sci 2017;18(1):01-39. *https://doi.org/10.3390/ijms18010197*
8. Gamage S, Dissabandara L, Lam AK-Y, Gopalan V. The role of heme iron molecules derived from red and processed meat in the pathogenesis of colorectal carcinoma. Critical Rev Oncology/hematology 2018;126(1):121-8. *https://doi.org/10.1016/j.critrevonc.2018.03.025*
9. Hanyuda A, Lee DH, Ogino S, Wu K, Giovannucci EL. Long-term status of predicted body fat percentage, body mass index and other anthropometric factors with risk of colorectal carcinoma: two large prospective cohort studies in the US. Int J Cancer 2020;146(9):2383-93. *https://doi.org/10.1002/ijc.32553*
10. Santos SCDd, Barbosa LER. Crohn's disease: Risk factor for colorectal cancer. J Coloproctol (Rio de Janeiro). 2017;37(01):55-62.
11. Rottmann BG, Patel N, Ahmed M, Deng Y, Ciarleglio M, Vyas M, *et al*. Clinicopathological significance of neutrophil-rich colorectal carcinoma. J Clin Pathol 2023;76(1):34-9. *https://doi.org/10.1136/jclinpath-2021-207702*
12. Zafar S, Zaidi A. Impact of urbanization on basin hydrology: a case study of the Malir Basin, Karachi, Pakistan. Regional Env Change 2019;19(01):1815-27. *https://doi.org/10.1007/s10113-019-01512-9*
13. Pervez S, Jabbar AA, Haider G, Ashraf S, Qureshi MA, Lateef F, *et al*. Karachi cancer registry (KCR): Age-Standardized incidence rate by age-group and gender in a Mega city of Pakistan. Asian Pacific J Cancer Prevention: 2020;21(11):3251-8. *https://doi.org/10.31557/APJCP.2020.21.11.3251*
14. Goodin A, Blumenschein K. Measurement and Descriptive Analysis; Chapter 8. In: Aparasu RR, Bentley JP, editors. Principles of Research Design and Drug Literature Evaluation. 1. Second ed. U.S.A: McGraw-Hill Education; 2020:75-86.
15. Aparasu RR. Sampling methods; Chapter 107. Research methods for pharmaceutical practice and policy. 1. First ed. United Kingdom: Pharmaceutical Press; 2016:107-24.
16. Shrestha B, Dunn L. The declaration of helsinki on medical research involving human subjects: A review of seventh revision. J Nepal Health Res Counc 2019;17(45):548-52. *https://doi.org/10.33314/jnhrc.v17i4.1042*
17. Varshitha A. Prevalence of oral cancer in India. J Pharm Sci Res 2015;7(10):845-8.
18. Shield KD, Ferlay J, Jemal A, *et al*. The global incidence of lip, oral cavity, and pharyngeal cancers by subsite in 2012. CA: A Cancer J Clin 2017; 67(1):51-64. *https://doi.org/10.3322/caac.21384*
19. Ahmed RN, Rai L, Samo KA, *et al*. Factors affecting delay in diagnosis of colorectal cancer: A cross-sectional study from a tertiary care hospital of Karachi, Pakistan. Int J Clin Pract 2021; 75(10):14529-39. *https://doi.org/10.1111/ijcp.14529*
20. Batool R, Jamal K, Sheroze MW, *et al*. Clinical features of colorectal carcinoma at the Jinnah Postgraduate Medical Centre, Karachi, Pakistan: a cross-sectional study. J Med Res Health Sci 2022;5(9):2203-9. *https://doi.org/10.52845/JMRHS/2022-5-9-1*
21. Hafeez S, Mahmood A, Khan RU, Malkani N. Trends in cancer prevalence in Punjab, Pakistan: A systematic study from 2010 to 2016. J Bioresource Manag 2020;7(2):68-78. *https://doi.org/10.35691/JBM.0202.0133*
22. Sarwar MR, Saqib A. Cancer prevalence, incidence and mortality rates in Pakistan in 2012. Cogent Med 2017;4(1):01-13. *https://doi.org/10.1080/2331205X.2017.1288773*
23. Ahmad Z, Idress R, Fatima S, *et al*. Commonest cancers in Pakistan-findings and histopathological perspective from a premier surgical pathology center in Pakistan. Asian Pac J Cancer Prev 2016;17(3):1061-75.