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Original Article

Delay from Onset of Symptoms to Reporting at a Cancer Care Facility and the Impact of Alternate Medicine Usage as a Contributing Factor

V. Seenu[1] Pratibha Kole[1] Suman Dhabal[1]

[1] Department of Radiation Oncology, Burdwan Medical College, Purba Bardhaman, West Bengal, India

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Address for correspondence Suman Dhabal, MD, Radiation Oncology, Vidyasagarpally, Katjuridanga, Kenduadihi, District Bankura, West Bengal 722102, India (e-mail: sumandhabal6@gmail.com).

Abstract

V. Seenu

Cancer patients often present after a period of certain delay from onset of symptoms. By tradition, alternate medicine has been the commonly sought after remedy for them. The objective of this study was to evaluate the delay in presentation to a cancer care facility, with respect to advanced stage at diagnosis and the use of alternate medicine. A cross-sectional study was undertaken in a tertiary care hospital from eastern India over 5 months where patients with cytological or histological proof of malignancy were interviewed using a pretested questionnaire. Comparative analysis was done with cross tables along with Kruskal–Wallis test for association between delay and the independent variables (demographic parameters and alternate medicine usage). Predictors for delay were assessed with logistic regression analysis. Spearman's rank test was used to measure the direction and strength of correlation of delay and alternate medicine use against stage at presentation. One-thousand twenty-two subjects were interviewed of whom 61.44% presented in advanced stage (either stage III and IV). About 56.1% patients had 4 to 6 months delay, while 19.1% patients presented after more than 6 months. About 27.5% patients had history of initial alternate medicine usage. Progressive increase in subjects presenting in advanced stage was observed with corresponding increase in delay, from 62.63% in more than 1 month delay to 80.48% in more than 3-month delay and 98.47% in those having more than 6-month delay. More of alternate medicine users presented with significant delay versus who did not (96.08 vs. 67.34% for >3 months delay) and the difference further increased with longer delay. About 89.67% of those who had used alternate medicine presented in advanced stage. Among them, this percentage progressively escalated with increase in delay period. Positive correlation between delay ($\rho = 0.742$ for total sample) and ($\rho = 0.592$ for alternate medicine users) advanced stage was observed. This study found a considerably high occurrence of delay in presentation among cancer patients after onset of symptoms. This delay was strongly associated with advanced stage at diagnosis and alternate medicine use initially. It provides substantial information to formulate policies for implementing awareness on symptoms of cancer and benefits of its early detection.

Keywords

- early detection of cancer
- alternate medicine
- behavioral sciences
- epidemiology
- delayed diagnosis
- cancer care facility

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Introduction

Cancer is one of the leading causes of death in most developing countries and when presenting in advanced stage, the response of the disease to treatment is reported to be suboptimal, which can inadvertently result in poor outcome[1–3] and with questionable efficacy in treatment of malignancy, use of alternate medicine in the initial phase of the disease has been shown to cause delay in diagnosis and advancement of stage, thus worsening its prognosis.[4] The objectives of this study were to estimate the delay of presentation to a cancer care facility from the initiation of symptoms of malignancy and to evaluate this delay with respect to the use of alternate medicine and advanced stage (stage III and IV) of presentation.

Materials and Methods

Study Design and Population

A single institutional hospital based cross-sectional study was undertaken in the radiation oncology department of a government medical college in eastern India, between August 2023 and December 2023. A convenience sampling method was used for enrolling the subjects.

Patients with cytological or histological proof of malignancy, giving written signed consent after proper information and explanation regarding this study (in case of minor, consent of parent was considered), were enrolled. Inability to recall the period of delay between onset of symptoms and time at presenting to hospital and unavailability of adequate documents regarding important details of disease led to exclusion.

Sample Size Calculation

Approximately 1,800 patients were encountered per month for 5 months (August–December 2023). So, population size, $N = 1800^{*}5 = 9000$.

Now, using the formula, sample size $= \frac{\frac{z^2 \times p(1-p)}{e^2}}{\frac{z^2 \times p(1-p)}{e^2 \times N}}$

the sample size was estimated to be 1061. Details of calculation are enclosed in the ►Supplementary Material, available in the online version.

Study Technique

A questionnaire consisting of questions assessing the sociodemographic factors, the disease related parameters, the delay between onset of symptoms and reporting to hospital and usage of alternate medicine before initial treatment was prepared. Initially, the questionnaire was pretested among a group of 15 subjects. It was validated and after few amendments, the final version was attained. Study proposal was submitted to institutional ethical committee and after getting written clearance, interview of the subjects by trained physicians was started. Data thus collected was compiled and subjected to statistical analysis.

Statistical Analysis

The data was analyzed using Statistical Package for Social Sciences (SPSS) Statistics Version 26.0 (IBM Inc., Chicago, Illinois, United States) and Microsoft Excel (Microsoft Corp., Redmond, Washington, United States). Comparative analysis was done with cross tables along with Kruskal–Wallis test for association between delay and the independent variables (demographic parameters and alternate medicine usage). Predictors for delay were assessed with logistic regression analysis. Spearman's rank test was used to measure the direction and strength of correlation of delay and alternate medicine use against stage at presentation. P value less than 0.05 was considered as statistically significant.

Results

Among the patients attending the outpatient department of our institution, 1,089 fulfilled the inclusion criteria and were selected. Out of them, 67 were rejected as per the exclusion criteria. Ultimately, 1,022 subjects were interviewed.

Demographic Parameters

The subjects were aged between 7 and 87 years with a median age of 55 years (interquartile range: 47–62 years) with majority (589 [57.6%]) of them being females. Most of them (903 [88.3%]) belonged to rural background with 477 (46.7%) subjects having completed primary education, 508 (49.7%) being homemakers and majority (581 [56.8%]) having monthly family income ranging between 10,000 and 19,999 INR. Details are presented in ►Supplementary Table 1.

Disease Related Parameters

Most common primary site of diagnosis was breast (242 [23.6%]) followed by head and neck (213 [20.8%]) and uterine cervix (191 [18.6%]). Commonest stage at presentation was stage III {455 (44.5%)} followed by stage II (360 [35.2%]) and stage IV (173 [16.9%]). Six-hundred twenty-eight (52.1%) subjects had an advanced stage (either stage III or IV) at presentation. Details are presented in ►Supplementary table 2.

Parameters Related to Delay in Presentation

Majority of the subjects (574 [56.1%]) presented to a cancer care facility after an interval of 4 to 6 months from the onset of symptoms. Seven-hundred sixty-nine (75.2%) subjects had a delay of more than 3 months and 196 (19.1%) subjects had a delay of more than 6 months. Only 21 (0.2%) subjects reported within 1 month.

In male subjects, delay was more pronounced in those with lung cancer than those with head and neck cancers (29.56 vs. 24.86% at >6 months delay), whereas in the female subjects, delay was more pronounced in those with breast cancer than those with cancer of the uterine cervix (23.43 vs. 3.19% at >6 months delay). Variation of delay with respect to gender specific diagnoses are detailed in ►Supplementary Table 5, available in the online version.

Parameters Related to Usage of Alternate Medicine

Two-hundred eighty-one subjects (27.5%) admitted of using alternate medicine after onset of symptoms that was chiefly homeopathy (214 [20.9%]) followed by ayurveda (43 [4.20%]) with most (156 [15.26%]) using it for a period of 4 to 6 months. About 89.67% of those who used alternate medicine and 50.74% of those who did not use it had an advanced stage (either stage III or IV) at presentation, respectively. ►Supplementary table 2, ►Supplementary Fig. S1 (A)

Association of Cumulative Delay in Reporting to Hospital to Various Independent Variables

For the ease of understanding, the delay for the individual subjects is categorized as period of cumulative delay as follows:

a) ≤1 month
b) >1 month (includes those with delay >1 month, >3 months, >6 months and >1 year)
c) >3 months (includes those with delay >3 months, >6 months and >1 year)
d) >6 months (includes those with delay >6 months and >1 year)
e) >1 year

Association of delay in presentation was assessed against age, sex, domicile, education, occupation, monthly family income, and alternate medicine use of the subjects with the use of cross tabulations and chi-squared test, but no consistent pattern of association was observed. Details of association between cumulative delay period and various independent variables are enclosed in the ►Supplementary Table 5 and 6, available in the online version.

Logistic regression analysis was carried out to assess the role of demographic parameters namely age, sex, domicile, education, occupation, and income as predicting factors for delay. Out of all these, only having female sex had higher odds (odds ratio [OR]: 2.94, 95% confidence interval: 2.14–4.04, $p = 0.000$) of presenting with delay of more than 3 months, which was statistically significant. ►Supplementary Table 3

Proportion of subjects presenting in advanced stage (stage III or IV) progressively increased with corresponding increase in the period of delay from 627 out of 1,001 (62.63%) having more than 1 month delay to 619 out of 769 (80.48%) subjects having more than 3 month delay to 193 out of 196 (98.47%) having more than 6-month delay to 11 out of 11 (100%) having more than 1 year delay (►Table 1; ►Supplementary Fig. S1 (B)).

A higher proportion of subjects who had used alternate medicine (270 out of 281 [96.08%]) presented with significant delay as compared to those who did not (499 out of 741 [67.34%] for more than 3 months delay and the difference further increased with increase in duration of delay. ►Supplementary Fig. S2 (A)

Of those 281 subjects who had used alternate medicine, 252 (89.67%) presented in an advanced stage. With increase in delay period, this percentage progressively escalated in this sub population. ►Supplementary Fig. S2 (B)

Spearman's rank test demonstrated a strong positive correlation (Spearman's rho: 0.742) between delay and stage at presentation. For those who had used alternate medicine, a moderate positive correlation (Spearman's rho: 0.592) between the same parameters was observed.

Discussion

Delay in cancer treatment has been classically divided into patient delay and provider delay. Patient delay is defined as the interval between the date of initial symptom and consultation with a physician, while provider delay is defined as the interval from first visit to starting of medical intervention.[2] Multiple studies have suggested that patient delay, typically more than 3 months, is strongly associated with larger tumor size, advanced stage during presentation and inferior long-term survival.[3,5–7] With advancement in stage, the tumor cells show

Table 1 The relationship between delay, alternate medicine usage, and stage of disease

Variable	Category	Percentage of subjects for the respective period of cumulative delay					*p*-Value
		≤1 month (21)	>1 month (1001)	>3 month (769)	>6 month (196)	>1 year (11)	
Alternate medicine usage	Yes (281)	0 (0.00)	281 (100.00)	270 (96.08)	120 (42.70)	7 (2.49)	0.000
	No (741)	21 (2.83)	720 (97.16)	499 (67.34)	76 (10.25)	5 (0.67)	
Stage	I (34)	7 (33.33)	27 (2.70)	1 (0.13)	0 (0.00)	0 (0.00)	0.000
	II (360)	13 (61.90)	347 (34.66)	149 (19.37)	4 (2.04)	1 (9.09)	
	III (455)	1 (4.76)	454 (45.35)	149 (58.25)	65 (33.16)	4 (36.36)	
	IV (173)	0 (0.00)	173 (17.28)	171 (22.23)	127 (64.79)	7 (63.63)	
Advanced stage (III + IV) (628)		1 (4.76)	627 (62.63)	619 (80.48)	193 (98.47)	11 (100.00)	
In 252 alternate medicine users with advanced stage disease (III + IV)		0 (0.00)	252 out of 281 (89.68)	249 out of 270 (92.22)	119 out of 120 (99.16)	7 out of 7 (100.00)	

Values are presented as number (%).

lesser degree of differentiation and greater propensity for microscopic dissemination and metastasis along with decreased response to treatment, ultimately leading to higher occurrences of mortality and morbidity.[8–10] It has been suggested that timely appreciation of initial symptom by the patient acts as a trigger for seeking prompt medical attention, which forms the psychological basis of variation in patient delay.[11] Also, it is often observed that the rate of survival and cure of cancer is higher in those diagnosed in the initial stage, especially for those subsites, for which symptoms develop in early stage (e.g., breast, cervix, oral cavity).

In this study, 75% subjects presented with more than 3 months of delay and 19% presented at more than 6 months, which are alarmingly high. Delay in presentation was more pronounced in those with lung cancer among male subjects and in those with breast cancer among females. Of all the sociodemographic parameters assessed, only female sex had higher odds (OR: 2) of predicting a delay more than 3 months. Progressive increase in the period of delay was associated with corresponding increase in the percentage of subjects presenting in advanced stage, from 62.63% in those having more than 1 month delay to 80.48% in those having more than 3-month delay and 97.95% in those having more than 6-month delay. This very observation adequately points toward the massive disadvantage of delayed reporting after onset of symptoms.

Evidence from existing literature highlight the association of initial alternate medicine usage to delay in presentation and advanced stage in diagnosis.[4,12,13]

In this study, 89.67% of those subjects who had history of alternate medicine usage presented in advanced stage (stage III or IV) versus 50.74% of those who did not. In this subgroup, progressive increase in the period of delay was associated with corresponding increase in the percentage of presentation in advanced stage, from 89.68% in those having more than 1 month delay to 92.22% in those having more than 3-month delay to 99.16% in those having more than 6-month delay, which were greater than the corresponding values for the total sample as a whole. Though a direct causal association could not be inferred upon, for those who had used alternate medicine, a moderate positive correlation between delay and stage at presentation was observed. These findings shed light on the harm caused by loss of invaluable time after onset of symptoms due to engagement in alternate medicine usage, ultimately leading to delayed presentation in an advanced stage.

This study has some limitations. It could be difficult and error-prone for subjects to correctly recall the exact date of first symptom especially in those with longer delay, thus introducing bias in the reported findings. Also, some sex specific cancers differ by modes of presentation. For example, breast cancer usually is reported early with a lump, whereas prostate cancer presents late with subtle symptoms. This variation was not taken into consideration that does not allow us to generalize the findings of this study across sexes.

Conclusion

This study, conducted in a majorly rural part of eastern India, reveals the alarmingly high levels of delay in presentation among cancer patients after onset of symptoms, of which female sex was a significant predictor. This delay was significantly associated with advanced stage at diagnosis and alternate medicine use after onset of symptoms. This study provides substantial information in order to generate policies for maximally curbing this delay by urgent implementation of awareness programs especially among the rural population of low-middle income countries, focusing on the symptoms of malignancy and the necessity of visiting a hospital promptly, right after suspicion of those symptoms. Knowledge on benefits of early detection on reduction in mortality and cost burden of cancer treatment also needs to be imbibed. Research works scrutinizing the attitude among the population regarding the reasons behind their preference of alternate medicine for cancer treatment is of utmost necessity.

Note

This study was conducted after written approval from the Institutional Review Boards of Burdwan Medical College:

1. The Scientific committee of Burdwan Medical College, and
2. The Institutional Ethics committee of Burdwan Medical College.

Authors' Contribution

V.S. was involved in data acquisition, compilation, analysis, drafting, critical review, and final approval. P.K. helped in data acquisition, drafting, analysis, critical review, and final approval. S.D. helped in conceptualization, project supervision, data acquisition, compilation, analysis, drafting, critical review, and final approval.

Ethical Approval

The authors declare that this study conforms with the ethical standards as per the declaration of Helsinki. This study was commenced after getting signed consent from the individual participants after they were properly informed and explained regarding the details of this study in their own vernacular with the assurance that participation in this study will not impact their treatment in any form and they are at freedom to abandon/withdraw from the study at any point of time.

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Conflict of interest

None declared.

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