Effect of socio-economic factors on delayed access to health care among Chinese cervical cancer patients with late rectal complications after radiotherapy

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A B S T R A C T

Objectives. To determine the effect of socio-economic status (SES) on delayed access to medical treatment by Chinese cervical cancer patients who suffered from late rectal sequelae (LRS) after external beam radiation therapy (EBRT) and intracavitary brachytherapy.

Methods. Patients diagnosed with LRS were interviewed for their SES, factors including age, residing district, religion, marital status, income, education, insurance and patient delay (the time interval from the onset of symptoms to the first medical consultation) and other factors such as weight, symptom duration and disease stage at diagnosis.

Results. One hundred and twenty nine patients were interviewed. Seventy-one patients (55%) sought medical treatment within three months after the first symptom being recognized and fifty-eight patients (45%) delayed their medical treatment over 3 months. The study shows that age≥55 (OR=12.1; 95% CI: 3.3–43.9), lower education (OR=4.6; 95% CI: 2.0–10.4 for women with primary school education or illiterate), low annual household income (OR=2.3; 95% CI: 1.2–5.1) and widow/divorce (OR=0.1; 95% CI: 0.01–0.07) were the high risk factors for delayed reporting. Patients with bleeding or bleeding plus other symptoms (61.2%) were more likely to seek treatment within three months, compared to patients with other symptoms only (38.8%) (p=0.002). Additionally, delayed reporting was found to be significantly associated with the late stage of late rectal sequelae (LRS) (p=0.000) and the patients with 55 years or older (p=0.000).

Conclusions. Delayed reporting and late-stage presentation of late rectal sequelae are more prevalent among Chinese cervical cancer patients with 55 years or older, low education, poor marital status, or poor financial status. Effective social support and educational programs should be implemented to encourage these patients to seek medical treatment as soon as possible.

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Introduction

Cervical cancer is the most common gynecological malignancy in China. Nearly 100,000 cases of cervical cancer are diagnosed annually, accounting for one fifth of the total cases in the world [1]. The combination of external beam radiation therapy (EBRT) and intracavitary brachytherapy has been a standard treatment for advanced cervical cancer, providing a dramatic improvement in local control and overall survival [2]. However, the incidence of late rectal sequelae (LRS) caused by the treatment is still a challenge for doctors and definitely has a devastating impact on the quality of life of the patients, especially when they report late stage LRS symptoms such as rectovaginal fistulas (RVF) [3–5]. The frequency of post irradiation RVF is generally considered less than 5% [6]. Nevertheless, recent literature reviews indicate that the incidence of RVF is about 12.5–28.0% in patients with cervical cancer in China, which is much higher than previously reported [5,7,8]. The radiation causes tissue damage and reduces vascular supply, consequently leading to proctitis and ulceration of the rectal wall. More than one third of these ulcers will progress to RVF within 2 years after the treatment [9]. Radiotherapy methods (EBRT dose, frequency of intracavitary brachytherapy, point A dose, and rectal dose) have been thoroughly shown to increase the risk of the development of RVF [4,5]. Interventions that help patients recognize the various early signs and symptoms of LRS may help control and prevent further deterioration of this complication [10]. Therefore, recognition and reporting of early symptoms may contribute to lowering the incidence of RVF in Chinese patients.

Previous studies have shown that socio-economic status (SES) has a profound influence on delayed reporting and late-stage presentation in breast and lung cancers [11–13]. Moreover, a cross-sectional survey conducted recently in Argentina has shown that SES has a
considerable impact on cervical cancer and could have negative effects on radiotherapy compliance [14]. However, to our knowledge, little information is available concerning the association between socio-economic status and the reporting rate and stage presentation of LRS. The present study was, therefore, focused on the impact of SES on delay by LRS patients in seeking medical care.

Materials and methods

A consecutive series of patients with locally advanced cervical cancer (International Federation of Gynecologists and Oncologists (FIGO) Stage IIB–IVA [15]) were admitted to the First Affiliated Hospital of Xi’an Jiaotong University, China for LRS treatment. They had received EBRT combined with intracavitary brachytherapy before admission. After obtaining consent from each patient, the information concerning their SES was collected between September 2007 and March 2009 using a standard questionnaire, such as place of residence (rural or urban), educational level (illiterate, primary or secondary/higher education), annual household income category (low, medium and high; categorized according to the National Bureau of Statistics of China), religion (Muslim, Christian or no religion), marital status (married, single, divorce or widow), age (≥55 years or <55) and other clinical background data including clinical symptoms (mild diarrhea, mild cramping, excessive rectal mucous, bleeding, discharge, incontinence, dysuria and fistula), durations and stage of LRS at the time of diagnosis. According to the Radiation Therapy Oncology Group (RTOG), LRS is divided into four stages (I–IV). In this study, stages I and II were identified as the early stage and stages III and IV as the late stage. Dates of the first symptom recognition and the first medical consultation were also recorded. Delayed access to healthcare was defined as the time interval of more than three months between the first symptom recognition and the first medical consultation. The patients were divided into two groups: those who sought medical care within three months or less and those who sought medical care more than three months after the first symptom recognition. Patients were excluded if this time interval could not be confirmed.

Statistical analysis was performed using univariate and multivariate logistic regression models to calculate odds ratios (ORs). Age, weight, marital status, educational level, occupation, annual household income, religion, and the nature of the first LRS symptoms were selected as the potential risk factors. P-values were set as 0.05 (cutoff significance). SPSS version 13.0 for Windows (SPSS, Chicago, IL, USA) was used for statistical analysis.

Results

One hundred and sixty-four patients were chosen for this study. Of these patients, 141 (86%) finished the study while the remaining 23 either refused to participate or were missing. Twelve patients were excluded due to poor data quality, leading to the final study population of 129 post irradiation LRS patients. Of these 129 patients, 43 (33.3%) were diagnosed with stage IIB cervical cancer, 34 patients (26.3%) with stage IIIA, 29 patients (22.5%) with stage IIIB, and 23 patients (17.8%) with stage IV, according to the FIGO staging system. The average age of the patients was 48.1 years (SD = 10.6), and most of the patients were married (85.3%). The time interval of delayed access to healthcare ranged from less than one week to 60 months (Mean = 3.7, SD = 9.2 months). Forty five percent of the patients reported a delay of more than three months. The characteristics of the study population and their delayed interval are shown in Table 1. Table 2 shows the results of the univariate and multivariate logistic regression analysis. Age (≥55 years, OR = 12.1; 95% CI: 3.3–43.9), lower education (OR = 4.6; 95% CI: 2.0–10.4), low annual household income (OR = 2.3; 95% CI: 1.1–5.0) and widow/divorce (OR = 0.11; 95% CI: 0.01–0.07) were the risk factors for delayed reporting. Patients who had experienced bleeding or bleeding with other symptoms (61.2%) were more likely to seek treatment within three month after the recognition of the first LRS symptom, compared to patients without bleeding (38.8%) (p = 0.002). Significant associations were also identified between delayed reporting and the late LRS stage (p = 0.000), and between delayed reporting and older patients (p = 0.000). Associations between delayed and clinical variables are shown in Table 3.

Discussion

Cervical cancer is the third most common cancer for women worldwide. In developed countries, the incidence of cervical cancer has decreased dramatically since the introduction of the cervical screening program. However, the incidence of cervical cancer in developing countries remains high. Therefore, it is of great value to identify the reasons for the high incidence of cervical cancer in developing countries. Recently, increasing evidence has shown that some SES factors are correlated with the cervical cancer stage at the time of diagnosis, the symptom duration, and delay-time from diagnosis to registration [16]. To our knowledge, the present study is the first study that analyzed the impact of SES of post irradiation LRS patients on the LRS stage at diagnosis, the symptom duration, and the time to report. In this study, we found that the widowed/divorced women and the women with lower education tended to delay their access to healthcare and tended to be diagnosed as suffering late-stage LRS. The widowed/divorced women lacked the financial and social support from their spouse, which may discourage them from seeking treatment; on the other hand, the women with lower education did not understand the implications of LRS or were not able to take serious notice of the early symptoms of the disease. According to previous studies, low education is strongly related to poor health literacy and low or limited health literacy is an important risk factor of worse health outcomes [16–18]. Usually patients with low health literacy are less likely to seek preventive screening measures. The improvement of health literacy in patients with low education may help improve LRS awareness and decrease the late stage LRS incidence. Our results are consistent with those of a recent study, which

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\text{Table 1} \\
\text{Characteristics of post irradiation LRS patients (n = 129).} \\
\begin{array}{ll}
\text{Age (years)} & \text{No (%)} \\
\geq 55 & 51 (39.5) \\
< 55 & 76 (60.5) \\
\text{Education} & \\
\text{Illiterate} & 39 (30.2) \\
\text{Primary} & 40 (31.0) \\
\text{Secondary/higher education} & 50 (38.8) \\
\text{Marital status} & \\
\text{Married} & 110 (85.3) \\
\text{Widowed/divorced} & 19 (14.7) \\
\text{Stage of LRS (RTOG)} & \\
\text{I} & 23 (17.8) \\
\text{II} & 35 (27.1) \\
\text{III} & 31 (24.0) \\
\text{IV} & 40 (31.0) \\
\text{Delay presentation (months)} & \\
> 3 & 58 (45.0) \\
\leq 3 & 71 (55.0) \\
\text{Religion} & \\
\text{Have} & 41 (31.8) \\
\text{No} & 88 (68.2) \\
\text{Place of residence} & \\
\text{Rural} & 98 (76.0) \\
\text{Urban} & 31 (24.0) \\
\text{Annual household income ($)} & \\
\text{Low (<700)} & 73 (56.6) \\
\text{Medium (700–1500)} & 32 (24.8) \\
\text{High (>1500)} & 24 (18.6) \\
\text{First LRS symptoms seen} & \\
\text{Bleeding} & 41 (31.8) \\
\text{Bleeding accompanied by others*} & 64 (49.6) \\
\text{Others*} & 50 (38.8) \\
\text{Health insurance} & \\
\text{Some} & 79 (61.2) \\
\text{None} & 50 (38.8) \\
\end{array}
\]

* Others include discharge, abdominal pain, back pain, incontinence, loss of appetite, nausea/vomiting, abdominal distension, dysuria, pain, or fistula.
reported the association of delayed reporting, patients’ behavior, and breast cancer knowledge with the advanced stage at the time of diagnosis [19].

The healthcare services in China have been improved remarkably since the SARS epidemic in 2003 [20]. A large number of health facilities have been established in rural areas, and the distance and transportation are no longer significant barriers for women seeking immediate medical care [21]. All these changes may help to explain why no statistically significant difference was observed in the delayed LRS reporting between the patients living in the rural and urban areas.

Previous studies have demonstrated that individuals without health insurance have limited access to medical care, when compared with those who are insured [22]. However, this study provides no clues about whether having health insurance coverage might improve the LRS stage at the time of diagnosis and shorten the delayed reporting. Most of the LRS patients (61%) had participated in the Rural Cooperative Medical System in China, a form of community-based medicare established in 2006. Therefore, having health insurance or not is not a factor affecting the patients’ access to medical care [23].

Our study showed that the recognizable initial symptoms were significantly associated with patient delay. Patients who had bleeding or other symptoms (77%) were more likely to seek treatment within three months after the recognition of the first symptom, compared to patients without bleeding. A patient may be afraid of cancer recurrence and then seek for medical treatment when she finds herself bleeding again after radiotherapy. Twenty three percent of the patients did not seek medical care probably due to their lack of medical knowledge about the other common symptoms of LRS. These findings revealed the importance of enhancing the patients’ knowledge and awareness of the signs and symptoms of LRS. Therefore, women need to be educated about the diverse types of LRS symptoms [10]. Education about the different types of LRS symptoms may assist in symptom recognition as well as encourage patients to seek medical advice even when a symptom is ambiguous.

Studies have shown that older age is a significant risk factor for patient delay [24–26]. A recent study of women’s knowledge and beliefs on breast cancer has concluded that intervention programs should particularly target the older women because older age is a risk factor for breast cancer and the subsequent delayed presentation [27]. Similarly, this study indicated that women with 55 years or older showed longer delays compared with patients fewer than 55. This result is consistent with the previous findings that older patients experience a higher risk of LRS and late-stage presentation [5,28,29].

Table 2
The results of univariate and multivariate logistic regression analysis on patient delay.

<table>
<thead>
<tr>
<th></th>
<th>≤3 months (n = 71)</th>
<th>&gt;3 months (n = 58)</th>
<th>Univariate analysis</th>
<th>Multivariate analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>OR (95% CI)</td>
<td>P</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥55</td>
<td>12 (16.9)</td>
<td>39 (67.2)</td>
<td>10.1 (4.4–23.1)</td>
<td>0.000</td>
</tr>
<tr>
<td>&lt;55</td>
<td>59 (83.1)</td>
<td>19 (32.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>5 (7.0)</td>
<td>34 (58.6)</td>
<td>5.3 (3.0–9.4)</td>
<td>0.000</td>
</tr>
<tr>
<td>Primary</td>
<td>25 (35.2)</td>
<td>15 (25.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary/higher education</td>
<td>41 (57.7)</td>
<td>9 (15.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>67 (94.4)</td>
<td>43 (74.1)</td>
<td>0.17 (0.05–0.55)</td>
<td>0.003</td>
</tr>
<tr>
<td>Widowed/divorced</td>
<td>4 (5.6)</td>
<td>15 (25.9)</td>
<td>0.11 (0.01–0.07)</td>
<td>0.027</td>
</tr>
<tr>
<td>Stage of LRS (RTOG)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I and II (early stage)</td>
<td>47 (66.2)</td>
<td>12 (20.7)</td>
<td>0.13 (0.06–0.29)</td>
<td>0.000</td>
</tr>
<tr>
<td>Ill and IV (late stage)</td>
<td>24 (33.8)</td>
<td>46 (79.3)</td>
<td>1.67 (0.73–3.87)</td>
<td>0.226</td>
</tr>
<tr>
<td>Place of residence</td>
<td></td>
<td></td>
<td>2.16 (0.52–8.96)</td>
<td>0.290</td>
</tr>
<tr>
<td>Rural</td>
<td>51 (71.8)</td>
<td>47 (81.0)</td>
<td>1.92 (0.89–4.16)</td>
<td>0.094</td>
</tr>
<tr>
<td>Urban</td>
<td>20 (28.2)</td>
<td>11 (18.9)</td>
<td>0.64 (0.15–0.27)</td>
<td>0.539</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have</td>
<td>27 (38.0)</td>
<td>14 (24.1)</td>
<td>0.48 (0.23–0.99)</td>
<td>0.048</td>
</tr>
<tr>
<td>No</td>
<td>44 (61.9)</td>
<td>44 (75.9)</td>
<td>0.49 (0.15–1.67)</td>
<td>0.260</td>
</tr>
<tr>
<td>Annual household income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>28 (39.4)</td>
<td>45 (77.6)</td>
<td>2.69 (1.58–4.58)</td>
<td>0.000</td>
</tr>
<tr>
<td>Medium</td>
<td>25 (35.2)</td>
<td>7 (12.1)</td>
<td>2.32 (1.08–4.99)</td>
<td>0.030</td>
</tr>
<tr>
<td>High</td>
<td>18 (25.3)</td>
<td>6 (10.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First LRS symptoms seen</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bleeding</td>
<td>11 (15.5)</td>
<td>4 (6.9)</td>
<td>0.42 (0.23–0.74)</td>
<td>0.003</td>
</tr>
<tr>
<td>Bleeding*</td>
<td>41 (57.7)</td>
<td>23 (39.7)</td>
<td>0.79 (0.31–1.99)</td>
<td>0.619</td>
</tr>
<tr>
<td>Others*</td>
<td>19 (26.8)</td>
<td>31 (53.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health insurance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have</td>
<td>38 (53.5)</td>
<td>41 (70.7)</td>
<td>0.48 (0.23–0.99)</td>
<td>0.048</td>
</tr>
<tr>
<td>None</td>
<td>33 (46.5)</td>
<td>17 (29.3)</td>
<td>0.49 (0.15–1.67)</td>
<td>0.260</td>
</tr>
</tbody>
</table>

* Others include discharge, abdominal pain, back pain, incontinence, loss of appetite, nasea/vomiting, abdominal distension, dysuria, pain, or fistula.

Table 3
Associations between delayed reporting and clinical variables.

<table>
<thead>
<tr>
<th></th>
<th>≤3 months</th>
<th>&gt;3 months</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage of LRS (RTOG)</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>I and II (early stage)</td>
<td>7.96</td>
<td>0.003</td>
<td></td>
</tr>
<tr>
<td>Ill and IV (late stage)</td>
<td>3.47</td>
<td>0.039</td>
<td></td>
</tr>
<tr>
<td>Chi-square = 26.64, df = 1</td>
<td>0.000</td>
<td>0.002</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>≥55</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>&lt;55</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Chi-square = 33.84, df = 1</td>
<td>0.002</td>
<td>0.002</td>
<td></td>
</tr>
<tr>
<td>First LRS symptoms seen</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Bleeding or bleeding accompanied by others*</td>
<td>0.000</td>
<td>0.000</td>
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</tr>
<tr>
<td>Others*</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Chi-square = 9.57, df = 1</td>
<td>0.002</td>
<td>0.002</td>
<td></td>
</tr>
</tbody>
</table>

* Others include discharge, abdominal pain, back pain, incontinence, loss of appetite, nasea/vomiting, abdominal distension, dysuria, pain, or fistula.
This study also demonstrated that low income had a positive impact on the delayed disease reporting and the patients with low income were more likely to be diagnosed with late-stage LRS [30,31]. In China, their children usually pay off old patients’ medical expenses partly. However, the children’s income is not included in the old patients’ household income. Therefore, the patients’ affordability is hard to estimate. The impact of the annual household income on the delayed reporting of LRS would be more significant if the medical expenses paid by the children were considered.

Most of the LRS patients (71%) in this study had no religion. Therefore, religion was not identified as a significant risk factor for late-stage LRS and delayed reporting. Even though the importance of such cultural factors has been increasingly recognized, no study to date, however, has shown a direct relationship between religion and cancer stage or mortality [32].

In the present study, delayed reporting access to healthcare was more common among Chinese patients with late-stage LRS (III/IV, RTOG). Moreover, the duration of the initial LRS symptoms was relatively shorter in patients less than 55 years old. Younger patients usually sought healthcare timely while older patients may underestimate the severity of symptoms and thus delay reporting.

In conclusion, these findings have positive implications for LRS education efforts and public health interventions. The study will also help identify the target population for health education on the early stage reporting of LRS. Specific educational approaches and social supports should be tailored to the target group in order to achieve early screening for reducing the socio-economic impact on LRS. These results can also be applied to larger populations and developing countries where the education and social supporting programs are not available.

Conflict of interest statement
The authors declare that there are no conflicts of interest.

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