

REVIEW

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Survival Rate of Colorectal Cancer in Iran: A Systematic Review and Meta-Analysis

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Abstract

Background: Different studies have been conducted to estimate the survival rate of colorectal cancer in Iran but there is no overall estimate of the survival rate. The aim of this study was to calculate the pooled 1, 3, and 5-year survival rate of the patients with colorectal cancer in Iran. **Methods:** To retrieve relevant studies, we conducted a systematic search in Iranian databases, including Iran Medex, Magiran, SID, and international databases such as Medlin/PubMed, Scopus, and Google scholar using “Colorectal Neoplasms” and “Survival Rate” as keywords up to December 1st, 2017. We used random effect model to estimate pooled 1, 3, and 5-year survival rates of the patients with colorectal cancer in Iran. To assess the heterogeneity, we used Chi-squared test at the 5 % significance level ($p < 0.05$) and I² Index. We used meta-regression and subgroup analysis to find a potential source of heterogeneity. **Results:** After a systematic search, 196 articles were found, of the 38 studies met the eligibility criteria and are included in our meta-analysis. The pooled 1, 3, and 5-year survival rates in patient with colorectal cancer were 0.84 (95% CI: 0.81-0.87), 0.64 (95%CI: 0.59-0.70), and 0.54 (95%CI: 0.49-0.58) respectively. The 5-year survival rate in the subgroup of women was 0.5 (0.44-0.56) and in male subgroup was 0.44 (0.40-0.48). In a subgroup of the tumor site, the 5-year survival rate in colon cancer was 0.6 (0.49-0.75) and rectum cancer was 0.54 (0.36-0.69). In multivariable models, there was a significant association between years of study and 5-year survival rate as a source of heterogeneity ($\beta = 18.9, P=0.01$). **Conclusion:** According to the results of this study, women had a better survival rate than men, and according to the tumor site, the 5-year survival rate in colon cancer was better than the rectum cancer.

Keywords: Colorectal cancer- survival rate- meta-analysis- Iran

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Introduction

Colorectal cancer (CRC) is the third most common cancer after lung and breast cancer and the fourth leading cause of oncological death in the world, with an estimated 1.4 million cases and 700,000 deaths occurring in 2012 (Torre et al., 2015; Zare-Bandamiri et al., 2017). The incidence of this cancer varies in the world. Nearly, 55% of these cases have occurred in highly developed countries, with the highest rates in Australia and New Zealand, and the lowest in the countries of West Africa (Ferlay et al., 2015).

CRC is one of the most common cancers in Iran, which has increased in recent years. The incidence of this cancer in Iran is lower than other developed countries; however, in - recent decades, this rate has increased significantly. According to national reports of Iran cancer registration in 2009, colorectal cancer is the third most common cancer in women and the fourth most common cancer in men

(Kumar et al., 2010).

The survival rate is one of the main indicators for evaluating the effect of healthcare, disease control, and measuring the effect of treatment. Survival rates are defined as the proportion of people with the same type and stage of cancer that is living in a specific period of time after the diagnosis (team, 2017).

There is a wide geographical distribution in the survival rates of patients with colorectal cancer. The 5-year survival rate varies from 65% in the USA (team, 2017) to 64% in Korea and less than 8% in the countries of sub-Saharan Africa like Gambia and Uganda (Sankaranarayanan et al., 2011). Also, the 5-year survival rate of colorectal cancer in Iran varies from 27% to 85% (Mehrabani et al., 2012; Payandeh et al., 2016b).

Different prognostic factors can influence the survival rates of CRC like age, gender, race, histology type, tumor grade, tumor size, tumor stage, regional lymph nodes metastasis, pathologic stage, and location of

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tumor (Park et al., 1999; Moghimi-Dehkordi et al., 2008; Moghimi-Dehkordi et al., 2009; Ghazali et al., 2010). One of the most important factors that affect the survival rate in a patient with colorectal cancer is gender. The result of different studies indicated that the 5-year survival rate in women was significantly better than men (Wichmann et al., 2001; Koo and Leong, 2010; Majek et al., 2013). Another important prognostic factor is the location of the tumor. A different study indicated that the survival rate in rectum cancer was better than the colon ones and it is also depending on the stage of diagnosis (Meguid et al., 2008; Hemminki et al., 2010; Lee et al., 2013; Phipps et al., 2013).

Several studies had conducted to estimate the survival rate of colorectal cancer in Iran. But due to the differences between the results of previous studies, there is no consensus on the survival of colorectal cancer in Iran. Therefore, the aim of this study was to summarize the pooled survival rate of colorectal cancer in Iran.

Materials and Methods

We followed the preferred reporting items for systematic reviews and meta-analyses (PRISMA) to perform and report this study (Moher et al., 2009).

Data source and search strategy

In this systematic review and meta-analysis, two reviewers independently searched an international database such as PubMed/Medline, Web of Science (ISI), Scopus, ProQuest, Science Direct, Embase and Google Scholar, and Iranian databases such as MagIran, IranMedex, and Scientific Information Databank (SID) up to December 1st 2017. We conducted initial search strategy using MeSH terms like "Colorectal Neoplasms" AND "Survival Rate", set of proper keywords, including "Survival" OR "survive" OR "Prognosis", "Colorectal cancer" OR "Colon cancer" OR "Rectum cancer", and "Iran". Finally, we checked the reference list of all included studies, to avoid missing any relevant articles. No limitations in terms of language and date of publications were considered in this study. The EndNote software (version X7, for Windows, Thomson Reuters, Philadelphia, PA, USA) was used to facilitate screening the result of the systematic search.

Study selection

All cohort studies that reported the survival rate or survival time and longevity of patient diagnosed with colorectal cancer among an Iranian population, without any limitation up to December 1st, 2017 were included in this study. Studies that discussed colorectal cancer but they did not report the survival rate or they had insufficient information were excluded from the study. The conference proceedings, letters, review and meta-analysis, cross-sectional, case report, and case series studies were also excluded. The two authors (KH, M, and E, SH) independently reviewed the search result by title, abstract and full text and disagreement between two authors were resolved by discussion or with a third author (M, KH). The details of the screening process and the study inclusion

are shown in Figure 1.

Quality assessment and data extraction

In order to assess the risk of bias in all full-text articles included in this study, we used the recommended STROBE checklist (Von Elm et al., 2014) as follows: (a) clearly defined the source of participant selection, (b) clearly defined the eligibility criteria, (c) explain how to measure the exposure, (d) explain how to measure the outcome, (e) give the follow up information, (d) explain about sample size and power of the study. The quality of the included studies was assessed independently by two authors (KH, M, and E, SH). The studies were classified in three categories by using this checklist, which includes: low quality if each study obtained 30-59% of the total score, intermediate quality if each study retrieved 60-79% of the total score, and more than 70% considered as high quality. The value of weighted kappa statistic between author agreements was 86%. After confirming the quality of each study, two authors (KH, M, and E, SH) were independently extracted the data to the pre-specified data extraction sheet in Microsoft Excel. Variables extracted from each eligible study included: first author name, year of publication, period of study, location of study, study design, median follow up time, source of data, type of statistical analysis, sample size, mean age, the survival rate of one, three and five years with standard error or 95% confidence interval(CI).

Statistical analysis

We generated 1, 3 and 5 year pooled survival rate by using Der-Simonies and Laird's random-effect models. To calculate the standard error of survival rate and its variance, the 1 to 5-year survival rate in each study was considered as a binomial distribution. To graphically display the combined estimate of one, three and five-year survival rate, we used the metaprop command in Stata11. The metaprop command was specific to binomial data and for proportions near boundaries (i.e., in this instance 100% at 1-year survival or zero at stage IV) which allows computation of exact binomial and score test-based confidence intervals by allowing Freeman-Tukey double arcsine transformation to stabilize the variances. We used a Chi-squared test at the 5 % significance level ($p < 0.05$) and I^2 index to determine the statistical heterogeneity between studies. To find the potential source of heterogeneity we used meta-regression model with a suspected variable such as; sample size, publication year and location of study. Furthermore, we used subgroup analysis by gender, tumor site, and location of a study to determine the source of heterogeneity. Sensitivity analysis was done to investigate the effect of each study on the pooled 1, 3 and 5-year survival rate. In this study, the publication bias was not assessed because the probability of survival is always a positive number between zero and one and therefore, if we saw asymmetry in funnel plots it is due to the distribution of all studies on the right side of the vertical line that which is not related to publication bias.

We used Microsoft Excel 2010 to preparing data extraction sheet. Also, we used Stata11 (StataCorp, College Station, TX, USA) to conducted meta-analysis.

Results

Description of study

After initial search and screening by title, abstract and full text, 38 studies were enrolled according to the eligibility criteria which contain 19,160 patients, of the 61% were male (Figure1, Table 1, 2, 3). From the total sample size of included studies, 10309 (53.8%) patient were from Tehran, 1,527 (7.96%) patient were from the south, 1,291 (6.73%) subjects from the west, 859 (4.48%) patients from center and 413 (2.15%) and 227 (1.18%) patients were from the east and the north, respectively. We have two national studies that comprised 4,534 (23.66%) subjects from the whole country. The mean age of the patients with colorectal cancer included in this study was 53.1 years.

Survival rate

Using the random effect model, the pooled 1, 3 and 5 year survival rate of patient with colorectal cancer

were calculated 0.84 (95% CI: 0.81-0.87), 0.64 (95%CI: 0.59-0.70), and 0.54 (95%CI:0.49-0.58), respectively. The heterogeneity index (I^2) for 1, 3 and 5 year survival rate was 95.05%, 96.6% and 96.6%, respectively, that revealed the high heterogeneity between studies. To reduce the high heterogeneity between studies we performed subgroup analysis. According to the subgroup analysis, the pooled 1, 3 and 5 year survival rate in male subgroup, were 0.83 (95%CI: 0.79-0.88), 0.55 (95%CI: 0.53-0.57) and 0.44 (95%CI: 0.40-0.48), respectively. In female subgroup, the pooled 1, 3 and 5 year survival rate were 0.84 (95%CI: 0.80-0.88), 0.57 (95%CI: 0.52-0.63) and 0.50 (95%CI: 0.44-0.56), respectively. Furthermore, the result of subgroup analysis based on the tumor site revealed that, the pooled 1, 3 and 5 year survival rate in colon cancer subgroup were 0.90 (95%CI:0.87-0.93), 0.69 (95%CI: 0.63-0.75) and 0.60 (95%CI: 0.49-0.70) , respectively. In rectum cancer subgroup the pooled 1, 3 and 5 year survival rate were 0.88 (95%CI: 0.81-0.95), 0.73 (95%CI: 0.62-0.83) and 0.54 (95%CI: 0.36-0.69), respectively.

Table1. Characteristics of Included Studies in Meta-Analysis (Colorectal Cancer)

NO	First Author	Year of Publication	Year of study	Location	No. of patients	Mean age \pm SD	Survival rate (%)					
							1 year	2 year	3 year	4 year	5 year	10 year
1	Abbasi Asl M et al (2015)	2015	2007-2009	Tehran	88	56 \pm 13.91	79.2	63.7	52.5	46.2	39.6	—
2	Abdolalian Z et al (2016)	2016	1987-2012	Tehran	232	18-82	—	—	90	—	72	64
3	Allahyari A et al (2016)	2016	2009-2015	Mashhad	96	57.8	—	—	—	76	—	—
4	Ansari R et al (2007)	2007	1995-2003	Tehran	237	58.1 \pm 14.8	80	—	—	—	49	—
5	Dianatinasab M (2016)	2016	2009-2014	Shiraz	220	—	95	—	87	—	51	—
6	Esna-Ashari F et al (2008)	2009	2000-2004	Iran	2342	58.1 \pm 14.7	79.2	65	57.3	51.7	47.3	—
7	Faghihzade S et al (1998)	1998	1986-1990	Tehran	216	—	86	64	51.6	48.9	40.6	—
8	Fatemi R et al (2015)	2015	2004-2013	Tehran	107	53.5 \pm 12.6	—	—	—	—	73.8	—
9	Hashemian A.H et al (2017)	2017	2001-2007	Tehran	1127	—	91.2	—	73.2	—	61	—
10	Madadzadeh F et al (2017)	2017	2005-2010	Fars	561	55.7 \pm 13.6	—	—	—	—	59.6	—
11	Mehrabani D et al (2012)	2012	2003-2008	Shiraz	243	58.6 \pm 13.5	93.9	—	50.3	—	27.02	—
12	Mehrkhani F et al (2009)	2008	1999-2002	Tehran	1090	50.5 \pm 1.51	72	—	54	—	47	—
13	Moghimi-Dehkordi B et al (2008)	2008	2002-2007	Tehran	1127	53.5 \pm 14.3	91.1	—	73.1	—	61	47.9
14	Moradi A et al (2009)	2009	2000-2005	Iran	2192	57.8 \pm 14.9	84	68	54	43	41	—
15	Nasiri Sh et al (2010)	2010	1999-2002	Tehran	109	50.5 \pm 16.1	72	—	54	—	47	—
16	Omidvari sh et al (2013)	2013	2004-2010	Shiraz	153	57.15	—	—	—	—	69.4	—
17	Parsae R et al (2015)	2015	2006-2011	Mashhad	241	56.6 \pm 0.9	81	66	53	44	—	—
18	Payandeh M et al (Payandeh et al., 2016a)	2016	2002-2014	Kermanshah	183	54.2 \pm 13.2	—	—	—	—	84.6	—
19	RahimiPordanjani S (Chahmatki et al., 2016)	2016	2000-2010	Chaharmahal and Bakhtiari	452	59.1 \pm 19.9	85.7	—	—	—	71.9	52.5
20	Rasouli M.A et al (2017)	2017	2009-2014	Kurdistan	335	60.5 \pm 1.12	87	69	57	42	33	—
21	Roshanaei G et al (2014)	2014	2005-2013	Hamadan	169	56.4 \pm 14.5	89	—	54	—	31	—
22	Saeedi Saedi H et al (2009)	2009	2001-2006	Mashhad	76	50	—	—	68.2	—	—	—
23	Safae A et al (2012)	2009	2002-2007	Tehran	1127	53	—	—	—	—	61	—
24	Saki Malehi A et al (2012)	2012	2000-2007	Tehran	739	59.7 \pm 12.85	—	—	—	—	63.3	—
25	Semnani S et al (2016)	2015	2006-2007	Golestan	227	54	71	—	52	—	44	—
26	Vakili M et al (2014)	2014	2001-2011	Yazd	604	58.9 \pm 19.9	72.2	—	—	—	50.1	39.8
27	Zare-Bandamiri M et al (2016)	2016	2005-2010	Shiraz	570	55.8 \pm 23.6	—	—	—	—	56.9	—
28	Zaargar A et al (2016)	2016	2007-2009	Qazvin	35	64.73 \pm 13.2	96	—	86	—	75	—
29	Safae A (2010)	2010	2002-2005	Tehran	110	50.1	92.6	—	80.1	—	41.3	—

Table 2. Characteristics of Included Studies in Meta-Analysis (Colon and Rectum Cancer)

NO	First Author	Year of Publication	Year of study	Location	Mean age ± SD	Tumor site	No. of patients	Survival rate (%)					
								1 year	2 year	3 year	4 year	5 year	10 year
1	Akhavan A et al (2014)	2014	2004-2012	Yazd		Colon	-	-	-	-	-	-	
						Rectum	119	97	-	88	-	55	-
2	Akhoond M et al (2010)	2010	2002-2007	Tehran	53.5±14.3	Colon	802	88.7	77.9	68.5	61.4	56.8	
						Rectum	392	89.1	74.2	60.7	47.1	41.9	-
3	Amirifard N et al (2016)	2016	2012-2015	Kermanshah	57.6±12.5	Colon	25	-	71	-	-	-	
						Rectum	25	-	76	-	-	-	-
4	Amirifard N et al (2016)	2016	2011-2016	Kermanshah	52.8±14.5	Colon	-	-	-	-	-	-	
						Rectum	102	-	78	76	-	-	-
5	Asghari-Jafarabadi M et al (2009)	2009	2002-2007	Tehran	55±37.6	Colon	802	91.7	83.7	75.9	69	63.3	
						Rectum	392	96	91.2	84	78.2	76	-
6	Fatemi R et al (2015)	2015	2004-2013	Tehran	53.5±12.6	Colon	NR	-	-	-	-	75.9	
						Rectum	NR	-	-	-	-	70	-
7	Gohari M et al (2011)	2011	2002-2007	Tehran	53.7±14.6	Colon	790	92	-	71	-	48	
						Rectum	291	86	-	71	-	42	-
8	Heidarnia M.A et al (2013)	2013	2005-2006	Tehran	63±11.8	Colon	580	-	-	-	-	68.3	
						Rectum	-	-	-	-	-	-	-
9	Sanei B et al (Sanei et al., 2013)	2013	2003-2012	Isfahan	58.9±13.8	Colon	-	-	-	-	-	-	
						Rectum	101	63.6	-	-	-	40.7	-

Meta-regression analysis

To identify the effect of the potential variable like the year of study, sample size and location of study as a source of heterogeneity, we used meta-regression analysis (Table 4). In the univariable model there was no significant association between included variables and pooled 1, 3 and 5-year survival rate (p-value>0.05). In multivariable meta-regression model, only there was a significant association between year of study and pooled

5-year survival ($\beta= 18.9, P=0.01$).

Sensitivity analysis

According to the result of sensitivity analysis that indicated in Table 5, after omitting each study there were no significant changes in the pooled 1, 3, and 5-year survival rate of the patients with CRC.

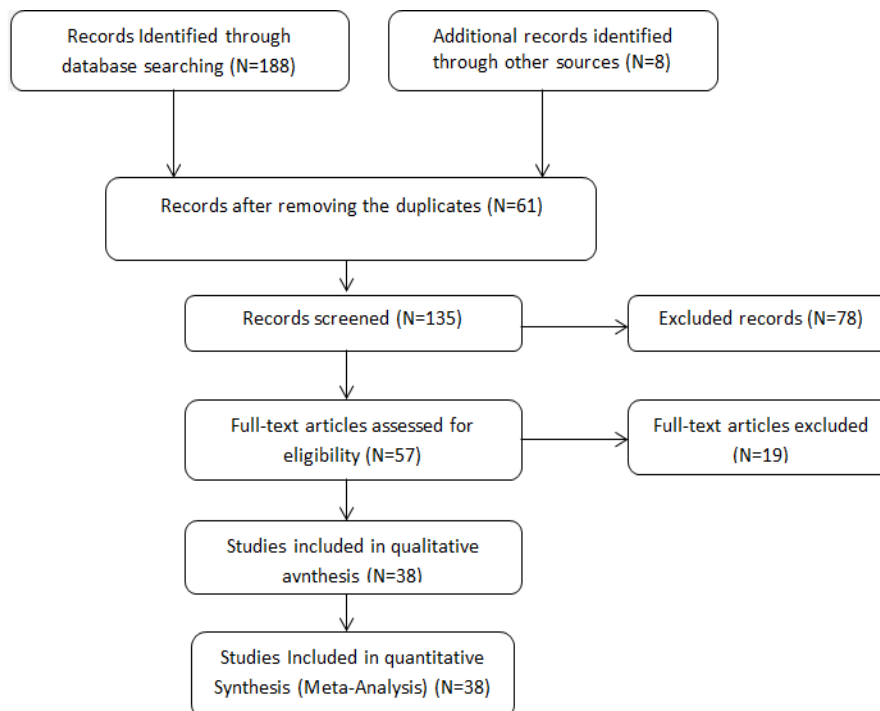
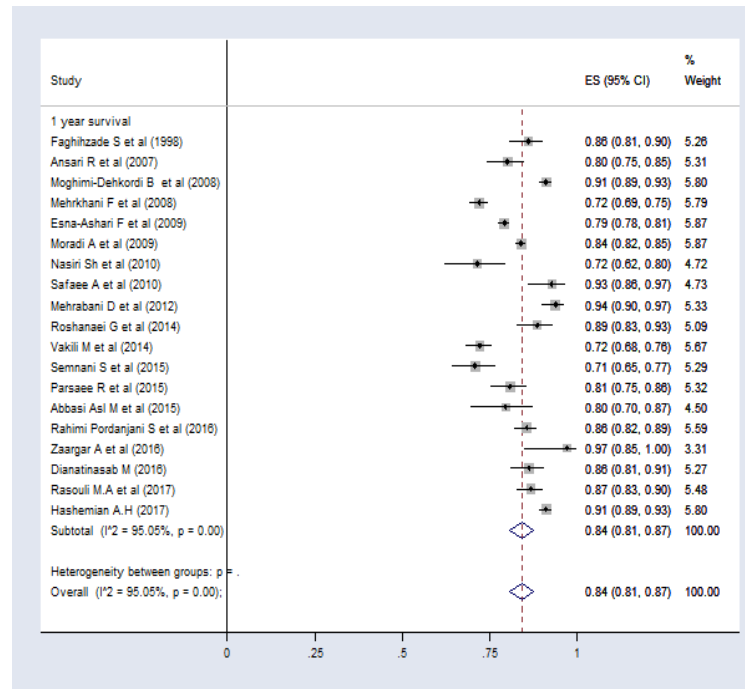


Figure 1. Flowchart of Search and Studies Selection

Table 3. Result of Subgroup Analysis for Estimating the Pooled 1, 3, and 5 Year Survival Rate in Patient with Colorectal Cancer

NO	Title	Subgroup	No. of study	1 year survival 95%CI	No. of study	3 year survival 95%CI	No. of study	5 year survival 95%CI
1	Tumor site	Colorectal	19	0.84 (0.81-0.87)	18	0.64 (0.59-0.70)	26	0.54 (0.49-0.58)
		Colon	4	0.90 (0.87-0.93)	4	0.69 (0.63-0.75)	5	0.60 (0.49-0.70)
		Rectum	6	0.88 (0.81-0.95)	6	0.73 (0.62-0.83)	6	0.54 (0.36-0.69)
2	Gender	Male	6	0.83 (0.79-0.88)	3	0.55 (0.53-0.57)	7	0.44 (0.40-0.48)
		Female	6	0.84 (0.80-0.88)	3	0.57 (0.52-0.63)	7	0.50 (0.44-0.56)



Figuer 2. Forest Plot of Pooled 1 Year Survival Rate in Patient with Colorectal Cancer

Discussion

In this meta-analysis, we estimated the pooled 1, 3, and 5 year survival rates of patient with colorectal cancer in Iran.

The pooled 1, and 3 year survival rates in our study were 0.84 (95% CI: 0.81-0.87) and 0.64 (95%CI: 0.59-0.70), respectively. In a study conducted in India in 2001 the 1 and 3 year survival rates were reported

63.4 and 42.2, respectively (Yeole et al., 2001), that was lower than the results of our study. Otherwise, in a study by Coleman in 2011 the 1-year survival rate in Australia, Canada, Denmark, Norway, Sweden, and the UK was reported by 84.9, 83.5, 77.7, 82.4, 83.8, and 74.7, respectively (Coleman et al., 2011). The result of this study is consistent with the finding of our study. In a study from China in 2013, the 3year survival rate was reported 0.74 (Yuan et al., 2013). The 5-year survival rate in our study

Table 4. Meta-Regression Analysis for Assessing the Effect of Suspected Variables on the Pooled 1, 3, 5 and 10 Year's Survival

Survival rate	Variable	Univariable Model			Multivariable Model		
		β	SE	P-value	β	SE	P-value
1 year survival rate	Year of study	-0.29	4.4	0.94	0.41	6.2	0.9
	Sample size	1.5	4.07	0.7	0.93	5	0.8
	Location	-1.1	3.9	0.7	-0.95	5	0.8
3 year survival rate	Year of study	3.6	6.9	0.6	7.3	7.6	0.3
	Sample size	3.3	6.1	0.5	2.8	6.6	0.6
	Location	-9.5	5.5	0.1	-10.7	6	0.09
5 year survival rate	Year of study	9.7	6	0.1	18.9	7.1	0.01
	Sample size	-0.88	7	0.9	7.4	7.05	0.3
	Location	-3	6	0.6	-11	6.2	0.09

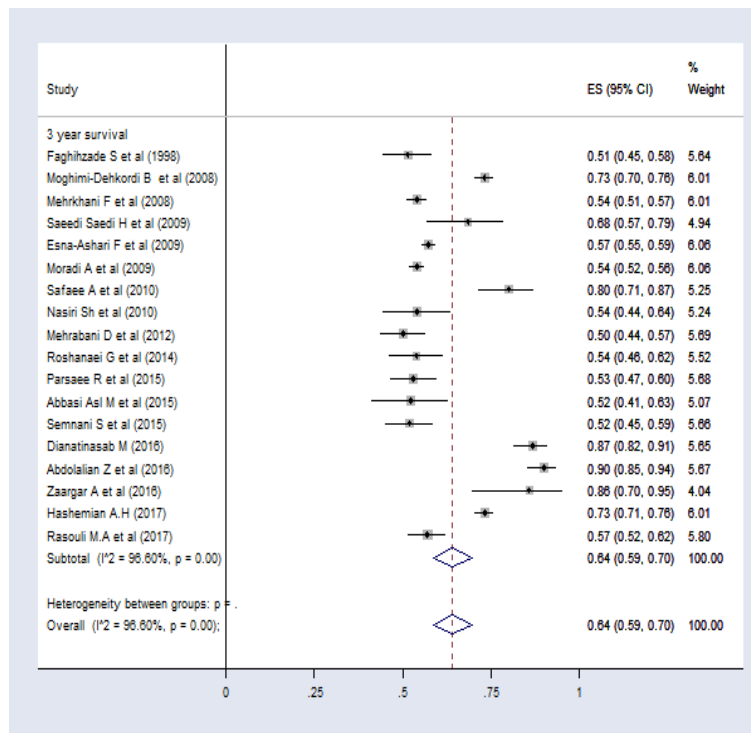


Figure 3. Forest Plot of Pooled 3 Year Survival Rate in Patient with Colorectal Cancer

was 0.54 (95%CI: 0.49-0.58). In studies that conducted in developing countries like India in 2001 (Yeole et al., 2001) and in Malaysia in 2010 (Ghazali et al., 2010), the 5-year survival rate was reported 33.6 and 34.3 respectively.

In a study from Japan in 2005, the 5-year survival rate was reported 61.4 (Shiono et al., 2005). Also, studies that conducted in Germany in 2012, USA, England, France, and Italy were reported the 5-year survival rate 65, 65, 52.7, 60.3 and 59.3 respectively (Brenner et al., 2012;

Majek et al., 2012; team, 2017). And also in a study conducted in China, the 5-year survival rate was reported 0.68 (Yuan et al., 2013).

The 5 year survival rate of patients with colorectal cancer in our country is lower than the developed regions. Therefore, we conclude that the survival rate of patients with colorectal cancer in Iran is between developed and developing countries.

The survival rate of CRC patient in Iran like other

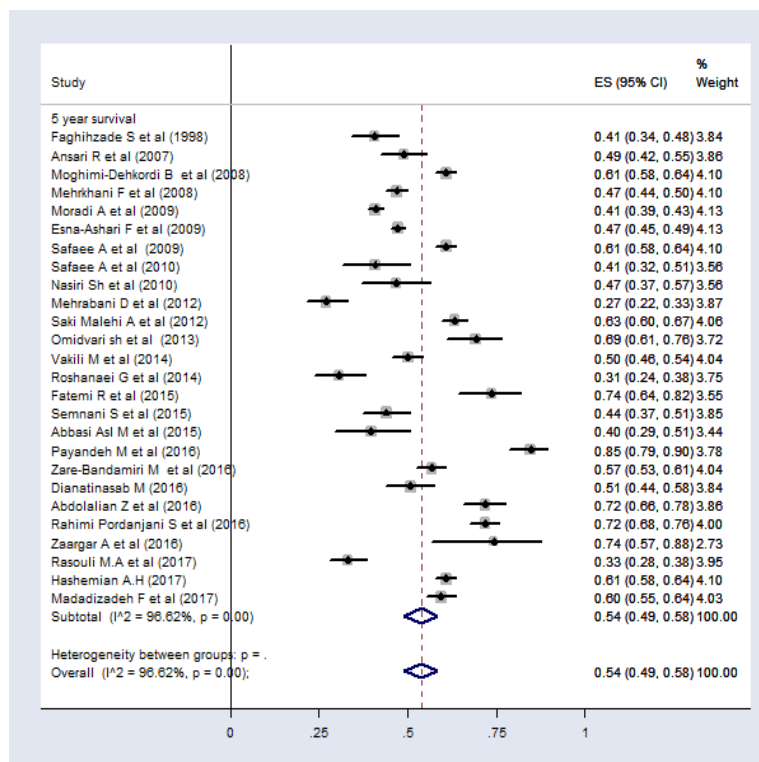


Figure 4. Forest Plot of Pooled 5 Year Survival Rate in Patient with Colorectal Cancer

patients in the world depends on various factors such as demographic, pathologic and tumor characteristics, geographical distribution and gene mutation or having a family history (Dolatkhah et al., 2015; Rafiemanesh et al., 2016). But the most important factor for Iranian CRC patient is that they disease diagnosed in advanced stage (Aryaie et al., 2013; Dolatkhah et al., 2015). So this significant difference in 5-year survival rate may be due to, poorly established screening program like the fecal occult blood test, sigmoidoscopy and colonoscopy and limited accessibility in developing region (Sankaranarayanan et al., 2011).

According to the high heterogeneity between the results of the included studies, we used subgroup analysis. The results of meta-analysis in subgroup based on the tumor site revealed that the pooled 1 and 5 year survival rate in colon cancer was better than the rectum cancer and only 3-year survival rate was better in rectum cancer than the colon cancer.

In a study from Malaysia in 2010, the 5-year survival rate in colon cancer was reported 0.44 and 0.23 for rectum cancer (Ghazali et al., 2010). In China, in 1992-1995 the 5-year survival rate in Colon and rectum cancer was reported at 0.43 and 0.41 respectively (Xiang et al., 2011). The result of these studies was similar to the results of our study.

The result of studies in USA (team, 2017) and England (Morris et al., 2011) revealed that the 5-year survival rate is slightly higher for rectal cancer than colon cancer.

The result of some studies suggest that, the different site of tumors in colorectal cancer have been influenced by different risk factors and may have different biological and molecular profile, that they can results in differences in survival rate (Andrieu et al., 2004; Mahipal et al., 2006; Kim et al., 2007; Yamauchi et al., 2012; Phipps et al., 2013). In one study the differences between survival rates by tumor site were dependent on stage at diagnosis, for example, there were no differences in survival of colon and rectum cancer in early stage, but in the advanced stage, patient with rectum cancer have better survival than colon cancer (Lee et al., 2013). Other studies claimed that colon cancer has a better response to antitumor drugs than the rectum cancer (Ueo et al., 1991; Lee et al., 2013) and patient with colon cancer has better prognosis than rectum cancer (Li et al., 2007; Lee et al., 2013).

The results of subgroup analysis based on gender indicate that, for all 1, 3, and 5 years, the survival rates for women were better than men.

In a study in Germany in 2013 (Majek et al., 2013) and Cuba in 1994-1995 (Garrote et al., 2011) the age-specific 5-year survival rate in women was better than men that were similar to the result of our study.

The reason for better survival in women than men may be due to higher participation rate in women compared in men for screening programs like fecal occult blood test and colonoscopy (Stock et al., 2011; Pox et al., 2012; Majek et al., 2013). The most important factor for better survival in women is female gonadal hormones that have a protective effect and influence on the immune system. On the other hand, testosterone has a destructive effect on the immunological response (Parkin et al., 2005; Santarelli

et al., 2008; Hagggar and Boushey, 2009).

Limitation

One of the most important factors that influence the survival of patients with colorectal cancer was the stage of diagnosis. The 5year survival rate was ranged from 90% in localized stage, 70% for regional and 10% for the patients diagnosed at distant metastatic stage (7:11,17). In our study because of the limited number of conducted study in this filed and using different criteria for staging we can't estimate the pooled survival rate of the colorectal cancer patient in a different stage.

A large number of studies were excluded due to the overlap of these studies by location and year of the study. Another limitation was that most of the studies were conducted in Tehran and we didn't have sufficient data for other parts of the country. Also, some studies were reported the survival rate differently, for example, they reported only mean and median survival.

In conclusion, the result of this study indicates that the 1 and 3 year survival rate of the patients with colorectal cancer in Iran was similar to developed countries and 5-year survival rate in our country was between developed and developing countries. The survival of colorectal cancer in all year in women was significantly better than man and the survival rate by tumor site was better in colon cancer than rectum cancer.

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