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Effectiveness of Education and Counselling Interventions on Cancer Patients' Pain: A Systematic Review and Meta-Analysis

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Abstract

Background: Pain is the most frequent and devastating symptom experienced by cancer patients. Education and counselling interventions can effectively manage cancer related pain. However, magnitude of their effectiveness needs to be examined critically. **Purpose:** This review aimed to evaluate the effectiveness of education and counselling interventions on pain intensity, quality of life (QoL), self-efficacy and pain related knowledge of cancer patients. **Methods:** Databases of PubMed, CINAHL, SPRINGERLINK, and Cochrane CENTRAL were searched for studies published between January 2013 and December 2023. Cochrane Risk of Bias tool version 2 (RoB 2) was used to assess risk of bias in the included studies. Meta-analysis was performed to calculate the pooled effects of the interventions. **Results:** 14 RCTs involving 1,756 cancer patients with pain were included in this review. Seven studies provided the data for meta-analysis which favors the education and counselling interventions as compared to usual care on pain intensity with a large pooled effect size; the standardized mean difference was (SMD) −3.06 [95% CI −4.54, −1.58; p = 0.001], QoL SMD 2.25 [95% CI 1.89, 2.62; p = 0.001], self-efficacy SMD 0.82 [95% CI 0.30, 1.33; p = 0.002], and pain related knowledge SMD 0.81 [95% CI 0.27, 1.35; p = 0.003]. **Conclusion:** Education and counselling interventions are highly effective for improving pain intensity, QoL, self-efficacy and pain-related knowledge of cancer patients. These interventions could be integrated into clinical practice to facilitate cancer patients with pain.

Keywords

Cancer, Counselling, Education, Knowledge, Pain, Quality of Life, Self-Efficacy

1. Introduction

Globally, the burden of cancer has risen up to 19.3 million new cases and 10.0 million cancer deaths in 2020. Prevalent cases have increased in five years to more than 50 million. Every 1 in 5 persons develops cancer in which 1 in 8 men and 1 in 11 women die from it. Approximately, 28 million new cancer cases are expected each year by 2040, worldwide [1]. In Pakistan, the prevalence of cancer is increasing with an estimated 178,388 newly diagnosed cases and 117,149 deaths annually. The prevalence of cancer cases diagnosed within five years is 329,547 [2].

Pain is one of the most frequent and distressing symptoms experienced by cancer patients at any stage of their disease trajectory. Nearly, one-third of adult patients who are under active treatment for cancer and two-thirds of patients having advanced malignant diseases experience pain [3]. In Pakistan, the rate of under treatment of cancer pain among patients with advanced cancer is approximately 64% and the barriers to effective pain control are insufficient training of clinicians, false beliefs of patients, unavailability of opioid medicines, and socioeconomic factors [4]. Persisting and inadequately treated pain can be devastating and may negatively affect patients' psychological and emotional well-being, activities of daily living, and QoL [5] [6].

Adults usually have professional and household related responsibilities and they desire self-management to cope appropriately with the cancer related pain instead for being a passive recipient of the pain management by the health-care provider [7]. Therefore, they need to learn how to assess pain, administer medications, manage side effects, and respond in case of unrelieved pain [8]. Patients' pain related self-management skills depend on their knowledge, practices, and attitudes regarding pain management [9]. Through education and counseling interventions, healthcare professionals guide cancer patients on how to utilize pain relieving strategies in their everyday life and how to solve problems caused by pain which help in managing their pain, enhancing their self-efficacy and improving their QoL [10].

Various trials revealed that education and counselling interventions have a significant and positive impact with a small to moderate effect on patients' cancer related pain [11]-[14]. Only one recent systematic review on the relevant topic has been found in which narrative synthesis of six RCTs was conducted to evaluate the effects of educational interventions for the outcomes of cancer related pain, QoL, self-efficacy, pain related knowledge and medication adherence. Findings revealed the effectiveness of the intervention for improving QoL and pain-related knowledge. However, results of effectiveness of intervention on pain intensity, self-efficacy and medication adherence were varied across the studies [15]. Hence,

there is a need to critically review education and counselling interventions for their effectiveness with estimation of the magnitude of their pooled effect size and evaluated if they could be adopted into practice to facilitate cancer patients with pain.

Review Question

What are the effects of education and counselling interventions on cancer patients' pain intensity, QoL, self-efficacy, and pain related knowledge in comparison to usual care?

2. Methods

A protocol of systematic review was developed and registered on PROSPERO (CRD42023479806). The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines are followed for reporting this systematic review and meta-analysis [16].

2.1. Eligibility Criteria

This review included interventional studies including only randomized controlled trials (RCTs) which were published between January 2013 to December 2023 in Peer-reviewed journals in English language. Participants in these studies were adult (≥18 years) cancer patients who were suffering from pain. Interventions were education and counselling which were implemented through any mode of delivery. Comparison groups were usual or standard care. Primary outcome was pain intensity and secondary outcomes were quality of life, self-efficacy, and pain related knowledge.

All reviews, non-interventional studies, qualitative studies, protocols, editorial comment papers, discussion papers, research thesis, and dissertations were excluded. Studies focused on patients younger than 18 years or targeting non-cancer-related pain were not included.

2.2. Search Strategy

Assistance from an academic librarian was obtained for developing the search strategies. Relevant keywords and related Medical Subject Headings (MeSH) for each component of PICOS were identified. A systematic search for literature was carried out on the databases of PubMed, SPRINGERLINK, Cochrane CENTRAL, and Cumulative Index to Nursing and Allied Health Literature (CINAHL) to find studies in English language that were published between 1st January 2013 to 30th December 2023. The following keywords were used "patient*" AND "cancer pain" OR "cancer related pain" AND "education" OR "educational intervention" AND "counselling" OR "psychoeducation" AND "pain Intensity" OR "pain severity" AND "quality of life" AND "self-efficacy" OR "self-management" OR "self-care" AND "pain related knowledge". The keywords were searched in different combinations. The search was further refined by using different filters including, spe-

cies-human, study-RCTs, field-cancer and original research. Additionally, a manual search in reference lists of relevant articles and reviews was also conducted to find more studies. Details of all search results and selection processes are recorded in the PRISMA flow chart (Figure 1).

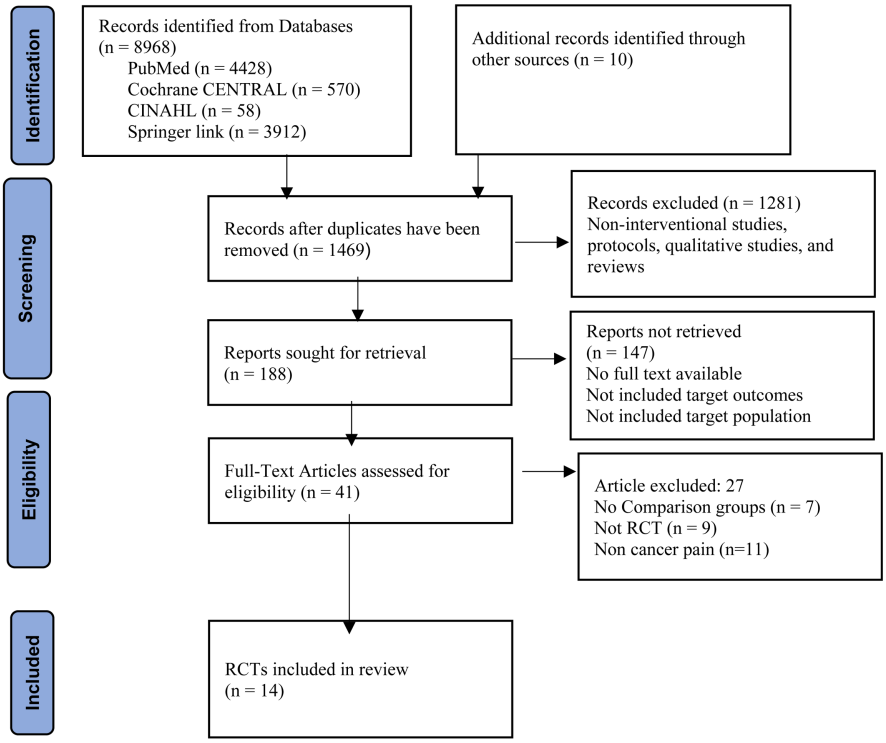

Figure 1. PRISMA flow chart for search results and selection processes.

2.3. Process of Study Selection

Duplicate studies were removed by using Zotero Reference Manager [17]. The retrieved titles and abstracts were evaluated for relevance and then relevant articles were reviewed as full text. All studies were assessed, evaluated, and finalized on the basis of inclusion and exclusion criteria before being included in the final review by the consensus of another independent reviewer (AK) to ensure the objectivity in selection process and reduce the selection bias. After the full-text review, 14 studies were included in this review

2.4. Quality assessment of individual studies

All the studies were critically apprised by utilizing the Cochrane Risk of Bias tool version 2 (RoB 2) which provides a judgement for low, some concern, or high risk [18]. Included RCTs were assessed for quality under five domains: risk of bias in the randomization process, deviation in intended intervention, missing outcome data, measurement of outcome, and selection of the reported result. Risk of bias graph in Figure 2 shows the proportion of results at each level of risk of bias in the included studies. As shown in Figure 3, all studies had some concerns about risk of bias except one [19].

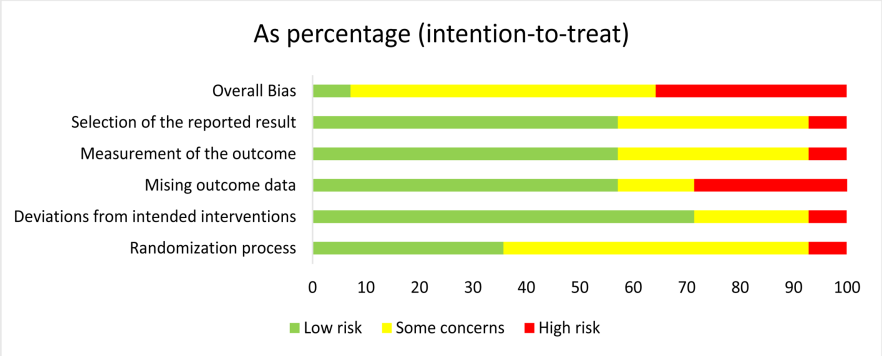

Figure 2. Risk of bias graph.

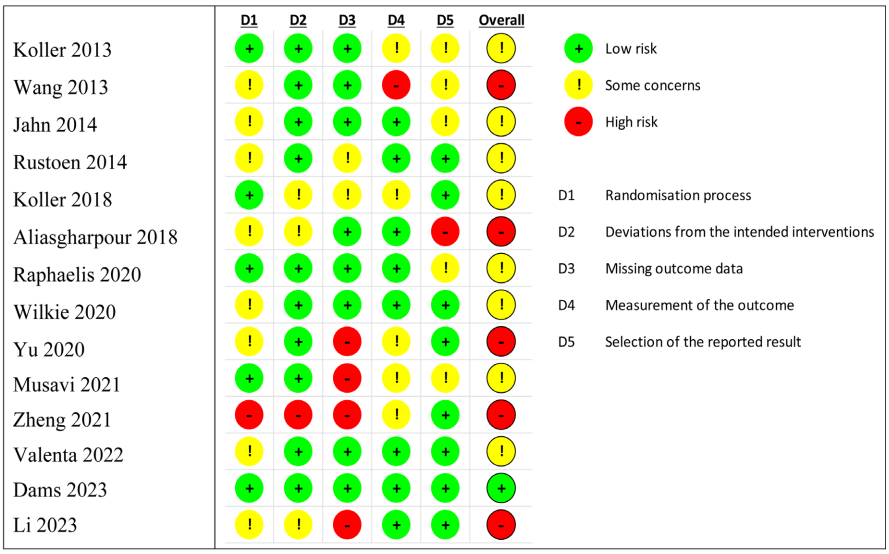

Figure 3. Risk of bias summary.

2.5. Statistical Analysis

Meta-analysis was performed using the REVMAN 5.4.1 software to calculate the magnitude of pooled effect size of interventions for pain intensity, QoL, self-efficacy, and pain related knowledge. Numeric values required for meta-analysis were provided only in seven RCTs. Values of mean and standard deviation of the outcomes for intervention and control groups and number of participants in each group were entered in REVMAN. The random effect model was used for more than 50% heterogeneity. For effect size estimation, standardized mean differences between the experimental and control groups were calculated with 95% confidence intervals.

2.6. Data Extraction

A structured Excel sheet was used to extract information from the included studies. Accuracy and completeness of extracted data were verified twice. Reviewers discussed the discrepancies in the data and resolved disagreements by reaching consensus (Tables 1-3).

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Table 1. Socio-demographic and clinical characteristics of RCTs.

Study Data			Socio-Demographic and Clinical Characteristics of Intervention Group (IG) and Control Group (CG)															
A/Y/C	P: CG/IG	S	Age (CG)		Age (IG)		Cancer Stage (CG)%				Cancer Stage (IG)%				Radio (CG)	Radio (IG)	Chemo (CG)	Chemo (IG)
			M	SD	M	SD	I	II	III	IV	I	II	III	IV				
Koller *et al.*, 2013 - Germany	39: 20/19 Pain ≥3 on NRS	C	58.5	10.8	60.5	11.1	NR	NR	NR	-	-	-	-	-	55	57.89	40	31.57
Wang *et al.*, 2013 - China	237:114/123	H	-	-	51.3	-	15.8	4.4	-	79.8	8.9	10.6	-	80.5	-	-	-	-
Jahn *et al.*,2014 - Germany	207: 105/102 Pain ≥3.0 on NRS	H	55.90	12.62	57.75	1.97	20.5	38.5	41.0	-	42.9	50.0	7.1	-	2.9	2.9	16.2	7.8
Rustoen *et al.*, 2014 - Norway	179: 92/87 Pain ≥ 2.5 on NRS	C	66.8	12.7	64.3	11.4	-	-	-	-	-	-	-	-	34.8	29.9	38	31
Koller *et al.*, 2018 - Germany	39: 19/20 Pain ≥ 3 on NRS	H	58.1	11.2	55.3	10.2	-	-	-	-	-	-	-	-	-	-	-	-
Aliasgharpour *et al.*, 2018 - Iran	98: 49/49 Pain ≥ 4 on VAS	H	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Raphaelis *et al.*, 2020 - Austria	153: 92/61	H	58.9	60.0	58.6	59.0	-	-	-	-	-	-	-	-	-	-	-	-
Wilkie *et al.*, 2020 - USA	234: 154/80 Pain ≥3 on 0-10 Scale	H	67.9	14.4	69.5	13.1	-	-	-	-	-	-	-	-	-	-	-	-
Yu & Wang, 2020 - China	100: 50/50	H	50.1	2.8	49.7	2.7	-	-	56	44	-	-	46	54	-	-	-	-
Musavi *et al.*, 2021 - Iran	75: 35/40 pain 3 - 10 on VAS	H	46.28	8.31	47.80	12.23	-	-	-	-	-	-	-	-	-	-	-	-
Zheng *et al.*, 2021 - China	94: 47/47 pain ≥ 4 on NRS	H	49.23	6.79	49.51	7.06	-	-	51	49	-	-	47	53	-	-	-	-
Valenta *et al.*, 2022 - Switzerland	26: 9/17 Pain = 3 on NRS	C	64.1	11.0	66.6	14.5	-	-	-	-	-	-	-	-	33.3	23.5	55.6	11.8
Dams *et al.*, 2023 - Belgium	184: 92/92	H	55.2	11.4	55.4	11.5	54	31.5	8	6.5	48	39	10	3	72	80	60	68.5
Li *et al.*, 2023 - China	91: 43/48	H	56.67	15.82	56.10	15.63	-	-	-	-	-	-	-	-	-	-	-	-

Author/ Year/Country (A/Y/C), Participants (P), Setting (S), Hospital (H), Community (C), Control Group (CG), Intervention Group (IG), Mean (M), Standard Deviation (SD), Radiotherapy (Radio), Chemotherapy (Chemo) Visual Analogue Scale (VAS), Numeric Rating Scale (NRS).

Table 2. Intervention details and measurement tools.

A/Y/C	Control Group	Intervention Details						Measurement Tools			
		Intervention Provider	Intervention Content	Mode of Delivery	Dose/Duration	Frequency	Follow up Period	Pain Intensity	Quality of Life	Self-Efficacy	Pain Related Knowledge
Koller *et al.*, 2013- Germany	Standard care	Nurses	PRO-SELF with Three key strategies: information provision, skills building, and nurse coaching	Face to face and Telephone	Visit: 1 hr and Phone calls: 5 - 10 min	10 contacts 6 visits and 4 phone calls	22 wks	Pain Dairy NRS	-	PSEQ	PPQ
Wang *et al.*, 2013 China	Standard care	Pharmacist	Medication education	Face to face and Telephone	30 min	8 contacts	4 wks	BPI	-	-	PKQ
Jahn *et al.*,2014-Germany	Usual Care	Nurses	SCION-PAIN 3 modules: pharmacologic, non-pharmacologic pain management, and discharge management. Patient education, skills training, and counseling	Face to face and Telephone	1 hr 50 min	3 - 6 contacts	4 wks	BPI	EORTC QLQ C30	-	FESV-BW
Rustoen *et al.*,2014-Norway	Usual care and booklet	Nurses	PRO-SELF Pain Control Program	Face to face and Telephone	-	6 contacts	6 wks	Pain Diary and NRS	-	-	-
Koller *et al.*, 2018- Germany	Standard care	Nurses	ANtiPain information, skill building and coaching	Face to face and Telephone	-	3 contacts	6 wks	BPI	MOS SF	PSEQ	-
Aliasgharpour *et al.*, 2018 Iran	Routine care	Nurses	Education and training	Face to face	20 min	6 contacts	6 wks	VAS	-	-	-
Raphaelis *et al.*, 2020- Austria	Standard care	Nurses	EvANtiPain (information, skills building and Coaching)	Face to face and Telephone	50 m - 1 hr 30 m	3 contacts	8 wks	BPI	EORTC QLQ C30	PSEQ	-
Wilkie *et al.*, 2020 USA	Usual care	Nurses	PAINRelieveIt eHealth intervention	Internet-based system	-	-	1 wk	PINS	-	-	-
Yu & Wang, 2020 China	Routine care	Nurses	Humanized nursing care	Face to Face	-	-	4 wks	VAS, BPI	WHOQOL	-	-
Musavi *et al.*, 2021-Iran	Routine care	Nurses	Providing information, skill development, guidance	Face to face and Telephone	2 hrs	3 - 6 contacts	12 wks	VAS	EORTC QLQ C30	PSEQ	-
Zheng *et al.*, 2021 China	Usual care	Nurses, Psychologist, Physician	education and counselling	Face to face and Telephone	-	-	-	NRS	GQOLI 74	-	-
Valenta *et al.*, 2022- Switzerland	Usual care	Nurses	PRO-SELF© Plus PCP (information, skills building and Coaching)	Face to face and Telephone	1 hr and 10 min	7 contacts including 2- 3 home visits	6 wks	Pain diary BPI	-	PMI, SEQ	PPQ
Dams *et al.*, 2023 Belgium	Usual care/biomedical education	Physiotherapist	pain neuroscience education (PNE)	Face to face and digital session	30 min	6 contacts	72 wks	VAS	-	-	-
Li *et al.*, 2023 China	Routine care	Nurses	Orem-based nursing care	Face to Face	-	-	4 wks	VAS	QOLS (SF-36)	ESCA	-

Brief Pain Inventory (BPI), German Pain Coping Questionnaire (FESV-BW), European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ C30), Self-Care Improvement through Oncology Nursing (SCION)-PAIN, Visual Analogue Scale (VAS), Eastern Cooperative Oncology Group Performance Status (ECOG-PS), Patient Pain Questionnaire (PPQ), Eastern Cooperative Oncology Group (ECOG-PS) Generic Quality of Life Inventory-74 (GQOLI-74). Pain Self-Efficacy Questionnaire (PSEQ), Numeric Rating Scale (NRS).

Table 3. Outcomes measurement.

(a)

A/Y/C	Results Pain Intensity																							
	AP								WP								OPS							
	T0 (CG)		T0 (IG)		T1 (CG)		T1 (IG)		T0 (CG)		T0 (IG)		T1 (CG)		T1 (IG)		T0 (CG)		T0 (IG)		T1 (CG)		T1 (IG)	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Koller *et al.*, 2013 - Germany	4.18	1.79	3.80	2.01	2.66	1.89	2.58	1.73##	5.75	2.00	5.07	2.48	3.49	2.26	3.31	2.04##	-	-	-	-	-	-	-	-
Wang *et al.*, 2013 China	4.90	2.33	4.96	2.14	3.50	2.69	2.87	2.22*	6.56	2.23	6.68	1.99	4.81	3.02	4.22	2.47*	-	-	-	-	-	-	-	-
Jahn *et al.*, 2014-Germany	3.43	1.67	3.37	1.57	-	-	-	##	5.11	2.18	5.33	2.25	-	-	-	##	-	-	-	-	-	-	-	-
Rustoen *et al.*, 2014 -Norway	3.7	1.5	3.6	1.6	-	-	-	**	5.1	2.0	5.1	2.1	-	-	-	**	-	-	-	-	-	-	-	-
Koller *et al.*, 2018 - Germany	4.9	1.41	4.0	1.56	-1.71	1.77	-2.45	1.51##	8.2	1.43	7.6	1.39	-3.14	4.00	-4.27	2.41##	-	-	-	-	-	-	-	-
Aliasgharpour *et al.*, 2018 Iran	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30.44	8.007	30.18	8.18	29.95	8.49	16.51	10.83**
Raphaelis *et al.*, 2020 - Austria	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	##
Wilkie *et al.*, 2020 USA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.70	*	-	-	-	-	-	-	-	-
Yu & Wang, 2020 China	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		0.14	3.06	0.13**
Musavi *et al.*, 2021-Iran	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.71	0.51	5.37	0.62	5.36	0.64	2.52	0.69**
Zheng *et al.*, 2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*
Valenta *et al.*, 2022 -Switzerland	3.7	1.3	4.3	1.8	3.1	1.3	2.0	1.2*	5.1	2.0	5.3	1.9	3.8	2.0	2.3	1.5##	50.7	23.2	50.7	23.2	47.5	31.5	72.8	28.6##
Dams *et al.*, 2023 Belgium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	##
Li *et al.*, 2023 China	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*

Average Pain (AP), Worst Pain (WP), Overall pain score (OPS), Brief Pain Inventory (BPI), Visual Analogue Scale (VAS), Not Reported (-), Statistically Significant P ≤ 0.05 (*), Statistically Significant P ≤ 0.01 (**) Not Significant (##), Measured at Baseline (T0), Measured at Week 6 (TI).

Continued

(b)																								
A/Y/C	Results																							
	Quality of life								Self-Efficacy								Pain Related Knowledge							
	T0 (CG)		T0 (IG)		T1 (CG)		T1 (IG)		T0 (CG)		T0 (IG)		T1 (CG)		T1 (IG)		T0 (CG)		T0 (IG)		T1 (CG)		T1 (IG)	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Koller *et al.*, 2013 - Germany	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	##	5.96	1.13	5.56	1.24	5.91	1.19	6.44	1.34*
Wang *et al.*, 2013 China	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.53	2.63	12.39	2.55	14.62	3.22	17.92	2.38*
Jahn *et al.*, 2014-Germany	-	-	-	-	-	-	-	##	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	*
Koller *et al.*, 2018 - Germany	26.3 45.9	6.05 7.91	27.1 42.9	8.61 12.02	3.39 4.11	7.52 13.38	9.46 9.48	13.03 15.16##	3.1	1.01	3.1	1.48	0.20	1.53	1.5	1.44 ##	-	-	-	-	-	-	-	-
Raphaelis *et al.*, 2020 - Austria	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-
Yu & Wang, 2020 China	-	-	-	-	22.48	2.17	30.35	2.23**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Musavi *et al.*, 2021-Iran	34.28	16.01	32.33	15.13	29.52	11.46	59.00	10.83**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zheng *et al.*, 2021	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Valenta *et al.*, 2022 -Switzerland	-	-	-	-	-	-	-	-	69.9	10.1	69.2	18.5	67.3	12.8	79.9	17.8*	6.0	1.7	5.7	1.1	6.4	1.8	7.3	1.2*
Li *et al.*, 2023 China	-	-	-	-	-	-	*	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-

Not Reported (-), Statistically Significant P ≤ 0.05 (*), Statistically Significant P ≤ 0.01 (**) Not Significant (##), Measured at Baseline (T0), Measured at Week 6 (TI) Quality of life Physical (QoLP), Quality of life Mental (QoLM).

3. Results

3.1. Study Characteristics

This review includes 14 studies, all are RCTs and were conducted across a variety of countries including four from China [20]-[23], three from Germany [12] [13] [24], two from Iran [14] [25], and one each from Norway [26], Austria [27], USA [28], Switzerland [29] and Belgium [19].

There was a total of 1,756 participants, ranging from 26 to 237. The mean ages of the participants ranged between 46.2 to 69.5. The interventions were provided in 11hospitals [12] [14] [19]-[25] [27] [28] and three in community settings [13] [26] [29]. Seven studies provided the marital status of the participants, showing that majority (71.3%) were married and 28.7 % were single [14] [20] [21] [24] [25] [28] [29]. Four studies reported work status of the participants in which 79% were unemployed, and only 21% were employed [14] [21] [26] [29].

Five studies recorded the cancer stage in which 34% participants were in stage IV cancer, 15% were at stage III; 13% were at stage II, and 17% were at stage I [12] [19] [21]-[23]. Five studies reported information on the participants' treatments; 34% were receiving radiation therapy and 33% chemotherapy [12] [13] [19] [26] [29]. Inclusion criterion for cancer pain was reported as a grade ≥ 3 on Visual Analog Scale (VAS) or Numeric Rating Scale (NRS) of 0-10 in six studies [12]-[14] [24] [28] [29] ≥ 4 in two studies [23] [25] and ≥ 2.5 in one study [26]. However, in five studies the level of pain used as an inclusion criteria were not reported [19]-[22] [27].

3.2. Intervention Characteristics

Interventions were provided to the participants individually or in groups. Interventions were delivered face-to-face and via telephone in nine studies [12]-[14] [21] [23] [24] [26] [27] [29]. In three studies, face-to-face sessions were provided to the patients [20] [22] [25]. Internet based system was used to deliver the intervention in one study [28] and digital system with face-to-face session in one study [19]. In 11studies, the intervention providers were specially trained nurses [12]-[14] [20] [22] [24]-[29]. In one each study, pharmacist [21], physiotherapist [19] and nurses in collaboration with psychologist and physician [23] provided the intervention. The duration of face-to-face education and counselling varied from 10 minutes to 2 hours and the duration of telephonic follow-up was 5 - 20 minutes. The number of sessions was 3 to 10 and follow-up period ranged from 1 to 72 weeks. Education and counselling interventions for pain management were comprised of structured and tailored parts of information provision, skills building and coaching in nine studies [12]-[14] [20] [24] [26]-[29]. Focus of all interventions was on teaching and coaching the patients for their pain management [12]-[14] [19]-[29]. Basic components of these interventions included assessment of patients' baseline knowledge and attitude, development of their pain management skills including use of pain scales, formulation of individualized plans. Coaching

on pharmacological and non-pharmacological measures for pain relief and discharge management were also provided. In addition, supplementary materials such as teaching booklet, educational pamphlet, laminated cards, a pain diary, a weekly pill box, a compact disc, and a discharge preparation checklist were provided to the participants. Whereas, the control groups received usual/standard/routine care along with pharmacological pain treatment that was followed with instructions by the ward staff. In one study usual care comprised a booklet for pain management [26] (**Table 2**).

3.3. Outcome Measures

Pain intensity was measured in each study as the primary outcome. Brief Pain Inventory (BPI) used in six studies [12] [20]-[22] [24] [27] self-reported pain diary in three studies [13] [26] [29], VAS in three studies [14] [19] [25], NRS in one study [23] and Pain Intensity Number Scale (PINS) in one study [28]. Seven studies assessed QoL, four studies [12] [14] [20] [27] used the validated European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ C30), WHO QoL survey in one study [22], medical outcome study short-form, a 12-item self-report tool in one study [24], and generic QoL inventory-74 in one study [23]. The outcome of self-efficacy was reported in six studies. Pain self-efficacy questionnaire used in four studies [13] [14] [24] [27] pain management index and self-efficacy questionnaire in one study [29], and self-care competence scale in one study [20]. Four studies evaluated patients' pain-related knowledge and attitude in which two studies used a patient pain questionnaire [13] [29], pain-knowledge questionnaire in one study [21], and FESV-BW [German Pain Coping Questionnaire] in one study [12], see **Table 2**.

3.4. Effects of Education and Counselling Interventions on Cancer Patients' Pain

3.4.1. Pain Intensity

As shown in **Table 3**, all studies measured pain intensity. In five studies it was reported as average and worst pain [12] [13] [21] [24] [26]. Whereas, in seven studies pain intensity was reported as an overall pain scores [14] [19] [20] [22] [23] [25] [27], worst pain reported in one study [28], average, worst and overall pain scores reported in one study [29]. A significant decline in average pain scores between the groups reported in three studies [21] [26] [29]. Whereas, [12] [13] [24] found no statistically significant difference in average pain scores between the control and intervention groups. In three studies a significant improvement in the worst pain scores was reported in intervention groups as compared to control groups [21] [26] [28]. However, in four studies [12] [13] [24] [29] no significant differences were found in worst pain scores between the groups. Five studies demonstrated a significant reduction in overall pain intensity between the control and intervention groups [14] [20] [22] [23] [25]. No statistically significant differences in overall pain scores were found in studies by [19] [27] [29]. As shown in

Figure 4, the data from seven studies [13] [14] [21] [22] [24] [25] [29] was calculated in meta-analysis of effects of education and counselling interventions on pain intensity as compared to usual care. Significant effects were evident as pooled results showed SMD −3.06 [95% CI: −4.54, −1.58; p = 0.001], I^2 = 98%. Funnel plot in Figure 5 displayed asymmetry, most of the points are grouped on one side which is suggesting a potential publication bias or heterogeneity in the included studies.

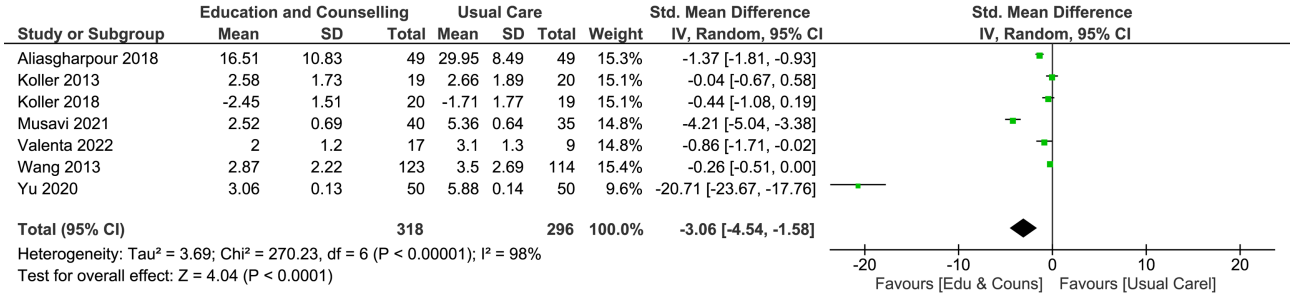

Figure 4. Forest Plot effects of education and counselling interventions on pain intensity (n = 7).

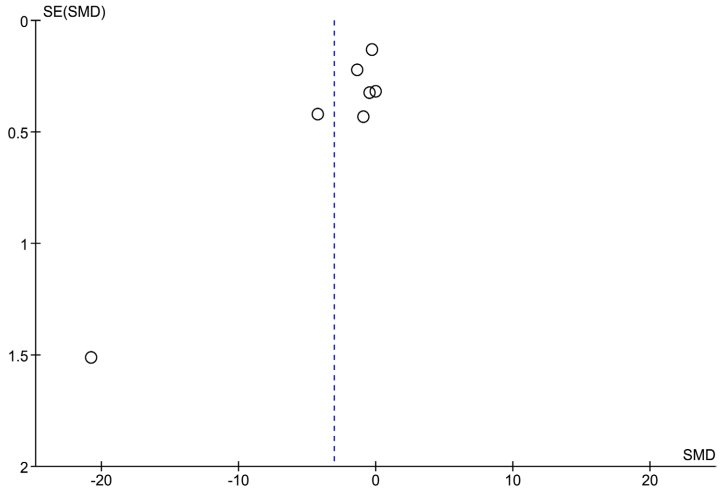

Figure 5. Funnel plot of included studies (n = 7).

3.4.2. Quality of Life

Six studies assessed QoL [12] [14] [20] [22]-[24]. Four studies reported a significant improvement in QoL of participants between the groups [14] [20] [22] [23]. Whereas, [12] [24] found no significant difference in QoL in the intervention groups as compared to control groups. Three studies [14] [22] [24] reported the data for meta-analysis on effect of education and counselling interventions on QoL. SMD was 2.25 [95% CI: 1.89, 2.62; p = 0.001], I^2 = 95% (Figure 6).

3.4.3. Self-Efficacy

Six studies measured the self-efficacy by utilizing a self-efficacy questionnaire [12] [13] [20] [24] [27] [29]. In four studies self-efficacy was significantly increased among the participants of intervention groups as compared to the control groups

[12] [20] [27] [29]. In two studies no significant difference in self-efficacy was noted between the groups [13] [24]. Only two studies [24] [29] provided the data for meta-analysis of effects of education and counselling intervention on self-efficacy. SMD was 0.82 [95% CI: 0.30,1.33; p = 0.002], I^2 = 0% (**Figure 7**).

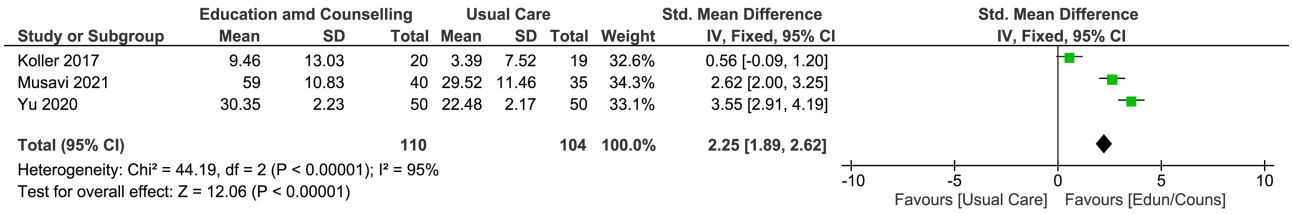

Figure 6. Forest plot effects of education and counselling interventions on quality of life (n = 3).

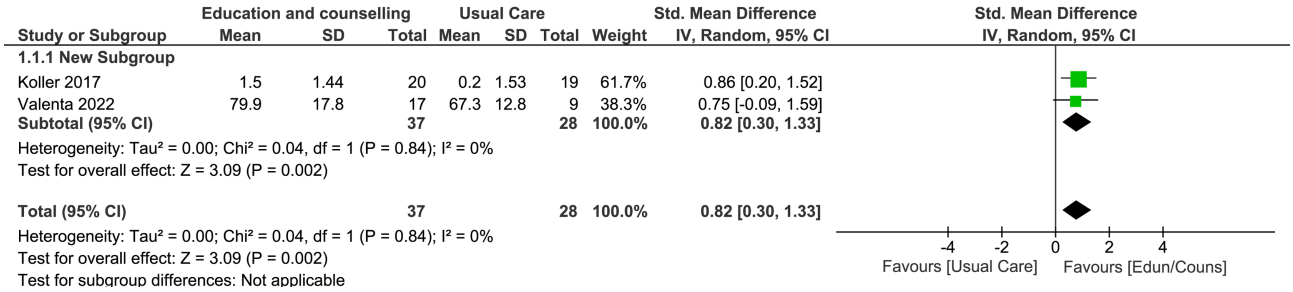

Figure 7. Forest plot effects of education and counselling interventions on self-efficacy (n = 2).

3.4.4. Pain Related Knowledge

As shown in **Table 3**, four studies evaluated pain related knowledge as an outcome and all of them found that participants in the intervention group had significantly higher levels of knowledge as compared to the control groups [12] [13] [21] [29]. Data from three studies were involved in meta-analysis for effects of education and counselling interventions on pain related knowledge [13] [21] [29]. SMD was 0.81 [95% CI 0.27, 1.35; p = 0.003], I^2 = 64% (**Figure 8**).

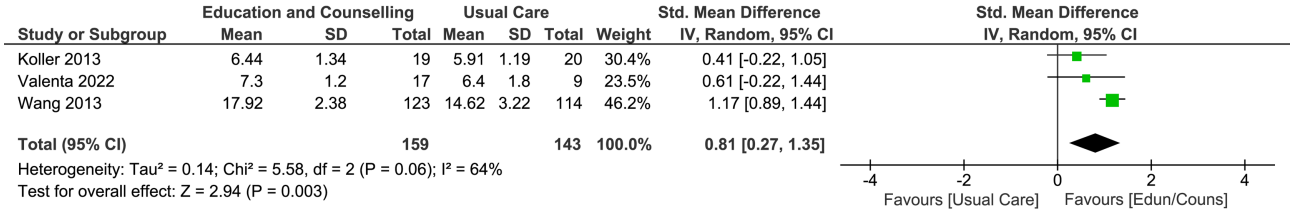

Figure 8. Forest plot effects of education and counselling interventions on pain related knowledge (n = 3).

3.4.5. Review of Published Systematic Review and Meta-Analysis

One earlier systematic review with meta-analysis [30] and a systematic review [31] were found that examined effectiveness of educational interventions on cancer patients' pain. [30] assessed publications through May 2012. Fifteen studies were included in the meta-analysis that identified a small to moderate effect size in the favor of education versus usual care for improvement in cancer related pain intensity (ES, 0.27 [−0.47, −0.07]; p = 0.007). However, the heterogeneity was sub-

stantial (I^2 = 71%). [31] assessed studies from 1995 to May 2017 and included 26 studies in the systematic review. 31% of the studies reported a statistically significant decline in pain intensity of the participants of education groups as compared to control groups. Significant improvement was found in pain knowledge (15/22 studies; 68%) and self-efficacy (1/2 studies).

4. Discussion

This systematic review examined 14 RCTs published between 2013 and 2023 to estimate the effectiveness of education and counselling interventions on cancer pain. No restrictions about cancer type and stage were made. The salient findings of this review are: eight studies (57%) presented a statistically significant difference in pain intensity between the intervention and control groups. Additionally, there was also a statistically significant improvement in quality of life reported in four out of six (66.6%) studies. Evidence supports the beneficial effects of the interventions on self-efficacy (4/6 studies; 67%) and pain-related knowledge (4/4 studies; 100%). These findings are concomitant with previous reviews [15] [31]. Variations in the results of the effectiveness and counselling interventions on cancer patients, pain may be confounded by the various characteristics of the participants such as types and stages of cancer. Patients' cancer pain experience and self-management might be different according to their type and stage of cancer [32]. Moreover, treatment goals and modalities may also depend on types and stages of cancer. In the early stages of cancer, the goal of the treatment is to improve patient survival. However, in the advanced stages of the disease, the goal is to improve the patients' quality of life through palliative care [33].

Findings of the current meta-analysis favor the education and counselling interventions as compared to usual care in reducing pain intensity, improving QoL, self-efficacy, and pain related knowledge of cancer patients with large pooled effect sizes which is showing practical significance of the interventions. Whereas, previous meta-analyses reported effectiveness of education and counselling interventions with small to moderate effects [30] [34]-[36].

In this meta-analysis considerable heterogeneity was found between the studies which indicates that variation in effect sizes of the included studies is not by chance but, it is because of true differences in the methods. Usually, in RCTs, similar interventions are applied for all types of pain and outcomes are measured at the same point in time by the researcher in every study. While, cancer pain and its management is not a static condition but, it is a dynamic process, since the physiology of each type of cancer is different and each stage varies depending on the disease so, providing the same intervention to address all types of pain and assessing outcomes at the same point of time may not produce the same effects [37]. Moreover, patients' expectations may also be varied for different types or stages of cancer, and consequently, patients' self-efficacy and QoL might be different [15]. As in the current review, substantial heterogeneity was found between the studies in terms of measurement tools, starting time of interventions, length

of follow-up, and mode of delivery. Though, face-to-face teaching and telephonic follow-ups were used to provide education and counselling to the patients in majority of the studies but, it was become challenging to establish an overall effects of the interventions due to variations in their starting points, frequencies and durations.

4.1. Limitations and Strengths

Since, this review included patients with all types of cancers with different stages of disease and was restricted to the pool of primary studies, small in numbers, compromised quality, different samples, and methods. This substantial heterogeneity may affect the consistency of the results and limit the generalizability. Potential bias in the included studies and variability in interventions could also affect the reliability and validity of results.

The main strength of this systematic review and meta-analysis is the inclusion of only randomized controlled trials. In this meta-analysis, intervention effects are quantified using standardized mean differences SMDs which have provided an objective comparison across studies. Findings of this review revealed strong effects of the education and counselling interventions which suggest their integration into clinical practice for managing cancer related pain.

4.2. Conclusion

Findings of this systematic review and meta-analysis revealed that education and counselling interventions decreased pain intensity, improved QoL, self-efficacy, and pain related knowledge of cancer patients. Given the strong effect sizes, healthcare providers might adopt structured education and counseling interventions into routine cancer care as complementary strategies to facilitate cancer patients with pain. However, future RCTs require robust methodology such as adequate sample sizes, uniform measurements, uniform outcome measure times, and specification of type and stage of cancer to determine the highly effective components of the intervention. Studies with longer follow-up periods and lower risk of bias are needed to confirm long-term benefits of the intervention. Moreover, investigating the cost-effectiveness of implementing these interventions in different healthcare settings is crucial for its widespread adoption. Further research is required to evaluate the effects of education and counseling intervention on pain perception, coping mechanisms, and adherence to pain management strategies.

Conflicts of Interest

Authors have no conflicts of interest to disclose.

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