



Investigating Post-Discharge Experiences in Ileostomy: Systematic Review and Meta-analysis

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ABSTRACT

In case of diseases such as cancers of the gastrointestinal system, traumas, and inflammatory bowel diseases, there is a need for an opening, called a stoma, that changes the excretory pathway for patients. Stoma, a word of Greek origin, means “mouthing, opening, mouth”. The type of stoma that causes the greatest metabolic changes is called an ileostomy. These changes may negatively affect the recipient's adjustment to ileostomy and coping with this new circumstance. This systematic review and meta-analysis aimed to investigate post-discharge experiences of individuals who have undergone ileostomy. Cross-sectional, cohort, and qualitative studies, which were published between January 2010-September 2020, were assessed. Suitable studies were identified from Medline, CINAHL, PsycINFO, Ovid, and PubMed databases on 21.09.2020. Results from a total of 20 studies (11 cross-sectional, 5 cohort, and 4 qualitative) were combined. Analysis of the combined reports showed: 29% had wound complication; 26% had wound dehiscence; 29% had skin complications; 7% had stomal complications; 11% had an anastomosis; 7% had ileus; and 10% had infection. It was concluded that individuals with ileostomy had problems with their social environment and healthcare team, as well as with communication, role change, adjustment, and psychological and ileostomy-related complications. It was concluded that individuals with ileostomy had problems with their social environment and healthcare team as well as on communication, role change, adjustment, and psychological and ileostomy-related complications.

Keywords: Ileostomy, patient expectations, post-discharge experiences, ileostomy complications

Introduction

In case of gastrointestinal system diseases, such as cancers, traumas, and inflammatory bowel diseases, there is may be a need for an opening, known as a stoma (from the Greek for mouth, opening), that changes the excretory pathway for patients.^{1,2} In a report entitled “Estimated global cancer incidence, mortality, and prevalence”, published by the International Agency for Research on Cancer, colorectal cancer is the third most common type of cancer in men and the second most common type of cancer in women globally. More than half (55%) of colorectal cancer cases are reported from developed countries. Considering that an intestinal stoma is opened in most of these cases, cancer and stoma have gained importance as the co-existence of two conditions because of the effects on patients lifestyle.^{2,3} In the gastrointestinal system, colostomy is defined as the opening of the colon to the abdominal wall and ileostomy is defined as a similar opening of the small intestine.⁴ Stoma volume and

metabolic changes in the body differ, depending on the type of stoma (ileostomy or colostomy). The ileostomy type of stoma is reported to cause more metabolic changes than the colostomy.⁴ An average of 500-800 mL of drainage per day is observed in ileostomy. Dehydration due to this drainage can cause metabolic changes, such as drainage-related skin complications and electrolyte losses associated with digestive enzymes.⁴

An ileostomy is the procedure of temporarily or permanently mouthing the lumen of the ileum to the abdominal wall through a surgical opening.⁵ The purpose of an ileostomy is to drain the stool from the body through the ileum instead of the normal way through the anus. The stoma procedure, which causes a change in the digestive tract, may cause problems for the individual.⁵ It was found that if precautions were not taken against these problems, it would cause complications for the individual, inability to manage personal health, and an increase in the rate of hospital admissions. It is known that



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among individuals with stoma, individuals with ileostomy have more problems related to malnutrition and stoma management.⁶ It has been reported that among individuals with stoma, 71% have experienced ileostomy complications and that 43% have experienced colostomy complications.⁷ When stomal complication rates are analyzed, peristomal skin irritation was seen in 15-85% of cases, peristomal hernia in 1-37%, stomal prolapse in 2-25%, stoma stenosis in 2-10%, and stoma retraction in 1-11%.⁷ The main problems individuals with stoma experience include involuntary gas discharge, odor, leakage, skin problems, lack of personal care, body image deterioration, asthenia, weakness, loneliness, decreased self-respect, rejection by the family, social isolation, sexual problems, and deterioration in work and social relations.^{2,6,8} These problems can negatively affect the individual's adjustment to the stoma and the ability to cope with the stoma. Despite these adversities and the fact that the stoma has a negative effect on the quality of life, it can prolong their life and help them return to a healthy life.^{3,6} In our experience these problems occur during the post-discharge period due to lack of symptom management. The role of healthcare professionals in ileostomy stoma care is of the utmost importance, both during the period of hospitalization and after they are discharged. Problems that individuals with stoma experience can be reduced or eliminated with suitable care, training and counseling services. Therefore, these types of support should be provided in a holistic fashion to encompass physical, social, and psychological aspects.

There is no comprehensive literature review reflecting the experiences of individuals with ileostomy. This systematic review and meta-analysis aims to investigate post-discharge experiences of individuals who have undergone ileostomy.

Research Questions

What are the experiences of patients with ileostomy regarding stoma and metabolism-related problems that develop in the post-discharge period, complications related

to ileostomy wounds and systems, and re-admission to a health institution?

Method

This study was conducted as a systematic review and meta-analysis. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement) criteria were used in preparing and reporting the study.⁹

Eligibility Criteria

The selection of studies suitable for this systematic review and meta-analysis was determined according to patient/problem/population; exposure; outcomes; study design; Table 1. Cross-sectional, cohort, and qualitative studies that were published in English, between January 2010 and September 2020, were included. Intervention studies, reviews, and case studies were excluded.

Query Strategy

To find suitable studies, the databases investigated were Medline, CINAHL, PsycINFO, Ovid, and PubMed, which were accessed on 21.09.2020. The queries were conducted using the keywords "ileostomy OR colostomy OR stoma" AND "patient expectations OR post-discharge experiences" AND "ileostomy complications OR complications OR ostomy complication". In addition, reference lists of included studies were checked.

Selection of Studies

Based on the inclusion criteria, two researchers reviewed titles and abstracts and selected full texts independently. Any inconsistencies in the selection process of included articles were resolved through discussion. Reference lists of suitable articles were reviewed.

Evaluation of the Methodological Quality of Studies

Critical appraisal checklists developed by the Joanna Briggs Institute (JBI) for analytical cross-sectional, cohort, and qualitative studies were used for quality assessment of articles.¹⁰ JBI's critical appraisal checklist developed for

Table 1. PEOS

Question components	Definition/description	Keywords	Alternative query terms
Patient/problem participants (P: Patient/problem/population)	Individuals with ileostomy	Ileostomy	Colostomy Stomy Ostomy
Exposure (E: exposure)	Ileostomy	Ileostomy care	
Outcomes (O: Outcomes)	Post-discharge experiences Post-discharge problems	Patient expectations Post-discharge experiences	Ileostomy complications complications ostomy complication
Study design (S: Study design)	Cross-sectional, cohort and qualitative studies		

analytical cross-sectional studies consists of eight items, the checklist for cohort studies has eleven items, and the checklist for qualitative studies has ten items. Questions on these checklists are answered with “yes, no, unclear, and not/applicable” options.¹¹ The evaluation results for each included study are given in Table 2 as “quality score”. The quality assessment process was conducted independently by two researchers, and questions that were answered differently were resolved through discussion and combined into a single text.

Data Retrieval (Extraction/Withdrawal)

Research data were obtained with the data extraction tool developed by the researchers. Using this tool, data on the author and publication year of studies, study design, type of ileostomy, sample size, age range, and experiences of individuals with ileostomy were obtained. This process was conducted independently by two researchers and compared and combined to a single text. In cases where there were different data, the relevant article was checked again and the correct data were taken.

Statistical Analysis

In this systematic review, the data obtained from quantitative studies (16 studies) were combined by conducting a pooled estimates meta-analysis. The meta-analysis of the study was conducted using Comprehensive Meta-Analysis Version 3-Free Trial (<https://www.meta-analysis.com/pages/demo.php>). The heterogeneity between studies was assessed by the Cochrane Q and Higgins I² tests, and an I² value greater than 50% was considered to indicate a statistically significant heterogeneity. In cases where the I² value was equal to or greater than 50%, random effect results were taken whereas fix effect results were taken in cases where it was smaller than 50%. 95% confidence interval (CI) and estimated ratios were calculated for each outcome variable.¹¹ Data from qualitative studies are presented in narrative form.

Results

Query Results

The initial search identified 7667. These articles were first examined independently by two researchers, in terms of their title and abstract. After the review, the full text of the remaining 40 articles was analyzed. Of these forty articles, the following were excluded: 13 articles for being traditional reviews; three articles for having data collected before 2000; one article for including ileostomy complications in low-birth-weight infants; and three studies for analyzing ileostomy and colostomy rates combined, so that it was not clear which findings specifically related to ileostomy. The remaining 20 articles were included in this study (Figure 1).

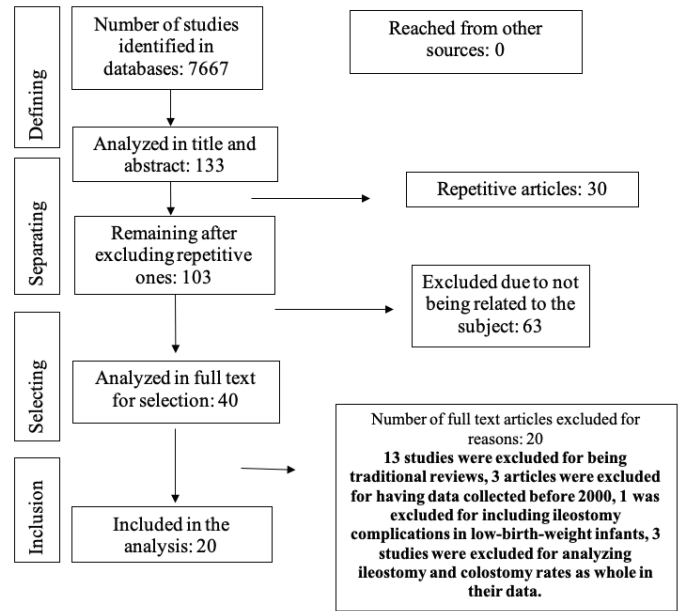


Figure 1. PRISMA flow diagram
PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses

Characteristics of Studies and Participants

Of the studies included in the systematic review and meta-analysis, two were prospective and nine were retrospective cross-sectional studies, while five were cohort and four were phenomenological qualitative studies. The sample size in these studies ranged from 10 to 22,034. The data reported in the studies included in the analysis were collected after 2000 and published between 2012 and 2020 (Table 2).

Quality Assessment Results

Among studies included in this systematic review and meta-analysis, it was found that 5-7 items in the 8-item quality assessment tool for 11 cross-sectional studies, 8-10 items in the 11-item quality assessment tool for five cohort studies, and 8-9 items in the 10-item quality assessment tool for the four qualitative studies had “Yes” as an answer (Table 2).

Meta-analysis Results

In studies included in this systematic review and meta-analysis, problems related to the wound in the ileostomy were defined in three different ways (Figure 2). Wound complications were reported in two of these studies.^{12,13} Based on the combined results of these studies, it was found that an estimated 29% of individuals with ileostomy developed a wound complication (95% CI: 0.007-0.958; $z=-0.444$; $p=0.657$; $I^2=99\%$) (Figure 2a). Two of the studies reported dehiscence at the wound site.^{12,14} The estimate obtained from the combined results of these studies was that 26% of individuals with ileostomy had wound dehiscence (95% CI: 0.065-0.165; $z=-8.016$; $p<0.001$; $I^2=96\%$) (Figure 2b). According to the meta-analysis results based on the

findings of seven studies, it was found that an estimated 29% of individuals with ileostomy developed skin complications

Table 2. Quality assessment scores

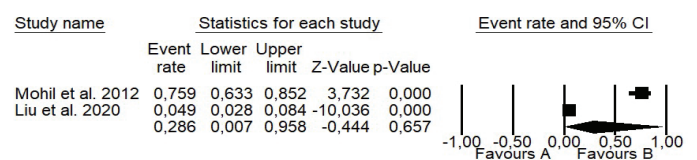
Author's name, year of study	Type of study	Quality score
Thorpe et al. ²⁸ (2014)	Phenomenological qualitative study	Yes: 8/10 No: 2/10
Mohil et al. ¹¹ (2012)	Prospective cross-sectional study	Yes: 7/8 No: 1/8
Liu et al. ¹² (2020)	Retrospective cross-sectional study	Yes: 7/8 No: 1/8
Fish et al. ²⁴ (2017)	Retrospective cross-sectional study	Yes: 6/8 No: 2/8
Chan et al. ²¹ (2019)	Retrospective cross-sectional study	Yes: 7/8 No: 1/8
Taneja et al. ¹⁵ (2017)	Cohort study	Yes: 8/11 No: 3/11
Tyler et al. ²² (2014)	Cohort study	Yes: 10/11 No: 1/11
Hayden et al. ²⁷ (2013)	Retrospective cross-sectional study	Yes: 6/8 No: 2/8
Sarkut et al. ¹⁴ (2015)	Retrospective cross-sectional study	Yes: 7/8 No: 1/8
Spiers et al. ²⁹ (2016)	Phenomenological qualitative study	Yes: 8/10 No: 2/10
Li et al. ²⁰ (2017)	Retrospective cross-sectional study	Yes: 6/8 No: 2/8
Justiniano et al. ²⁶ (2018)	Cohort study	Yes: 8/11 No: 3/11
Kandagatla et al. ²⁵ (2018)	Retrospective cross-sectional study	Yes: 6/8 No: 2/8
Lindholm et al. ¹⁶ (2013)	Retrospective cross-sectional study	Yes: 7/8 No: 1/8
Koc et al. ¹⁷ (2017)	Retrospective cross-sectional study	Yes: 6/8 No: 2/8
Morris and Leach ³⁰ (2017)	Phenomenological qualitative study	Yes: 8/10 No: 2/10
Carlsson et al. ¹⁸ (2016)	Prospective cross-sectional study	Yes: 5/8 No: 3/8
Taneja et al. ¹⁹ (2019)	Cohort study	Yes: 8/11 No: 3/11
Seo et al. ²³ (2018)	Cohort study	Yes: 9/11 No: 2/11
Smith et al. ³¹ (2017)	Phenomenological qualitative study	Yes: 9/10 No: 1/10

in the wound area (95% CI: 0.123-0.524; $z=-1.776$; $p=0.076$; $I^2=96\%$) (Figure 2c).^{12,14-19}

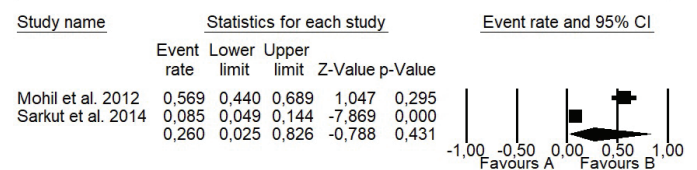
The meta-analysis revealed that systemic complications observed in individuals with ileostomy developed in four different systems (Figure 3). Complications related to the respiratory system were found in three of these studies.^{12,13,20} Based on the combined results of these studies, it was concluded that an estimated 8% had respiratory system complications (95% CI: 0.004-0.636; $z=-1.594$; $p=0.111$; $I^2=99\%$) (Figure 3a). Complications related to the renal system were reported in six of these studies^{12,13,20-23} and again an estimated 8% developed complications in the renal system (95% CI: 0.062-0.125; $z=-11.840$; $p<0.001$; $I^2=96\%$) (Figure 3b). Complications related to the abdominal system were reported in two of these studies^{13,20} so that an estimated 4% of abdominal complications were found (95% CI: 0.007-0.257; $z=-3.034$; $p=0.002$; $I^2=98\%$) (Figure 3c). Complications related to the gastrointestinal system were reported in three studies, and according to the combined results, this complication rate was estimated to be 9% (95% CI: 0.062-0.148; $z=-9.119$; $p<0.001$; $I^2=92\%$) (Figure 3d).^{13,23,24}

Four different problems from seven studies related to stoma were reported in individuals with ileostomy (Figure 4).^{12-14,17,21-23} Stomal complications were found with an estimated rate of 7% (95% CI: 0.024-0.191; $z=-4.492$; $p<0.001$; $I^2=99\%$) (Figure 4a). Anastomosis due to ileostomy

(a)



(b)



(c)

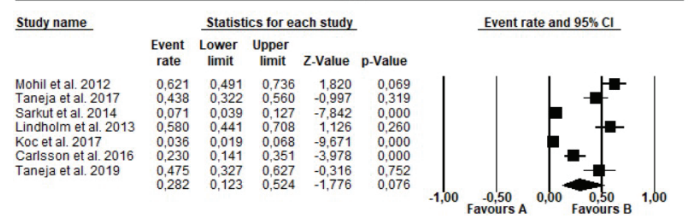


Figure 2. Complications related to ileostomy wound. (a) Wound complication, (b) wound dehiscence, (c) skin complication
CI: Confidence interval

were reported in two studies^{12,23} with an estimated prevalence of 11% (95% CI: 0.013-0.561; $z=-1.749$; $p=0.080$; $I^2=91\%$) (Figure 4b). Two studies reported ileus, and according to the combined results, the rate of ileus was estimated to be 7% (95% CI: 0.009-0.372; $z=-2.458$; $p=0.014$; $I^2=97\%$) (Figure 4c).^{12,23} Infection due to ileostomy was reported in four studies.^{12,20,23,25} The rate of reported infection was 10% (95% CI: 0.065-0.165; $z=-8.019$; $p<0.001$; $I^2=96\%$) (Figure 4d).

In terms of hospital usage, the rate of hospitalization¹⁹ in one study while hospital readmission rates were reported in seven.^{13,19-22,24,26} An estimated 93% of individuals with ileostomy re-attended the hospital (95% CI: 0.792-0.976; $z=4.185$; $p<0.001$; $I^2=0.00$) (Figure 5a) and 26% were re-hospitalized (95% CI: 0.172-0.377; $z=-3.815$; $p<0.001$; $I^2=99\%$) (Figure 5b).

Four different metabolic problems related to ileostomy exit were reported in studies (Figure 6). Sepsis was reported

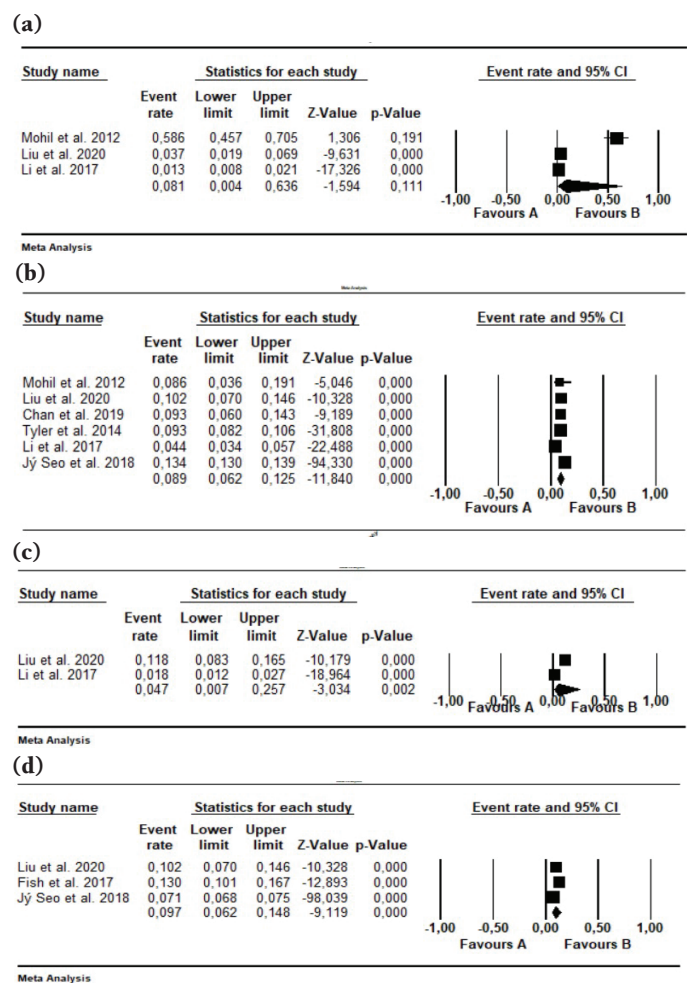


Figure 3. Complications for systems. (a) Complications related to the respiratory system, (b) Complications related to the urinary/renal system, (c) Abdominal complications, (d) Complications related to the gastrointestinal system
CI: Confidence interval

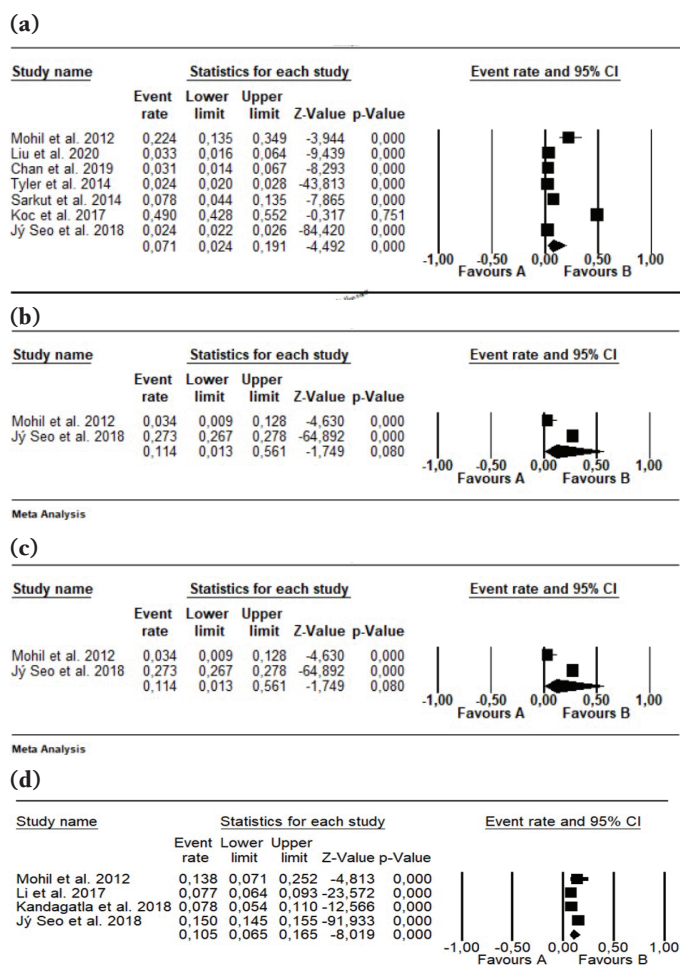


Figure 4. Reported problems due to stoma. (a) Stomal complications, (b) Anastomosis, (c) ileus, (d) infection

in three^{20,22,23} and the estimated sepsis rate was 2% (95% CI: 0.014-0.044; $z=-12.183$; $p<0.001$; $I^2=98\%$) (Figure 6a). Three studies reporting fluid-electrolyte imbalance^{20,22,27} with an estimated rate of 4% (95% CI: 0.011-0.151; $z=-4.410$; $p<0.001$; $I^2=97\%$) (Figure 6b). Dehydration was reported in six studies.^{12,13,20,23,25,26} According to the combined results, the estimated dehydration rate was 9% (95% CI: 0.074-0.132; $z=-13.436$; $p<0.001$; $I^2=89\%$) (Figure 6c). One study reported weight loss¹⁵ which reported a rate of weight loss in the patients of 43% (95% CI: 0.311-0.560; $z=-1.047$; $p=0.295$; $I^2=0.00\%$) (Figure 6d).

Results from Qualitative Studies

The experiences of individuals with ileostomy were reported in four qualitative studies included in this systematic review.²⁸⁻³¹ The results of these studies were combined under six themes: Individuals' communication with their environment; role change; communication with the multidisciplinary healthcare team; problems caused by complications due to ileostomy; adjustment to ileostomy; and psychological effects on the individual. In two studies,

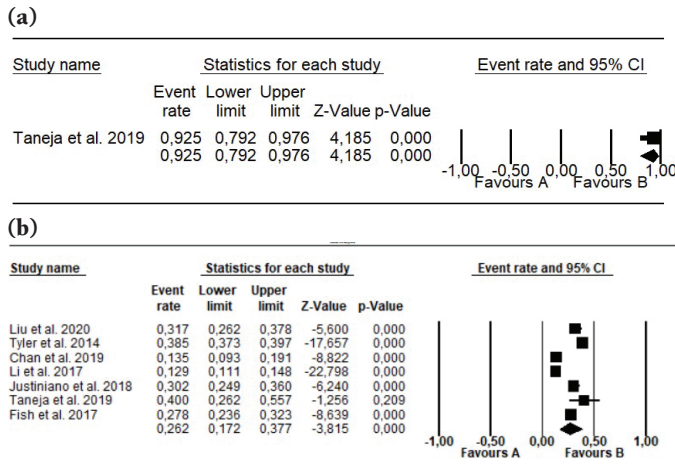


Figure 5. Re-admission to the healthcare facility due to stoma. (a) Re-admission to the hospital, (b) re-hospitalization

it was reported that patients had positive and negative experiences of communication with their environment after ileostomy.^{30,31} In one study, it was reported that ileostomy created confusion in some individuals' self-perception and that this caused changes in interpersonal roles.³¹ In three studies reporting the communication experiences of the individual who had undergone ileostomy with a multidisciplinary healthcare team, patients reported both positive and negative experiences about the healthcare team.²⁸⁻³⁰ It was reported that individuals who shared positive experiences was affected by the fact that they could reach the healthcare team more easily, that they had healthcare professionals trained on stoma and that they trusted the healthcare team.²⁸⁻³⁰ Three studies reported experiences of individuals who experienced complications related to ileostomy.²⁸⁻³⁰ It was concluded that some of the individuals with ileostomy went to the hospital again due to complications, that they experienced pain, that their daily activities were affected, and that they had difficulty in adjusting to the stoma.²⁸⁻³⁰ In two studies, it was reported that some individuals adjusted to ileostomy and that others could not.^{29,30} In two studies reporting the psychological effects of ileostomy, it was concluded that the presence of complications and communication had psychological effects on the process of accepting and adjusting to ileostomy.^{30,31}

Discussion

This study was conducted as a systematic review and meta-analysis in order to investigate post-discharge experiences of individuals with ileostomy. The combined results of 16 quantitative and four qualitative studies were analyzed. We hope that the results obtained may contribute to the improvement of post-discharge follow-up and care of individuals with ileostomy.

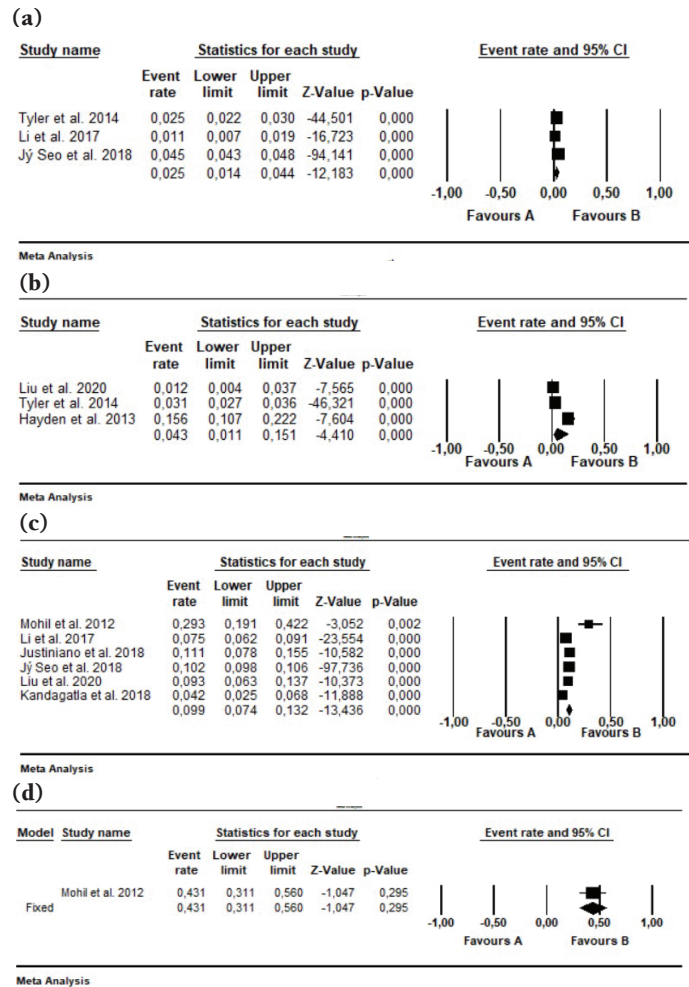


Figure 6. Metabolic problems with ileostomy. (a) Sepsis, (b) Liquid electrolyte disturbance, (c) dehydration, (d) weight loss

In this study, post-ileostomy experiences of individuals who had undergone ileostomy were reported. In the literature, in a review study conducted by Rajaretnam and Lieske⁵ in 2020, it was observed that similar results were reported in 20% of individuals with ileostomy after stoma opening.

In this systematic review and meta-analysis, it was found that an estimated 29% of individuals with ileostomy developed wound complication, that 26% had wound dehiscence, and that 29% developed skin complications in the wound area. In the systematic review by Malik et al.³², it was reported that 14% of individuals with ileostomy had skin complications and Ambe et al.³³ reported that 25-34% of individuals with stoma had skin complications and that this was the highest in individuals with ileostomy.²² Mehboob et al.³⁴ reported that 19.4% of individuals had skin complications and that 13% had wound complications. Based on these results, it can be said that wound dehiscence and skin complications in the wound area are common, especially in individuals with ileostomy. These complications are thought to develop as a result of fecal leakage onto the skin.

In our study, it was found that stomal complications (7%), anastomosis (11%), ileus (7%), and infection (10%) developed in some patients with ileostomy. Other studies conducted on this subject have reported a rate of ileus in individuals with ileostomy of 11-18% and 3.8%^{32,33} which is consistent with the findings presented here. Stoma separation (5.9%)³² and stoma-related complications (0.7-5.9%)³² have also been previously reported, again in line with the current findings. Mehboob et al.³⁴ reported that stomal complications developed due to reasons such as retraction (4.7%), high flow fistula (3.5%), parastomal hernia (2.3%), stomal necrosis (2.3%), bleeding (1.1%) and stomal occlusion (11.9%). We anticipate that training and informing individuals with ileostomy on stoma care will reduce these rates.

In the present study most individuals with ileostomy (93%) re-attended the hospital and that a significant portion (26%) were rehospitalized. Ambe et al.³³ reported that the rate of hospital readmission (16.9%) was lower. This difference may be explained by differences in sample populations.

In our study, serious systemic problems, such as sepsis (2%), fluid-electrolyte imbalance (4%), dehydration (9%), and weight loss (43%) occurred in some individuals with ileostomy. In another systematic review it was reported that 20% of individuals with ileostomy had dehydration and that 43% of hospital readmissions were due to dehydration.³³ As reported in the literature and in our study, dehydration experienced in individuals with ileostomy is thought to be associated with consequent fluid-electrolyte imbalance and weight loss.

This study identified problems related to communication with their social environment and healthcare team were reported by individuals with ileostomy together with difficulties related to role change, adjustment, psychological problems and ileostomy complications. Ambe et al.³³ also reported that ileostomy significantly changed an individuals' life, creating physical, psychological and social effects in their life. Allison et al.³⁵, on the other hand, reported that nurses providing care for individuals with ileostomy did not have the right approach due to lack of training on the subject and that this situation had a negative effect on the care and adjustment process of these individuals. In line with the results of our study and the literature, we think that the positive experiences of individuals with ileostomy can be improved and adjustment to ileostomy can be achieved through an effective informing and training process. This approach can allow early detection and possible prevention of complications that may arise and thus reduce re-admissions and hospitalization rates. We believe that the individual's adjustment to ileostomy and effective

communication with the healthcare team will yield positive physical, psychological, and social results.

Conclusion

In this systematic review and meta-analysis, more than a quarter of patients individuals with ileostomy had wound complication, wound dehiscence, and/or skin complications, while a smaller but appreciable proportion had stomal complications, anastomosis, ileus, and infection. It was also found in this study that some individuals with ileostomy experienced serious systemic problems, including sepsis, fluid-electrolyte imbalance, dehydration, and weight loss, and that an estimated 93% of them re-attended hospital because of their ileostomy while 26% were rehospitalized. Furthermore, patients receiving an ileostomy also reported problems with their social environment and healthcare team, as well as with communication, role change, adjustment, and psychological and ileostomy-related complications.

Based on these results, we suggest that many of these reported problems may be addressed through stoma training and counselling services provided by trained and experienced healthcare professionals, which should be continuous and easily accessible in order to increase adjustment to stoma in individuals with ileostomy and to early detect problems that may arise. We recommend that health institutions use technological facilities to organize training sessions for individuals with ileostomy and that these must be easily accessible. Solutions should be developed for problems that individuals with ileostomy experience and the efficacy of these solutions should be supported with further prospective, large and well-designed studies.

Peer-review: Internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: E.K., F.E.A., Concept: E.K., F.E.A., Design: E.K., F.E.A., Data Collection or Processing: E.K., Analysis or Interpretation: E.K., Literature Search: E.K., F.E.A., Writing: E.K., F.E.A.

Conflict of Interest: No conflict of interest was declared by the authors.

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