

The Hierarchy of Evidence



The Hierarchy of evidence is based on summaries from the National Health and Medical Research Council (2009), the Oxford Centre for Evidence-based Medicine Levels of Evidence (2011) and Melynyk and Fineout-Overholt (2011).

- I Evidence obtained from a systematic review of all relevant randomised control trials.
- II Evidence obtained from at least one well designed randomised control trial.
- III Evidence obtained from well-designed controlled trials without randomisation.
- IV Evidence obtained from well designed cohort studies, case control studies, interrupted time series with a control group, historically controlled studies, interrupted time series without a control group or with case- series
- V Evidence obtained from systematic reviews of descriptive and qualitative studies
- VI Evidence obtained from single descriptive and qualitative studies
- VII Expert opinion from clinicians, authorities and/or reports of expert committees or based on physiology

Melynyk, B. & Fineout-Overholt, E. (2011). Evidence-based practice in nursing & healthcare: A guide to best practice (2nd ed.). Philadelphia: Wolters Kluwer, Lippincott Williams & Wilkins.

National Health and Medical Research Council (2009). NHMRC levels of evidence and grades for recommendations for developers of guidelines (2009). Australian Government: NHMRC. http://www.nhmrc.gov.au/_files_nhmrc/file/guidelines/evidence_statement_form.pdf

OCEBM Levels of Evidence Working Group Oxford (2011).The Oxford 2011 Levels of Evidence. Oxford Centre for Evidence-Based Medicine. <http://www.cebm.net/index.aspx?o=1025>

Databases searched:	<input type="checkbox"/> CINAHL (Ebsco)	<input checked="" type="checkbox"/> Medline (Ebsco)	<input checked="" type="checkbox"/> Pubmed (NLM)	<input checked="" type="checkbox"/> Nursing (Ovid)	<input type="checkbox"/> Emcare (Ovid)
Keywords used:	Nausea, vomiting, children, oncology, paediatrics, aprepitant, ondansetron, palonesetron, chemotherapy, cancer, fosaprepitant, emetogenicity				
Search limits:					
Other search comments:					

Reference (include title, author, journal title, year of publication, volume and issue, pages)	Evidence level (I-VII)	Key findings, outcomes or recommendations
<p>Bakshi, S., Batra, A., Biswas, B., Dhawan, D., Paul, R., & Sreenivas, V. (2015) Aprepitant as an add-on therapy in children receiving highly emetogenic chemotherapy: a randomized, double-blind, placebo-controlled trial. <i>Supportive Care in Cancer</i>, 23, 3229-3237</p>	<p>II</p>	<ul style="list-style-type: none"> - randomized, double-blind controlled trial; 93 paediatric oncology patients (age 5-18 years) - patients were chemotherapy naïve receiving one of four highly emetogenic chemotherapy protocols - findings showed that aprepitant significantly decreased the incidence of chemotherapy-induced vomiting during the acute phase when used as an add-on drug with ondansetron and dexamethasone in children receiving highly emetogenic chemotherapy

<p>Baxter, A.L., Watcha, M.F., Baxter, W.V., Leong, T., & Wyatt, M.M. (2011) Development and validation of a pictorial nausea rating scale for children. <i>Pediatrics</i>, 127(6), e1542-1549</p>	<p>VI</p>	<ul style="list-style-type: none"> - authors developed a pictorial nausea scale, Baxter Retching Faces Scale (BARF) to assist health professionals in assessing nausea in paediatric patients - goal of the study was to create and validate a pictorial scale with regular increment levels between scores to display increases in nausea severity - 30 hematology-oncology patients, aged 4 to 17 years, and 15 paediatric nurses participated in the development of the scale - 127 patients ages 7 to 18 years who presented to a hospital emergency department or for ambulatory surgery participated in the validation of the scale - the vomiting face was selected by 90% of participants as the most severe type of nausea - findings suggest that the BARF scale is an effective tool for measuring nausea and vomiting and detecting change after antiemetic therapy and should be implemented for children less than 7 years of age in the paediatric setting - the Visual Analogue Scale - Nausea (VAS-N) was identified as a validated self-assessment tool in adult studies of nausea and should be implemented for measuring the severity of nausea in participants older than 7 years of age
<p>Berger, M.J., Ettinger, D.S., Aston, J., Barbour, S., Bergsbaken, J., Bierman, P.J., Brandt, D., Dolan, D.E., Ellis, G., Kim, E.J., Kirkegaard, S., Kloth, D.D., Lagman, R., Lim, D., Loprinzi, C., Ma, C.X., Maurer, V., Michaud, L. B., Nabell, L.M., Noonan, K., Roeland, E., Rugo, H.S., Schwartzberg, L.S., Scullion, B., Timoney, J., Todaro, B., Urba, S.G., Shead, D.A. & Hughes, M. (2017) NCCN Guidelines Insights: Antiemesis, Version 2.2017. <i>Journal of the National Comprehensive Cancer Network</i>, 15(7), 883-893</p>	<p>VII</p>	<ul style="list-style-type: none"> - review and update of previously published NCCN Clinical Practice Guideline in Oncology for Antiemesis - guidelines address all aspects of management for chemotherapy-induced nausea and vomiting (CINV); provides an overview of the treatment principles for preventing CINV and provides recommendations for antiemetic prophylaxis according to emetogenic potential of antitumour therapies - update revised the emetogenic potential of carboplatin, recommended a new formulation of granisetron (extended release subcutaneous injection) and added a new 4 drug regime including olanzepine for use with high emetogenic chemotherapy

<p>Blichfeldt-AEro, S. C., Leinebo, T. L., Messell, C, & Sanfi, I. (2017) Music and imagery for children undergoing chemotherapy: preliminary results of two RCTs. <i>Tsukuba, Japan: The 15th World Congress of Music Therapy</i> (Unpublished)</p>	<p>VII</p>	<ul style="list-style-type: none"> - conference abstract; preliminary results of two mixed methods multi-site randomised controlled trials - trials aimed to investigate music and imagery reduction effects of side effects of chemotherapy in children - preliminary results suggest that music imagery has health promoting effects
<p>Chan C.W.H., Lam, L.W., Li, C.K., Cheung, J.S.S., Cheng, K.K.F., Chik, K.W., Chan, H.Y.L., So, W.K.W., & Tang, W.P.Y. (2015) Feasibility of psychoeducational interventions in managing chemotherapy-associated nausea and vomiting (CANV) in paediatric oncology patients. <i>European Journal of Oncology Nursing</i>, 19, 182-190</p>	<p>III</p>	<ul style="list-style-type: none"> - pre-post-test control group designed study; 40 paediatric oncology patients - the beneficial effect of relaxation and patient education in alleviating chemotherapy-associated nausea and vomiting (CANV) was not well supported statistically - findings from descriptive data suggested that relaxation and patient education promoted the intake of preventative antiemetics - relaxation and patient education were well received by patients and parents, further research needed in the use of these interventions as preventative measures for managing CANV
<p>Children's Oncology Group. (2022) Guidelines on Chemotherapy-induced Nausea and Vomiting in Pediatric Cancer Patients. <i>COG Supportive Care Endorsed Guidelines, Children's Oncology Group (COG)</i>, Version date: July 15, 2022, Retrieved December 2022</p>	<p>VII</p>	<ul style="list-style-type: none"> - provides a comprehensive overview of chemotherapy-induced nausea and vomiting (CINV) supportive care endorsed guidelines in the paediatric oncology population - guideline provides an evidence-based approach and recommendations <ul style="list-style-type: none"> o to the assessment of the emetogenic potential of antineoplastic agents o for the prevention of acute CINV o for the prevention and treatment of anticipatory CINV o for the treatment of breakthrough and prevention of refractory CINV

<p>Döring, M., Cabanillas Stanchi, K.M., Queudeville, M., Hartmann, U., Ost, M., Koch, M., Malaval, C., Mezger, M., Schober, S., Weber, S., Lange, V., Handgretinger, R. & Ebinger, M. (2017) Antiemetic Prophylaxis with Granisetron and Fosaprepitant during Moderate and High Emetogenic Chemotherapy in Pediatric Patients. <i>Blood</i>, 130, Supp 1, 3228</p>	<p>IV</p>	<ul style="list-style-type: none"> - retrospective study; 86 paediatric oncology patients total, aged 2-17 years - assessed the efficacy and safety of a combination of intravenous fosaprepitant, granisetron and dexamethasone compared to granisetron and dexamethasone - both prophylaxis regimens were similarly safe and not significantly different in respect to drug related adverse effects - efficacy of the triple-prophylaxis (fosaprepitant) regimen was significantly superior when compared to granisetron plus dexamethasone alone
<p>Duggin, K., Tickle, K., Norman, G., Yang, J., Wang, C., Cross, S.J., Gajjar, A. & Mandrell B. (2014) Aprepitant Reduces Chemotherapy-Induced Vomiting in Children and Young Adults With Brain Tumours. <i>Journal of Pediatric Oncology Nursing</i>, 31(5), 277-283</p>	<p>IV</p>	<ul style="list-style-type: none"> - retrospective study; (52 paediatric oncology patients total) - 18 patients with a history of high-grade vomiting during radiation were prescribed a 5HT₃ receptor antagonist and aprepitant (without corticosteroid) during the first course of highly emetogenic chemotherapy (HEC); each patient matched with 2 controls who did not receive aprepitant - significantly less vomiting observed in patients receiving HEC, 5HT₃ receptor antagonist and aprepitant as compared to control group - suggests the addition of aprepitant (NK₁ antagonist) may be beneficial to control emesis in paediatric brain tumour patients receiving highly emetogenic chemotherapy
<p>Dupuis, L.L., Kelly, K., Krischer, J., Langevin, A., Tamura, R., ... McLean, T. (2018) Acupressure bands do not improve chemotherapy-induced nausea control in pediatric patients receiving highly emetogenic chemotherapy: A single blinded, randomized controlled trial. <i>Cancer</i>, 124, 1188-1196</p>	<p>II</p>	<ul style="list-style-type: none"> - randomised controlled trial: data collected from 200 patients, aged between 4-18 years - participants wore acupressure or sham bands continuously on each day of receiving chemotherapy and up to 7 days after, allowing for both acute and delayed nausea and vomiting timeframes - findings suggest that acupressure bands did not reduce the severity of chemotherapy induced nausea during the acute or delayed phase (OR 1.33; 95% CI 0.89 to 2.00; OR 1.23; 95% CI 0.7 to 2.01) respectively

<p>Flank, J., Robinson, P., Holdsworth, M., Phillips, R., Portwine, C., Gibson, P., Dupuis, L. (2016). Guideline for the treatment of breakthrough and the prevention of refractory chemotherapy induced nausea and vomiting in children with cancer. <i>Pediatric Blood & Cancer</i>, 63, 1144-1151</p>	<p>IV-VII</p>	<ul style="list-style-type: none"> - provides a comprehensive overview and guideline on the optimisation and refractory control of CINV in children and aimed for use on those aged between 1 month to 18 years of age, receiving chemotherapy. - “for children receiving acute CINV prophylaxis recommended for minimally, low, or moderately emetogenic chemotherapy, clinicians should upgrade or escalate the acute CINV prophylaxis provided to that recommended for chemotherapy of the next higher level of emetogenic risk.” - “for children receiving acute CINV prophylaxis recommended for highly emetogenic chemotherapy (HEC), we suggest that olanzapine be added to guideline>consistent CINV prophylaxis. “ - “for children receiving acute CINV prophylaxis recommended for HEC and who cannot receive olanzapine, we suggest that of the following antiemetic agents be added to guideline>consistent CINV prophylaxis: methotrimeprazine (also known as levomepromazine) metoclopramide (in children older than 1 year).” - “for children receiving acute CINV prophylaxis recommended for minimally, low, or moderately emetogenic chemotherapy, clinicians should upgrade or escalate the acute CINV prophylaxis provided to that recommended for chemotherapy of the next higher level of emetogenic risk.” - “for children experiencing refractory CINV despite initiation of previous recommendations and who have not previously received aprepitant because it is known or suspected to interact with the chemotherapeutic agent(s) being given, we suggest that the addition of aprepitant to acute CINV prophylaxis be considered.” - “for children experiencing refractory CINV despite initiation of the previous recommendations, we suggest that of the following interventions be added to the CINV prophylaxis provided: interventions that were employed successfully for the treatment of breakthrough CINV in previous treatment blocks (olanzapine, methotrimeprazine or metoclopramide) or simulation of P6 by means of acupressure or electroacupressure.”
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<p>Ghezelbash, S., & Khosravi M. (2017) Acupressure for nausea-vomiting and fatigue management in acute lymphoblastic leukemia children. <i>Journal of Nursing and Midwifery Sciences</i>, 4(3), 75-81</p>	<p>II</p>	<ul style="list-style-type: none"> - single blind, randomised controlled clinical trial; 120 hospitalized children (8-12 years of age) with acute lymphoblastic leukemia (ALL) as participants - study to determine the effectiveness of acupressure application in relieving nausea, vomiting and fatigue among children with ALL - suggested acupressure may reduce the intensity of nausea immediately post intervention, and fatigue and nausea at one hour post treatment - acupressure may be recommended as a complementary, nonpharmacological method for chemotherapy-induced nausea and vomiting and cancer-related fatigue management
<p>Gore, L., Chawla, S., Petrelli, A., Hemenway, M., Schissel, D., Chua, V., Carides, A.D., Taylor, A., DeVandry, S., Valentine, J., Evans, J.K., Oxenius, B., & for the Adolescent Aprepitant in Cancer Study Group. (2009) Aprepitant in Adolescent Patients for Prevention of Chemotherapy-Induced Nausea and Vomiting: A Randomized, Double-Blind, Placebo-Controlled Study of Efficacy and Tolerability. <i>Pediatric Blood & Cancer</i>, 52, 242-247</p>	<p>I</p>	<ul style="list-style-type: none"> - randomized, double-blind study; 50 adolescent patients - study evaluated the tolerability, efficacy, and pharmacokinetics of aprepitant plus a 5HT3 receptor antagonist and corticosteroids (aprepitant triple therapy) in adolescent cancer patients - aprepitant triple therapy was generally well tolerated in the adolescent group - aprepitant triple therapy controlled CINV better than the control regimen in the delayed phase, and controlled vomiting better than the control regimen in both the delayed and overall phases - tolerability and efficacy observed in the study suggest that the aprepitant dosing regimen approved for use in adults may also be effective in children age 11 and older

<p>Green, R., Horn, H. & Erickson, J.M. (2010) Eating Experiences of Children and Adolescents With Chemotherapy-Related Nausea and Mucositis. <i>Journal of Paediatric Oncology Nursing</i>, 27(4), 209-216</p>	<p>VI</p>	<ul style="list-style-type: none"> - qualitative study; convenience sample of 8 paediatric oncology patients and their caregivers - explored the eating experiences of children and adolescents during chemotherapy treatment; focus on nausea and mucositis as treatment related side effects that compromise nutritional intake - findings revealed all experienced nausea and preferred not to eat during these periods - highlighted the need for health care professionals to offer detailed eating suggestions during therapy to ensure patients can maintain adequate nutrition, weight, growth and development to improve treatment tolerance and outcomes
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<p>Hesketh, P.J., Kris, M.G., Basch, E., Bohlke, K., Barbour, S.Y, Clark-Snow, R. A., Danso, M.A., Dennis, K., Dupuis, L.L., Dusetzina, S.B., Eng, C., Feyer, P.C., Jordan, K., Noonan, K., Sparacio, D., & Lyman, G.H. (2020) Antiemetics: ASCO Guideline Update. <i>Journal of Clinical Oncology</i>, 38(24), 2782-2797</p>	<p>VII</p>	<ul style="list-style-type: none"> - review and update of previous clinical practice guidelines; systematic review of medical literature by expert panel - provides updated recommendations to prevent and manage nausea and vomiting by antineoplastic agents, radiation therapy and checkpoint inhibitors for adult and paediatric cancer patients - recommendations for high-emetic-risk antineoplastic agents (paediatric patients); <ul style="list-style-type: none"> o use three-drug combination of a 5-HT₃ receptor antagonist, dexamethasone and aprepitant or fosaprepitant o if unable to receive aprepitant or fosaprepitant, use two-drug combination of a 5-HT₃ receptor antagonist and dexamethasone o if unable to receive dexamethasone, use a two-drug combination of palonosetron and aprepitant or fosaprepitant - recommendations for moderate-emetic-risk antineoplastic agents (paediatric patients); <ul style="list-style-type: none"> o use two-drug combination of a 5-HT₃ receptor antagonist and dexamethasone o if unable to receive dexamethasone, use a two-drug combination of a 5-HT₃ receptor antagonist and aprepitant or fosaprepitant - recommendations for low-emetic-risk antineoplastic agents (paediatric patients); <ul style="list-style-type: none"> o patients should be offered ondansetron or granisetron - recommendations for minimal-emetic-risk antineoplastic agents (paediatric patients); <ul style="list-style-type: none"> o patients should not be offered routine antiemetic prophylaxis
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<p>Hughes, D., Ladas, E., Rooney, D., & Kelly, K. (2008) Massage Therapy as a Supportive Care Intervention for Children With Cancer. <i>Oncology Nursing Forum</i>, 35(3), 431-442</p>	<p>V</p>	<ul style="list-style-type: none"> - systematic literature review to assess the efficacy of complementary therapy (massage) for children undergoing cancer treatment; 70 articles included - findings suggest gentle massage techniques (light to medium pressure) are appropriate methods for paediatric patients - massage therapy was concluded to reduce the duration and severity of nausea, pain, fatigue and anxiety in the paediatric oncology setting
<p>Hussein, H.A., & Abdel Sadek, B.R. (2013) Acupressure for Chemotherapy Induced Vomiting Among School Age Children. <i>World Journal of Medical Sciences</i>, 8(4), 373-381</p>	<p>IV</p>	<ul style="list-style-type: none"> - quasi experimental research design study; purposive sample of 50 school aged children with a diagnosis of leukemia - findings supported the use of acupressure in paediatric oncology patients in combination with anti-emetic medication regimes to decrease the frequency of vomiting during treatment with a statistically significant difference between the study and control groups - recommendations were made for health professionals to assist children in learning correct acupressure techniques to assist them in relieving their nausea associated with chemotherapy

<p>Kang, H.J., Loftus, S., Taylor, A., DiCristina, C., Green, S., & Zwaan, C. M. (2015) Aprepitant for the prevention of chemotherapy-induced nausea and vomiting in children; a randomised, double-blind, phase 3 trial. <i>The Lancet Oncology</i>, 16(4), 385-394</p>	<p>II</p>	<ul style="list-style-type: none"> - randomised, multicentre, double-blinded study; 307 paediatric oncology patients - study examined the safety and efficacy of aprepitant in paediatric patients receiving moderately or highly emetogenic chemotherapy - 51% of patients in the aprepitant group and 26% in the control group achieved complete response (defined as no vomiting, no retching and no use of rescue medication) during the 25 to 120 hours (delayed phase) after initiation of emetogenic chemotherapy - concluded the addition of aprepitant to ondansetron with or without dexamethasone was effective for the prevention of chemotherapy-induced nausea and vomiting in paediatric patients being treated with moderately or highly emetogenic chemotherapy
<p>Karagozoglu, S., Tekyasar, F., & Yilmaz F.A. (2012) Effects of music therapy and guided imagery on chemotherapy-induced anxiety and nausea-vomiting. <i>Journal of Clinical Nursing</i>, 22(1-2), 39-50</p>	<p>III</p>	<ul style="list-style-type: none"> - cross-sectional, pre-post-test designed study; 40 adult participants - reported music therapy and visual imagery reduced the severity and duration of chemotherapy-induced nausea and vomiting significantly - music therapy and visual imagery commenced 15 minutes prior to chemotherapy, and continuing until completion of administration of chemotherapy recommended - music therapy and guided imagery particularly effective over multiple chemotherapy cycles in reducing anticipatory nausea and vomiting

<p>Kovacs, G., Wachtel, A.E., Basharova, E.V., Spinelli, T., Nicolas, P. & Kabickova, E. (2016) Palonosetron versus ondansetron for prevention of chemotherapy-induced nausea and vomiting in paediatric patients with cancer receiving moderately or highly emetogenic chemotherapy: a randomised, phase 3, double-blinded, double-dummy, non-inferiority study. <i>The Lancet Oncology</i>, 17(3), 332-344</p>	<p>II</p>	<ul style="list-style-type: none"> - randomised, multinational, double-blinded study; 502 paediatric oncology patients (aged 0 to <17 years) - study examined the safety and efficacy of palonosetron versus ondansetron in paediatric patients receiving moderately or highly emetogenic chemotherapy - study showed single dose 20 mcg/kg palonosetron was an effective prophylactic treatment for chemotherapy induced nausea & vomiting in the acute phase of moderate (MEC) and high emetogenic chemotherapy (HEC) - suggested 20 mcg/kg dose palonosetron was non-inferior to ondansetron in the acute phase, and was potentially superior to ondansetron in the delayed and overall phases - the dose of 10 mcg/kg palonosetron demonstrated similar efficacy to ondansetron during delayed and overall phases of MEC and HEC - concluded 20 mcg/kg palonosetron was indicated for use in the prevention of chemotherapy induced nausea and vomiting in paediatric oncology patients
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<p>Mazlum, S., Chaharsoughil, N.T., Banihashem, A., & Vashani, H.B. (2013) The effect of massage therapy on chemotherapy-induced nausea and vomiting in pediatric cancer. <i>Iranian Journal of Nursing and Midwifery Research</i>, 18(4), 280-284</p>	<p>II</p>	<ul style="list-style-type: none"> - randomised control trial; 70 paediatric oncology participants, aged 4-18 years, participants were randomly divided into two groups (massage therapy and control) - participants received three, 20-minute massage sessions during three set time periods (24 hours prior to chemotherapy, half an hour before and 24 hours post completion of chemotherapy) - massage techniques included a Swedish massage with effleurage, petrissage, friction and tapping movements with mild to moderate pressure - participants continued regular anti emetic medication regimes during massage therapy treatments - findings suggested massage as a useful intervention in reducing CINV in paediatric oncology patients after majority of nausea and vomiting cases decreased significantly after massage <ul style="list-style-type: none"> o Incidence of nausea was 25.7%, the severity, length and times of nausea were 20%, 54 minutes and 0.35 times lower in the intervention group o Vomiting incidence in the two groups was not however significantly different (p= 0.192) - recommendations were made for health professionals to educate and empower families to participate in massage therapy during their child's treatment - encouraged that regular anti emetic medication regimes are continued in conjunction with massage therapy for optimal management of CINV - using unscented massage oils will assist in minimising nausea associated with their scents
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<p>McKinnon, K., Jupp, J., Ghosh, S., Digout, C., Eason, S. & Romanick M. (2018) Adherence to pediatric acute chemotherapy-induced nausea and vomiting guidelines in Canadian hospitals. <i>Pediatric Blood & Cancer</i>, 66, e27488</p>	<p>IV</p>	<ul style="list-style-type: none"> - chart review of prescribing adherence to CINV guidelines at 4 Canadian paediatric oncology centers - patients received first course of chemotherapy (highly emetogenic or moderately emetogenic chemotherapy) - adherence to guidelines was low at all centres - complete CINV control was low, reports of emesis were high, indicating that patients were not receiving optimal treatment and management of chemotherapy induced nausea and vomiting
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<p>Miao, J., Liu, X., Wu, C., Kong, H., Xie, W., & Liu, K. (2017) Effects of acupressure on chemotherapy-induced nausea and vomiting: A systematic review with meta-analyses and trial sequential analysis of randomized controlled trials. <i>International Journal of Nursing Studies</i>, 70, (2017), 27-37</p>	<p>II</p>	<ul style="list-style-type: none"> - twelve studies included in the review, with 1419 patients included - aim of review was to evaluate the effectiveness of acupressure as an additional intervention in chemotherapy induced nausea and vomiting control - study inclusion criteria applied to 6 English databases: <ul style="list-style-type: none"> o Patient population receiving intravenous chemotherapy o Acupressure was used as an intervention both with and without antiemetic coverage o Antiemetics medications or nursing care were conducted as a comparator o Chemotherapy induced nausea and or vomiting as an outcome - findings suggest the following; <ul style="list-style-type: none"> o P6 was the most frequently used acupoint o Acupressure reduced the severity of acute (SMD= -0.18, 95% CI -0.31 to -0.05, p<0.01) and delayed (SMD= -0.33, 95% CI -0.64 to -0.01, p=0.04) nausea. However no significant effect on the incidence or frequency of vomiting was found
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<p>Miladinia, M., Baraz, S., Nouri, E., & Baeis, M. (2016) Light massage eases chemotherapy-induced nausea, vomiting in pediatric leukemia patients. <i>Massage Magazine</i>, 67</p>	<p>VII</p>	<ul style="list-style-type: none"> - article cited a randomised controlled trial involving 43 children with acute leukemia and undergoing chemotherapy - authors reported that the study focused on the use of a lighter form of massage therapy, known as slow stroke back massage to provide relief from side effects of treatment - participants were randomly assigned to either the slow stroke back massage or control group - nausea and vomiting levels were measured on day one of commencing chemotherapy, days two to seven of chemotherapy administration the massage group received five minutes of slow-stroke massage immediately prior to each chemotherapy session beginning - nausea was measured in both groups during chemotherapy administration and half hour and three hours post chemotherapy finishing. Episodes of vomiting over the next 24 hours were also recorded between both groups - results suggest a progressive reduction in means nausea severity and frequency of vomiting over the 7 day treatment period, in those who received slow-stroke massage treatment - the study authors state; "The results of this study are suggesting that [slow stroke back massage] as a non-pharmacological, easy and safe method is effective in controlling chemotherapy-induced nausea and vomiting in paediatrics with acute leukemia"
<p>Momani, T.G. & Berry, D.L. (2017) Integrative Therapeutic Approaches for the Management and Control of Nausea in Children Undergoing Cancer Treatment: A Systematic Review. <i>Journal of Pediatric Oncology Nursing</i>, 34(3), 173-184</p>	<p>II</p>	<ul style="list-style-type: none"> - review of current evidence on integrative therapeutic approaches for the control of chemotherapy-induced nausea and vomiting (CINV) in children with cancer; 21 studies included - integrative therapies included acupuncture/acupressure, aromatherapy, herbal supplements, hypnosis and other cognitive behavioural interventions - minimal information on the effectiveness and safety on integrative therapeutic approaches for CINV management in the paediatric oncology patient; further research suggested in areas of cognitive distraction, hypnosis and acupressure

<p>Mora J., Valero, M., DiCristina, C., Jin, M., Chain, A. & Bickham K. (2019) Pharmacokinetics/pharmacodynamics, safety, and tolerability of fosaprepitant for the prevention of chemotherapy-induced nausea and vomiting in pediatric cancer patients. <i>Pediatric Blood Cancer</i>, 66, e27690</p>	<p>II</p>	<ul style="list-style-type: none"> - study examined the pharmacokinetics (PK)/ pharmacodynamics (PD), safety and tolerability of fosaprepitant concomitantly administered with ondansetron +/- dexamethasone in paediatric oncology patients receiving chemotherapy with moderate or high emetogenic potential - intravenous fosaprepitant was well tolerated by pediatric cancer patients; drug-related adverse events were reported in 6.8% of patients, with hiccups being the most common adverse event - dose-proportional exposures were observed; adolescents (12 to 17 years) receiving fosaprepitant 150mg had exposures similar to adults at the same dose; patients < 12 years old required higher doses to achieve exposures comparable to adults
<p>Orrigo, K.M. (2015) The Impact of Interactive Music Therapy on the Pediatric Oncology Population. <i>Senior Honors Projects, 2010-current, James Madison University</i>, 1-34, Retrieved August 2018</p> <p>https://commons.lib.jmu.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1125&context=honors201019</p>	<p>VII</p>	<ul style="list-style-type: none"> - literature review of 13 trials - music therapy can have beneficial distraction effects on pain and anxiety levels experienced in the paediatric oncology population - music therapy had a positive impact on coping behaviours and overall wellbeing

<p>Patel, P., Robinson, P.D., Cohen, M., Devine, K., Gibson, P., Holdsworth, M.T., Neumann, E., Orsey, A., Phillips, R., Spinelli, D., Thackray, J., van de Wetering, M., Woods, D., Cabral, S., Sung, L. & Dupuis, L.L. (2022) Prevention of acute and delayed chemotherapy-induced nausea and vomiting in pediatric cancer patients: A clinical practice guideline. <i>Pediatric Blood & Cancer</i>, 69, e30001</p>	<p>VII</p>	<ul style="list-style-type: none"> - clinical practice guidelines with guidance for the prevention of acute and delayed chemotherapy-induced nausea and vomiting (CINV) in children and adolescents - recommendations for the prevention of acute and delayed CINV in paediatric cancer patients were developed based on evidence from systematic reviews, randomised controlled trials - recommendations for highly emetogenic chemotherapy (HEC) with acute CINV; <ul style="list-style-type: none"> o use a serotonin-3 receptor antagonist (5HT3RA), dexamethasone and (fos)aprepitant o use palonosetron as the 5HT3RA in patients unable to receive dexamethasone and/or (fos)aprepitant o consider adding olanzapine as a further antiemetic - recommendations for HEC with delayed CINV; <ul style="list-style-type: none"> o use palonosetron as preferred 5HT3RA in acute phase in patients at high risk of delayed CINV o further recommendations on the use of dexamethasone or (fos)aprepitant with delayed CINV provided o suggested no benefit of 5HT3RA use in delayed phase - recommendations for moderately emetogenic chemotherapy (MEC) with acute CINV; <ul style="list-style-type: none"> o children receiving MEC use 5HT3RA and dexamethasone o if unable to receive dexamethasone for acute CINV prophylaxis use 5HT3RA and (fos)aprepitant o use 5HT3RA if unable to receive dexamethasone and (fos)aprepitant, suggest palonosetron as preferred 5HT3RA, consider adding olanzapine - further recommendations provided to manage MEC in the delayed phase - use a 5HT3RA to manage acute CINV with low emetogenic chemotherapy (LEC), no prophylaxis required in delayed phase - no prophylactic antiemetic required for minimally emetogenic chemotherapy in acute and delayed CINV
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<p>Patel, P., Robinson, P.D., Devine, K., Positano, K., Cohen, M., Gibson, P., Holdsworth, M., Phillips, R., Spinelli, D., Thackray, J., van de Wetering, M., Woods, D., Cabral, S., Sung, L. & Dupuis, L.L. (2021) Prevention and treatment of anticipatory chemotherapy-induced nausea and vomiting in pediatric cancer patients and hematopoietic stem cell recipients: Clinical practice guideline update. <i>Pediatric Blood & Cancer</i>, 68, e28947</p>	<p>VII</p>	<ul style="list-style-type: none"> - clinical practice guideline outlining the recommendations for the prevention and treatment of anticipatory chemotherapy-induced nausea and vomiting (CINV) in children - systematic review of literature identifying acute and delayed CINV as a risk factor for anticipatory CINV, 13 studies met inclusion criteria; recommendations: <ul style="list-style-type: none"> o control of acute and delayed CINV should be optimized in order to minimize the risk of a child developing anticipatory CINV - systematic review of literature identifying strategies for secondary prevention of anticipatory CINV, 15 studies met inclusion criteria; recommendations: <ul style="list-style-type: none"> o psychological interventions such as hypnosis, systematic desensitization or relaxation techniques may be offered to children with anticipatory CINV o lorazepam prior to chemotherapy may be used to prevent anticipatory CINV in children o ginger or clonidine should not be used to prevent anticipatory CINV in children
<p>Phillips, R.S., Friend, A.J., Gibson, F., Houghton, E., Gopaul, S., Craig, S., Craig J.V. & Pizer, B. Antiemetic medication for prevention and treatment of chemotherapy-induced nausea and vomiting in childhood. <i>Cochrane Database of Systematic Reviews</i> 2016, Issue 2. Art. No.: CD007786. DOI: 10.1002/14651858.CD007786.pub3.</p> <p>(New search for studies and content updated (no change to conclusions), published in Issue 2, 2016)</p>	<p>I</p>	<ul style="list-style-type: none"> - updated revision of 2010 review; 34 randomised controlled studies included - suggests that 5-HT₃ antagonists are effective in paediatric patients who are receiving emetogenic chemotherapy; granisetron or palonosetron possibly better than ondansetron - the addition of dexamethasone with 5-HT₃ antagonists improves emetic control; risk-benefit of adjunctive steroid is uncertain - cannabinoids may be effective but produce frequent side effects - further research required on valid, age appropriate nausea and vomiting measurement tools; consultation and input from patients and families

<p>Popovic, M., Warr, D.G., DeAngelis, C., Tsao, M., Chan, K.K.W., Poon, M., Yip, C., Pulenzas, N., Lam, H., Zhang, L. & Chow, E. (2014) Efficacy and safety of palonosetron for the prophylaxis of chemotherapy-induced nausea and vomiting (CINV): a systematic review and meta-analysis of randomized controlled trials. <i>Supportive Care in Cancer</i>, 22, 1685-1697</p>	<p>I</p>	<ul style="list-style-type: none"> - systematic literature review, included 16 randomised controlled trials (1 involving paediatric patients) - reviewed the safety and efficacy of palonosetron compared to other 5HT₃ receptor antagonists (RAs) in chemotherapy induced nausea and vomiting (CINV) prophylaxis - palonosetron was statistically superior in achieving a complete response, complete control, no emesis and at times superior in no rescue medication as compared to other 5-HT₃ RAs - palonosetron was statistically significantly safer in 5-HT₃ RAs related adverse effects such as dizziness and mean QTc interval changes; was similar in the occurrence of constipation, headache and diarrhoea - concluded palonosetron was more efficacious and safer than other 5-HT₃ RAs
<p>Radhakrishnan, V., Joshi, A., Ramamoorthy, J., Rajaraman, S., Ganesan, P., Ganesan, T.S., Dhanushkodi, M. & Sagar, T. G. (2019) Intravenous fosaprepitant for the prevention of chemotherapy-induced vomiting in children: A double-blind, placebo-controlled, phase III randomized trial. <i>Pediatric Blood & Cancer</i>, 66(3), e27551</p>	<p>II</p>	<ul style="list-style-type: none"> - randomised, double-blinded study; 136 paediatric oncology patients receiving moderately or highly emetogenic chemotherapy, aged 1-12 years, participants were randomly divided into two groups (fosaprepitant or placebo) - complete response (CR) rates (no vomiting, no retching or use of rescue medication) were significantly higher in the fosaprepitant group during the acute and delayed phases after the last dose of chemotherapy administration - findings suggested the addition of fosaprepitant to ondansetron and dexamethasone improved chemotherapy-induced vomiting control in children treated with moderately or highly emetogenic chemotherapy

<p>Robison, J.G. & Smith, C.L. (2016) Therapeutic Massage During Chemotherapy and/or Biotherapy Infusions: Patient Perceptions of Pain, Fatigue, Nausea, Anxiety, and Satisfaction. <i>Clinical Journal of Oncology Nursing</i>, 20(2), e34-40</p>	<p>V</p>	<ul style="list-style-type: none"> - descriptive, correlational pilot study; 58 adult oncology participants - patients received therapeutic massage (TM) for 20 minutes whilst concurrently receiving chemotherapy and/or biotherapy; rated their pain, fatigue, nausea and anxiety pre and post TM using a Likert type scale; reported a statistically significant reduction in each of these variables post TM - results demonstrated a high level of patient satisfaction with the use of TM as part of patient care; may be an effective strategy for nurses to incorporate into holistic patient care - findings from study suggest that TM can be an effective strategy to decrease patients' perceptions of pain, fatigue, nausea and anxiety during chemotherapy and/or biotherapy
<p>Rodgers, C., Norville, R., Taylor, O., Poon, C., Hesselgrave, J., Gregurich, M., & Hockenberry, M. (2012) Children's Coping Strategies for Chemotherapy-Induced Nausea and Vomiting. <i>Oncology Nursing Forum</i>, 39 (2), 202-209</p>	<p>IV</p>	<ul style="list-style-type: none"> - prospective cohort study; convenience sample of 40 children, aged 7-12 years, receiving either moderate or highly emetogenic chemotherapy - study aimed to identify anticipatory, acute and delayed chemotherapy-induced nausea and vomiting (CINV) frequency and coping strategies used by the paediatric oncology patient population - findings suggest CINV occurred during the anticipatory, acute, and delayed times, with the highest frequency occurring during the delayed time following chemotherapy administration - most frequently used coping strategies were distraction and wishful thinking - findings suggest the most efficacious coping strategies included active and passive coping, most effective were social support and distraction

<p>Sing E.P.C., Robinson, P.D, Flank, J., Holdsworth, M., Thackray, J., Freedman, J., Gibson, P., Orsey, A.D., Patel, P., Phillips, R., Portwine, C., Raybin, J.L., Cabral, S., Sung, L. & Dupuis, L.L. (2019) Classification of the acute emetogenicity of chemotherapy in pediatric patients: A clinical practice guideline. <i>Pediatric Blood & Cancer</i>, 66(5), e27646</p>	<p>VII</p>	<ul style="list-style-type: none"> - clinical practice guideline with recommendations on the acute emetic potential of chemotherapy agents and regimens in pediatric oncology patients (aged 1 month to 18 years) - evidence based systematic review by an international panel of interdisciplinary professionals of 87 publications limited to pediatric patients; aiming to utilise the emetic potential of chemotherapy agents/regimens to assist the selection of appropriate prophylaxis for acute chemotherapy-induced vomiting (CIV)
<p>Timaeus, S., Elder, J., & Franco, K. (2018) Evaluation of the Use of Fosaprepitant for the Prevention of Chemotherapy-induced Nausea and Vomiting in Pediatric Patients. <i>Journal of Pediatric Hematology Oncology</i>, 40 (7), 527-531</p>	<p>IV</p>	<ul style="list-style-type: none"> - retrospective chart review; 35 paediatric patients, aged 10 months-18 years - complete control of emesis was observed in 89% of patients during the acute phase, 63% during the delayed phase and 60% overall following highly or moderately emetogenic chemotherapy administration - concluded fosaprepitant may be safe and effective in the prevention of chemotherapy induced nausea & vomiting in paediatric patients as young as 10 months of age
<p>Willier, S., Cabanillas Stanchi, K.M., von Have, M., Binder, V., Blaeschke, F., Feuchtinger, T.F. & Döring, M. (2017) Safety and Efficacy of Single-Dose Intravenous Fosaprepitant for the Prevention of Chemotherapy-Induced Nausea and Vomiting in Pediatric Patients with Hematooncological Malignancies after Moderate and High Emetogenic Chemotherapy. <i>Blood</i>, 130, Supp 1, 3220</p>	<p>IV</p>	<ul style="list-style-type: none"> - retrospective study; 79 paediatric oncology patients total, aged 0.8-18 years (median age 8 years) - assessed the efficacy and safety of a combination of intravenous fosaprepitant and ondansetron as compared to ondansetron alone - both prophylaxis regimens were similarly safe and not significantly different in respect to drug related adverse effects - efficacy of the fosaprepitant and ondansetron prophylaxis regimen was significantly superior when compared to ondansetron alone regimen with fewer paediatric patients experiencing vomiting in the acute and delayed CIV phase

<p>Wood, J.M., Chapman, K., & Eilers, J. (2011) Tools for Assessing Nausea, Vomiting, and Retching: A Literature Review. <i>Cancer Nursing</i>, 34(1), e14-24</p>	<p>V</p>	<ul style="list-style-type: none"> - systematic literature review and evaluation of chemotherapy induced nausea, vomiting and retching (CINVR) tools - 25 CINVR instruments identified in inclusion criteria; used in the adult oncology population - the ideal tool should measure for nausea, vomiting and retching symptoms, and be clear, concise and clinically relevant, whilst demonstrating validity and reliability - 1 tool, the Index of Nausea, Vomiting and Retching (INVR, Rhodes et al 1999) potentially met criteria - selecting the most appropriate CINVR tool for use in the clinical setting, will assist the nurse to provide optimum care for oncology patients
<p>Yousef, Y., Zaki, N., & Sayed, A. (2018). Efficacy of acupressure on nausea and vomiting among children with leukemia following chemotherapy. <i>Journal of Nursing Education and Practice</i>, 9 (1), 89-97</p>	<p>III</p>	<ul style="list-style-type: none"> - quasi experimental study conducted at two paediatric oncology departments in South Egypt: data collected from 120 participants with a diagnosis of leukemia and aged between 6-18 years and an inpatient for at least three days for chemotherapy treatment - aim of the study was to determine the effect of acupressure on nausea and vomiting in those receiving chemotherapy and test the hypothesis of P6 stimulation reducing the incidence and severity of nausea - participants were divided into groups receiving acupressure at P6 for three consecutive intervention sessions on the day of chemotherapy (study group) and routine care only (control group) - utilising the Rhodes Index for Nausea and Vomiting tool, results found a significant reduction of the frequency, distress and severity of nausea and vomiting, in those who received acupressure (p=0.000) - recommendations were made to provide educational programs to health-care professionals on the skill, knowledge and management of acupressure as a supportive intervention