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RAPID REVIEW

# Interventions for Opioid Agonist Treatment Access among Harm Reduction Clients

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## Key Findings

- There are few studies of primarily weak quality that report on findings related to interventions that facilitate access to opioid agonist treatment (OAT) among clients who attend harm reduction services. These services vary from onsite access to buprenorphine to facilitated referral (e.g., case management or incentives).
- Within this limited evidence base, specific interventions that aimed to increase client engagement with treatment services did not demonstrate an advantage compared with standard care.
- When clients accessed treatment supports, co-located detoxification services were associated with use of methadone, involvement in treatment was associated with decreased opioid use and treatment retention may be similar to other settings.
- Harm reduction services may serve as an important point of linkage for people interested in treatment services. Future studies are needed to understand the effectiveness of specific interventions to support engagement and retention in treatment.

## Scope

- This review addresses the question: What is the evidence on initiatives to facilitate access to OAT among harm reduction service clients, including health and social outcomes and engagement with services?
- The review is a rapid synthesis focused on people who use opioids and access harm reduction services, along with any intervention to facilitate access to OAT, including buprenorphrine or methadone. OAT is recommended whenever possible,[1] given evidence for reducing mortality.[2] Other health interventions and social services are also important in meeting the needs of people

who use opioids; however, a comprehensive review of all health and social interventions in this population was out of scope for this rapid review.

- Harm reduction services included needle and syringe distribution programs (NSP) and supervised consumption services (SCSs), which may operate as stand-alone services or services within another setting.

- During various stages of the synthesis process (i.e., scoping, screening, data extraction and review of the draft document), individual phone discussions were held with stakeholders who are involved in harm reduction services and have lived experience of substance use. Due to time limitations, in-depth consultation was not feasible at all stages.

# Background

- The opioid crisis continues to escalate in Ontario, with 1,250 opioid-related deaths in 2017.[3] In response, communities across the province are planning comprehensive interventions to address this growing problem.[3]

- Harm reduction interventions, such as naloxone distribution, SCS and NSP are effective in reducing harms related to substance use.[4-6] Some studies use the terms needle exchange programs (NEP), syringe exchange programs (SEP) and supervised injection facility (SIF); however, the terms SCSs and NSP are used in this report for consistency.

- Further, treatment with opioid agonists (i.e., methadone and buprenorphine) substantially reduces mortality among people dependent on opioids.[2]

- Evidence suggests that combinations of harm reduction and treatment interventions may result in greater health benefits for people who use substances.[6] For example, a recent systematic review and meta-analysis found that a combination of high-coverage NSP and OAT was effective in reducing Hepatitis C infection by 74% among people who use drugs.[7]

- In Ontario, a provincial funding application process was launched in October 2018 for programs that plan to offer SCSs along with onsite or defined pathways to treatment and support services. These are referred to as Consumption and Treatment Services (CTS).[8]

- This review of the current evidence on interventions to support integrating treatment with harm reduction services may assist with design and implementation of CTS or other pathways from harm reduction services to linking interested individuals to treatment.

# Methods

- A rapid review is a form of knowledge synthesis based on the steps of a systematic review,[9] making certain compromises in those steps in order to be timely.[10] A rapid review can respond to questions similar to those for a systematic review. A rapid review was the chosen approach, considering scope, feasibility and the need for responsiveness.

- This rapid review synthesizes published and grey literature related to initiatives that facilitate access to evidence-based OAT for people who use opioids and access harm reduction services. Stakeholder input informed the synthesis process from scoping to release.

- To identify relevant evidence, systematic searches were conducted for the above research question. PHO Library Services conducted a search in MEDLINE, Embase, CINAHL, PsycINFO, SocINDEX and Scopus, using relevant vocabulary and subject headings. The research team provided sample articles and inclusion/exclusion criteria for use in search strategy development. All database results were integrated and duplicates removed.

- A grey literature search was conducted to identify relevant unpublished articles. The grey literature search included a general web search, search for a related clinical trial registration, several custom search engines (Canadian and international public health agencies) and targeted web searches of major knowledge-producing organizations (e.g., Centre for Addiction and Mental Health, Canadian Centre on Substance Use and Addiction). Grey literature search results were divided into two sets with each set screened by separate single reviewers. Articles of questionable relevance were collated and reviewed by the first author to advise on exclusion or inclusion.

- Reference lists of included articles were searched for additional relevant articles; however, none of the reference list articles met inclusion criteria based on their methods and/or publication dates.

- English-language, peer-reviewed and unpublished articles were eligible for inclusion if they focused on people who use substances and access harm reduction services (primarily NSP and SCSs that operate as stand-alone services or services within another setting); included any initiative to facilitate access to OAT (e.g., methadone or buprenorphine); reported evaluation or primary research data; included findings on any health and social outcomes or engagement in services; were published 2013-2018.

- One staff member screened titles and abstracts and then full-text versions of all articles for inclusion. Peer-reviewed literature search results were divided into three sets with each set screened by separate single reviewers. Articles of questionable relevance were collated and reviewed by the first author to advise on exclusion or inclusion. A total of eight articles were identified for this rapid review.[11-18]

- For all relevant articles, one PHO staff extracted relevant data and summarized content. All extracted content was reviewed by the first author.

- Quality appraisal was independently conducted by two staff members using the Effective Public Health Practice Project (EPHPP) tool (applied to two randomized controlled trials, RCTs and two descriptive follow-up studies based on participants in RCTs),[19] the Newcastle-Ottawa (NOS) Quality Assessment Scale (adapted for cross sectional studies)[2] and the Quality Assessment Tool for Pre and Post Intervention Designs,[20,21] with any discrepancies resolved by discussion to consensus. Tools were chosen to match the research design of the article. Guided by quality ratings, narrative statements describing the strengths and weaknesses are reported.

# Results

- This synthesis reports results of the literature search, including a description of the available literature, quality of the included studies, findings reported by outcome and a summary description of each of the included studies in the synthesis.

## Description of the Literature

- Across all three search strategies, a total of 6,204 articles were retrieved by searches and screened. The peer-reviewed literature searches identified 1,477 articles, of which eight met inclusion criteria. The grey literature search identified 4,439 articles of which none met inclusion criteria. Two hundred and eighty-eight articles were identified from the reference lists of the included articles; however, none met inclusion criteria. Most excluded articles did not address access to treatment specifically from harm reduction services.

- Four studies were conducted in the United States,[13,15,16,18] two in Canada[14,17] and two in Sweden.[11,12] The majority of studies took place in NSP (mobile or fixed site),[11,12,15,16,18] with others taking place in SCSs,[14] harm reduction agencies (offering multiple services)[13] or a trailer established to care for people with presumed opioid overdose in the community.[17]

- Research designs of the relevant studies included two RCTs and two additional follow-up studies based on RCTs,[11,12,15,16] one pre-post design[13] and three cross-sectional studies.[14,17,18]

## Quality of Included Studies

- The majority of relevant studies were rated as weak,[11-17] while one was rated as moderate, using appraisal tools appropriate for the study design.[18] Four studies were reviewed and rated as weak,[11,12,15,16] based on the Effective Public Health Practice Project (EPHPP) tool.[19] Using the Newcastle-Ottawa (NOS) Quality Assessment Scale (adapted for cross-sectional studies),[2] three studies were reviewed: one study was appraised as moderate[18] and the other two were appraised as weak.[14,17] The last study was assessed using the Quality Assessment Tool for Pre and Post Intervention Designs[20,21] and was appraised as weak.[13] See Appendix A.

- Two studies had a control group and were conducted as RCT studies.[12,16] Included RCT studies showed some consistent methodological weaknesses: confounders were not controlled (e.g., through stratification, matching or analysis); assessors and participants were not blinded to research question and group assignment, respectively; finally, numbers and reasons for withdrawals and drop-outs were not described adequately. Sample size calculations were conducted for two RCTs;[12,16] one RCT was adequately powered to detect a difference between groups.[12]

- There were also similar weaknesses for cross sectional studies: convenience sampling was used; studies lacked descriptions of the response rate or the characteristics of the responders and non-responders; and confounding factors were not controlled. The pre-post study showed several methodological weaknesses:[13] no probability sampling was used; sample size was not justified; p values and confidence intervals were not reported; correlations of multiple outcomes were not studied; and missing data were not managed appropriately.[20,21]

- Many of the included studies had small sample sizes of less than 150 participants[11-13,18] and some included participants from the same study[11,12] or program.[15,16] In addition, blinding of participants and assessors was difficult, if not impossible, for the majority of studies due to informed consent and the nature of the intervention. These limitations with study design and assessment of outcomes, as well as issues with recruitment and retention, are common in studies conducted with marginalized populations.

## Summary of Each Included Study (N=8)

- Braback et al. (2016) conducted a RCT called Malmö Treatment Referral and Intervention Study (MATRIS)[12] and a follow-up study in 2017,[11] based in Malmö, Sweden to assess an intervention to improve attendance at an initial treatment appointment among those attending a NSP. The RCT assessed the effectiveness of a strength-based case management intervention (CMI) to facilitate treatment attendance compared to standard of care (referral only) among NSP attendees who were dependent on heroin (n = 75) and were referred to participate in evidence-based treatment with methadone or buprenorphine.[12]

    - **Context:** Potential participants were approached by nurses working at the NSP about their interest in participating in a study, which if eligible could result in methadone or buprenorphine treatment (one year of documented opioid dependence based on records at the NSP, medical charts or social services; treatment services paid by national insurance, delivered at a specialized clinic 3 km from the NSP). To enroll, participants met with a social worker within days for baseline assessment, were randomized to strength-based CMI (30-minute discussion identifying help needed to attend the medical appointment) or standard referral, received an appointment with a physician seven days after the interview, with methadone or buprenorphine starting four days thereafter (medication chosen individually; typically long waiting lists in treatment facilities in Sweden).

    - **Findings:** Overall, 100 people who currently used heroin were approached and 75 were randomized. Treatment initiation was high for both groups of participants: 95% in the intervention group and 94% in the control group. The authors reported that treatment entry was unrelated to intervention status, suggesting that CMI did not improve treatment attendance compared to referral alone.[12]

- A follow-up study to assess treatment retention was conducted by Braback et al. (2017) among all participants (n = 71) who successfully started treatment with methadone or buprenorphine from the MATRIS study.[11]

    - **Context:** In addition to the program information above, this article further described that there were no pre-treatment conditions for social stability, psychiatric comorbidity (excluded if severe, unstable condition) or drug use severity. There was no further information describing treatment, but the authors indicated that participants received standard care and “were followed up with regard to retention in treatment.”

    - **Findings:** The percentage of patients retained in treatment was 94% after three months, 89% after six months and 82% after 12 months (retention rates were not further stratified by intervention group).[11] The authors indicated that 80% or higher retention is typical in Sweden and suggested NSPs may have an important role in linkage to treatment based on similarly high retention rates among this group.

- Kidorf et al. (2018) evaluated the efficacy of different treatment initiation strategies for improving methadone treatment among people dependent on opioids (n = 212), referred from the mobile Baltimore Needle Exchange Program (BNEP).[16] This RCT compared three 3-month treatment initiation strategies: Low Threshold (LTI), Voucher Reinforcement (VRI) or Standard Care (SCI).

- **Context:** People dependent on opioids who were interested in methadone treatment were referred by BNEP staff to a research van (parked adjacent to the BNEP mobile van), where they could enroll in OAT at Addiction Treatment Services (ATS). The clinic intake was scheduled within one week of speaking to the research staff, with no obligation to join the study. At the intake appointment, participation and eligibility for the study was discussed (excluded if major mental illness or severe cognitive impairment). Weekly random observed urine samples were required in the program and take-home doses were authorized if patients had four consecutive negative urine samples (with random recalls for unopened doses using a daily automated telephone line). Patients without insurance paid for treatment on a subsidized sliding scale (average $10.00 weekly). Methadone doses started at 30 mg and increased by 5 mg weekly to a target of 80 mg, but were not increased if doses were missed. The SCI condition involved counselling up to eight hours per week if there were positive urine samples and time restrictions on doses if counselling sessions were missed. VRI involved providing vouchers (up to $1,329.00) for goods and services purchased by staff based on attending daily methadone dosing and counselling. LTI involved one counselling session per month and flexible hours for methadone doses independent of attending counselling. All participants received SCI after the first 13 weeks, for an additional 13 weeks of follow-up.

- **Findings:** The three initiation conditions did not differ by mean methadone dose (62.4 – 67.9 mg), counselling sessions (mean = 10.0, SD = 4.4), opioid-positive urine samples (28-32% between week 14 and 26; decreased odds of positive sample for all groups, SCI: OR = 0.91, 95% CI 0.89 – 0.91) or retention (mean days: 104.8 – 114.8 days, p = 0.440).[16]

- Similar to the 2018 study, Kidorf et al. (2013) evaluated changes in rates of self-reported heroin and cocaine use among people out-of-treatment and dependent on opioids, registered at the BNEP and participating in a RCT on improving treatment interest and enrollment (n=240). The study examined the effects of longitudinal variables (days of treatment, employment or attendance at self-help groups) on changes in drug use over one year with monthly follow-up questionnaires, and participants were compensated for their time.[15]

  - **Context:** Participants in the parent study were assigned to one of three referral conditions over a four-month period: Motivated referral condition (MRC), MRC + 1 (MRC with monetary incentives for attending sessions and enrolling in treatment) or Standard referral condition (SRC). Few additional details about context were provided, as they were reported in the parent study (published outside the timelines of this review).

  - **Findings:** Compared with baseline, participants reported fewer days of heroin use at monthly intervals (regardless of intervention condition) ($p < .001$). In addition, larger reductions in heroin use were associated with days of treatment and self-help group attendance, days of employment and lower baseline drug use ($p < .0001$).[15] The authors did not present results by treatment group in the parent RCT. (Results from the parent study are out of scope for this review based on the year of publication)

- Gaddis et al. (2017) evaluated Onsite, detoxification services co-located at the Insite SCS in Vancouver, among 1,316 individuals over two years as part of two longstanding prospective cohort studies among people who inject drugs (PWID).[14]

- **Context:** The length of stay at Onsite is on average one to two weeks, with the option to access transitional housing afterward. Although Onsite is not specific to opioid use, the program can refer patients to addiction treatment.[22] Further details about the referral processes were not provided.

- **Findings:** At baseline, 5.7% of the cohort participants reported using Onsite in the previous six months. At the end of the two-year period, 11.2% of participants reported enrolling at Onsite at least once; however, when the sample was restricted to recent SCS use, 23.7% of participants reported accessing Onsite during follow-up. Participation in methadone treatment was independently associated with the use of Onsite (Full cohort, AOR = 1.90, 95% CI = 1.34 – 2.68; Recent SCS use, AOR = 1.59, 95%CI = 1.10 – 2.31) and authors suggest this highlights the role of SCSs for facilitating entry into treatment services and potential benefit of co-located detoxification services.[14]

- Bachhuber et al. (2018) reported on a buprenorphine program called the Stabilization, Treatment, and Engagement Program (STEP), which is fully integrated within a NSP in Philadelphia, offering other harm reduction services and assistance with social services.[18]

  - **Context:** The program provides buprenorphine to NSP clients interested in cessation of heroin use. STEP clients are required to have health insurance (e.g., private or public) and photo identification and are not eligible if they have acute mental health issues. The program typically has a wait list of 150 to 200 people. Case managers provide referral and a mandatory 1.5-hour orientation session at the time of enrollment. Patients are assessed by the medical director and provided with a one-week prescription for buprenorphine home induction and later increased to a maximum of 16 mg dose daily due to concerns about diversion. Due to program constraints, patients are linked with outside services for counselling. Patients attend weekly appointments for the first four weeks, gradually extend to appointments every four weeks and provide unsupervised urine screening tests. If patients are still using heroin, they may be discharged from the program.

  - **Findings:** After 12 months, the authors reported 56% of patients were retained in treatment and 16% had positive urine samples for opioids.[18] Authors suggested retention was similar to those reported in other settings.

- Fox et al. (2017) collaborated with two New York City harm reduction (HR) agencies to develop a community-based buprenorphine treatment (CBBT) intervention and tested its feasibility and effectiveness.[13]

  - **Context:** One HR agency collaborated on developing the CBBT intervention, including focus groups and surveys with clients about interest and attitudes toward buprenorphine treatment. HR agency staff (n = 22) were trained over a five-week period to provide the following to their HR clients: buprenorphine education, motivational interviewing, referrals to buprenorphine-prescribing doctors and treatment retention support. Participants were eligible if they identified a problem with heroin or prescription opioid use, a history of injection drug use, no use of buprenorphine in the past six months and an interest in changing opioid use. There were 50 study participants recruited pre-intervention and 26 recruited post-intervention.

- **Findings:** Although the intervention was feasible, there was low initiation of buprenorphine treatment. Out of all pre-intervention participants, 4% initiated buprenorphine treatment over the follow-up period and none of the post-intervention participants initiated buprenorphine treatment over the follow-up period. Drug use (by self-report or urine toxicology) and drug-related human immunodeficiency virus (HIV) risk behaviours also did not differ significantly between pre- and post-intervention groups.[13]

- Scheuermeyer et al. (2018) reported on results of a program using a modified trailer to care for people in the Downtown East Side of Vancouver with presumed fentanyl overdose (OD) and meeting lower risk criteria severe outcomes, arriving by emergency medical services.[17] An objective of the service was to provide access to addiction care.

    - **Context:** The trailer offered OD treatment, HR (including naloxone kits), addictions care and community resources on-site. Patients were quickly assessed by a nurse, social worker or physician and offered a blanket, food and juice. Interested patients were assessed by addiction specialists and recommended buprenorphine (tablets provided on site, follow-up with primary care physician the next day) or methadone (prescription for three days provided).

    - **Findings:** Of 255 patients who were treated for OD, 1.1% were transferred to a local ED and 81.7% were given take-home-naloxone (THN) kits. Overall, 195 were assessed by an addictions physician, with 43 who accepted OAT at the time and 26 who returned to the trailer the next day for treatment.[17] Authors suggested patients may be receptive to treatment in this setting.

## Synthesis of Reported Outcomes

- Among the eight included studies, four reported outcomes for treatment initiation,[12-14,17] three studies reported outcomes related to treatment retention[11,16,18] and four studies reported opioid use.[13,15,16,18] The following section summarizes findings across each of the three outcomes.

### TREATMENT INITIATION

- Overall, treatment initiation rates varied substantially across four relevant studies, reflecting their heterogeneity. Braback (2016) found that referring interested clients from a NSP to methadone or buprenorphine treatment at an outpatient clinic in Sweden resulted in high rates of treatment initiation among recruited patients. Results did not differ between those who received case management intervention (CMI) or those who received only a referral (95% and 94% respectively).[12] Gaddis (2017) found that 11.2% of people who inject drugs reported enrolling in detoxification services co-located with an SCS in Vancouver and 23% among those who reported recent use of the SCS.[14] Scheuermeyer (2018) found that among patients who received care at a temporary trailer for a presumed fentanyl overdose in the community and saw an addictions physician, 10.0% accepted ‘to-go’ buprenorphine, 5.9% accepted a prescription for methadone, 18.6% patients promised to follow up with their primary care physician or return the next day for induction of buprenorphine/naloxone (with 9.7% overall who attended the trailer for follow-up within 24 hours).[17] In contrast, Fox (2017) found initiation of buprenorphine treatment among clients at a HR agency was low and did not differ between pre-and post-intervention (4% and 0% uptake respectively; performed chi-square tests).[13]

### TREATMENT RETENTION

- Treatment retention rates varied, but were fairly high, across three relevant studies, although the context of the programs differed. Bachhuber (2018) reported treatment retention in on-site buprenorphine treatment in Philadelphia was 77%, 65%, 59%, 56% at three-, six-, nine- and 12-month follow-up, respectively.[18] Additionally, Braback (2017) reported methadone or buprenorphine treatment retention rates in Sweden over one year of 94%, 89% and 82% at three-, six- and 12-month follow-up, respectively.[11] Kidorf (2018) compared methadone retention rates in Baltimore across three different treatment referral conditions and found similar results across all three conditions at three- and six-month follow-up, with mean days in treatment from 104.8 days to 114.8 days across all referral conditions (i.e., LTI; VRI; or SCI).[16]

### OPIOID USE

- The evidence regarding opioid use among patients referred to treatment from harm reduction services is mixed. Kidorf (2013) found that participants who received addictions treatment in a Baltimore program (self-reported "days of substance abuse treatment") reported fewer days of heroin use at follow-up intervals compared with baseline (M baseline = 28.18; SE = .28 vs. M follow-ups = 13.35; SE = .66; F [11, 239] = 21.40, $p < .001$).[15] Similarly, Kidorf (2018) reported that participants who received methadone reduced their opioid use over time (26-week follow-up) in all three conditions evaluated in the study (i.e., SCI OR: 0.91, 95% CI: 0.89 – 0.91; similar for LTI and VRI).[16] In contrast, Fox (2017) found no significant changes in drug use (self-reported or urine toxicology) between pre-and post-intervention conditions involving a CBBT.[13] Lastly, Bachhuber (2018) reported that the percentage of participants with a positive opioid screen in a Philadelphia program was 19%, 13%, 17% and 16% at three-, six-, nine- and 12-month follow-up, respectively (Note: patients who continued to use heroin intermittently were subject to administrative discharge).[18]

# Discussion

- The eight included studies describe evaluated interventions for onsite or facilitated access to treatment for interested clients attending harm reduction services, although evidence is limited and several contextual factors could influence understanding of their effectiveness or applicability for treatment services in Ontario.
    - Among the identified studies, none compared immediate, on-site access to OAT in harm reduction settings with referral to off-site treatment. A project in the United States was recently funded to compare these approaches through a RCT.[23] In a previous RCT in an emergency department setting, on-site initiation of buprenorphine significantly increased engagement in OAT at 30 days compared with referral.[24]
    - Dosing protocols may have influenced retention rates. The outpatient methadone program in Baltimore increased doses more slowly than the current guideline in Ontario (5 mg weekly in Baltimore compared with up to 15 mg as early as three days in Ontario).[16] In the Philadelphia program, the maximum dose of buprenorphine was 16 mg because of concerns about diversion,[18] whereas the maximum dose in Canada is 24 mg.[25]
    - Additionally, insurance coverage may be a factor in retention. In the Baltimore study, weekly fees of $10.00 among low income patients could have contributed to missed

doses, preventing dose increases to the target dose.[16] Conversely, higher retention rates were observed in a setting with national insurance coverage in Sweden.

- Further, other program policies could impact retention. For some treatment conditions, the Baltimore program delayed methadone dosing times if patients missed their counselling session, making it more inconvenient to receive their dose.[16] In the Philadelphia program, patients were discharged if heroin use continued, for failure to meet treatment goals (administrative discharge for 15% of participants).[18]

# Limitations

- Our rapid review is limited by the small number of studies, weak quality of the included studies and difficulties with representative samples.
- This review did not capture studies occurring earlier than within the past five years, although older information may be more limited in its applicability.
- Details were often unclear regarding the number of people who were potentially eligible, approached or accepted treatment.
- Given the focus of our review, we did not include other relevant health and social interventions, such as primary care, medical care for other health or mental health issues, psychological interventions and social supports.
- Other outcomes that may be relevant were not captured in the available studies, such as provider and patient experiences with the processes for engagement, initiation and retention in treatment, as well as other functional and social outcomes, such as employment.

# Conclusion

- There are few studies of primarily weak quality that report on findings related to interventions that facilitate access to opioid agonist treatment (OAT) among clients who attend harm reduction services. These services vary from onsite access to buprenorphine to facilitated referral (e.g., case management or incentives).
- Within this limited evidence base, specific interventions that aimed to increase client engagement with treatment services did not demonstrate an advantage compared with standard care.
- When clients accessed treatment supports, co-located detoxification services were associated with use of methadone, involvement in treatment was associated with decreased opioid use and treatment retention may be similar to other settings.
- These studies provide examples of the indicators that have been previously used to evaluate interventions that facilitate access to OAT among clients in harm reduction services. These indicators may inform future evaluation designs.
- Harm reduction services may serve as an important point of linkage for people interested in treatment services. Future studies are needed to understand the effectiveness of specific interventions to support engagement and retention in treatment.

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# Appendix A: Quality Appraisal of Included Review

**Table 1. Effective Public Health Practice Project (EPHPP)**

| Component Ratings | Braback (2017) | Braback (2016) | Kidorf (2018) | Kidorf (2013) |
|---|---|---|---|---|
| **SELECTION BIAS** | | | | |
| (Q1) Are the individuals selected to participate in the study likely to be representative of the target population? | 3- Weak | 2-Moderate | 2-Moderate | 2-Moderate |
| (Q2) What percentage of selected individuals agreed to participate? | | | | |
| **STUDY DESIGN** | | | | |
| Indicate the study design | | | | |
| Was the study described as randomized? | 1- Strong | 1- Strong | 1- Strong | 1- Strong |
| If Yes, was the method of randomization described? | | | | |
| If Yes, was the method appropriate? | | | | |
| **CONFOUNDERS** | | | | |
| (Q1) Were there important differences between groups prior to the intervention? | 3- Weak | 3- Weak | 3- Weak | 3- Weak |
| (Q2) If yes, indicate the percentage of relevant confounders that were controlled (either in the design (e.g., stratification, matching) or analysis)? | | | | |
| **BLINDING** | | | | |
| (Q1) Was (were) the outcome assessor(s) aware of the intervention or exposure status of participants? | 3- Weak | 3- Weak | 3- Weak | 3- Weak |
| (Q2) Were the study participants aware of the research question? | | | | |
| **DATA COLLECTION METHODS** | | | | |
| (Q1) Were data collection tools shown to be valid? | 3- Weak | 3- Weak | 1- Strong | 1- Strong |

| Component Ratings | Braback (2017) | Braback (2016) | Kidorf (2018) | Kidorf (2013) |
|---|---|---|---|---|
| (Q2) Were data collection tools shown to be reliable? | | | | |
| **WITHDRAWALS AND DROP-OUTS** | | | | |
| (Q1) Were withdrawals and drop-outs reported in terms of numbers and/or reasons per group? | 3- Weak | 3- Weak | 3- Weak | 2-Moderate |
| (Q2) Indicate the percentage of participants completing the study. (If the percentage differs by groups, record the lowest). | | | | |
| **GLOBAL RATING** | **3- Weak** | **3- Weak** | **3- Weak** | **3- Weak** |

**Table 2. Newcastle-Ottawa (NOS) Quality Assessment Scale (adapted for cross sectional studies)**

| Article | Bachhuber (2018) | Gaddis (2017) | Scheuermeyer (2018) |
|---|---|---|---|
| **Representativeness of the sample:** | | | |
| a) Truly representative of the average in the target population.* (all subjects or random sampling) | | | |
| b) Somewhat representative of the average in the target population.* (non-random sampling) | b) 1 | b) 1 | b) 1 |
| c) Selected group of users. | | | |
| d) No description of the sampling strategy | | | |
| **Sample size:** | | | |
| a) Justified and satisfactory.* | b) 0 | b) 0 | b) 0 |
| b) Not justified. | | | |
| **Non-respondents:** | c) 0 | c) 0 | c) 0 |

| Article | Bachhuber (2018) | Gaddis (2017) | Scheuermeyer (2018) |
|---|---|---|---|
| a) Comparability between respondents and non-respondents characteristics is established and the response rate is satisfactory.*<br>b) The response rate is unsatisfactory or the comparability between respondents and non-respondents is unsatisfactory.<br>c) No description of the response rate or the characteristics of the responders and the non-responders. | | | |
| **Ascertainment of the exposure (risk factor):**<br>a) Validated measurement tool.**<br>b) Non-validated measurement tool, but the tool is available or described.*<br>c) No description of the measurement tool. | a) 2 | c) 0 | c) 0 |
| **Comparability:**<br>The subjects in different outcome groups are comparable, based on the study design or analysis. Confounding factors are controlled.<br>a) The study controls for the most important factor (select one).*<br>b) The study control for any additional factor.* | None 0 | a) 1 | None 0 |
| **Assessment of the outcome:**<br>a) Independent blind assessment.**<br>b) Record linkage.**<br>c) Self report.*<br>d) No description. | b) 2 | c) 1 | b) 2 |
| **Statistical test:**<br>a) The statistical test used to analyze the data is clearly described and appropriate and the measurement of the association is presented, including confidence intervals and the probability | a) 1 | a) 1 | a) 1 |

| Article | Bachhuber (2018) | Gaddis (2017) | Scheuermeyer (2018) |
|---|---|---|---|
| level (p value).*<br>b) The statistical test is not appropriate, not described or incomplete. | | | |
| **TOTAL** | **6 (Moderate)** | **4 (weak)** | **4 (weak)** |

* indicates points allotted

**Table 3: Quality Assessment Tool for Pre- and Post-Intervention Designs**

| Article | Fox (2017) |
|---|---|
| **Sampling**<br>a. Was probability sampling used? (1)<br>b. Was sample size justified to obtain adequate power? (1) | a) 0<br>b) 0 |
| **Design**<br>a. One pre-test or baseline and several post-test measures (2) or<br>b. Simple before-and-after study (1) | a) 0<br>b) 1 |
| **Control of Confounders**<br>Does the study employ a comparison strategy? An attempt to create or assess equivalence of groups at baseline by:<br>a. Matching group participants (2) or<br>b. Statistical control (1) or<br>c. None (0) | a) 0<br>b) 1 |
| **Data Collection and Outcome Measurement**<br>a. Was the DV directly measured by an assessor? (1) | a) 1<br>b) 2 |

| Article | Fox (2017) |
|---|---|
| b. Were dependent variables either: i. Directly measured (2) or ii. Self-reported (1)<br>c. Were dependent variables measured reliably (with reliability indices previously or for this study)? (1)<br>d. Were dependent variables measured validly (with validity assessments previously or for this study)? (1) | c) 0<br>d) 0 |
| **Statistical Analysis and Conclusions**<br>a. Was (were) the statistical test(s) used appropriate for the main outcome and at least 80% of the others? (1)<br>b. Were p values and confidence intervals reported properly? (1)<br>c. If multiple outcomes were studied, were correlations analyzed? (1)<br>d. Were missing data managed appropriately? (1) | a) 1<br>b) 0<br>c) 0<br>d) 0 |
| **Drop Outs**<br>a) Is attrition rate <30% (if no attrition code 1) (1) | a) 0 |
| **TOTAL** | 6/16 (weak) |

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# Disclaimer



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