Evidence on interventions that improve mental health of child refugees and child asylum seekers in Europe: A Rapid Systematic Review

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Contents

Abstract

Background: A considerable number of child refugees and asylum seekers are entering Europe to seek refuge from ongoing conflict and war in their home countries. These children are identified as having unique but urgent mental health needs requiring timely interventions. Often, appropriate interventions are lacking or being delivered without a solid evidence base. There is a dire need for identification and appraisal of available evidence on present interventions and recognition of gaps in research. This rapid review has attempted a swift and systematic synthesis of all available evidence on interventions that address mental health of child refugee and asylum seekers in Europe.

Methods: Databases including PsycINFO, MEDLINE, SocINDEX, PubMed, Psychology and Behavioral Sciences Collection and Social Sciences Citation Index (via the Web of Science) were searched along with limited handsearching to identify studies that reported interventions on child refugee and child asylum seeker mental health in Europe. Identified studies were systematically screened for relevance and assessed for inclusion eligibility criteria based on outcome measure, participant status and age, regionality, language and year of publication. A narrative analysis was conducted to synthesise evidence from this heterogenic group of studies. Effect sizes (Cohen's d) were calculated to allow effectiveness establishment and cross-study comparison. Quality of interventions and study designs were assessed using Yates Quality assessment tool.

Results: Twelve studies were identified for inclusion. Four intervention categories were identified including verbal based interventions (n=5); clinical management interventions (n=4); art based interventions (n=2); parenting intervention (n=1). Verbal and art based interventions proved effective in reducing PTSD symptoms whilst parenting intervention and clinical management based on traditional interventions successfully targeted emotional and behavioural difficulties. These generally fulfilled the Yates quality assessment criteria for intervention design but not for quality of study designs. Interventions predominantly targeted refugee children with only 9% of the review sample consisting of asylum seeking children.

Conclusion: The identified studies provide a strong evidence base for use of verbal and clinical interventions for PTSD and emotional and behavioural difficulties respectively. Stand-alone studies showed potential for depression and anxiety symptoms, especially on a short-term basis. Future interventions need to embrace an integrated multi-level socio-ecological approach and generate evidence on other mental health issues, long term effectiveness, interventions for asylum seeking children, expansion of inclusion criteria to other languages and evidence from other resource rich receiving countries.

1. Introduction:

The world's population displacement levels are highest since the second world war [1]. Currently, 65.3 million (1% of the of the world's population) are living in forced displacement and extreme poverty [2]. If this were a nation it would equate to the 21st largest nation in the world with 24 individuals being added to it every minute based on calculations for the year 2015 [1]. Internally displaced people are by far the biggest subgroup accounting for 40.8 million displaced persons, with refugees being the second biggest (21.3 million) and the remaining 3.2 million being asylum seekers [1].

Besides the legal status, age subgroups are a significant consideration. This is exemplified by children who comprise a particularly vulnerable subgroup. According to the United Nations High Commissioner for Refugees (UNHCR), the child subgroup requires special attention as they can be distinguished from adults as being more vulnerable due to high susceptibility to developing disease, being injured and becoming malnourished; being dependent beyond food and physical needs requiring psychological support that must come from adults and a stable environment; and undergoing a layered developmental process which if interrupted at any level can disrupt normal growth and development [3,4].

Worryingly, children represent over half of the 21.3 million refugees around the world while the numbers in other legal categories are unclear [5,6]**.** Globally, there has been a five-fold increase in refugee and migrant children with numbers rising from 66,000 in 2010 to 300,000 between 2015-2016 [7]. This mass exodus is fuelled by conflict, persecution and poverty in countries including Syria, Afghanistan, Iraq, Somalia, South Sudan and Sudan [8]. Europe, generally being a relatively stable and geographically adjacent region to majority conflict areas has predictably seen an exponential increase in vulnerable children and adults entering its territories to seek refuge and gain asylum. According to the UNHCR European region hosts the second largest number of displaced people [9]. This is reflected in doubling of the number of European Asylum applications made by children in 2015 compared to 2014 [10]. In the latest figures provided by European Commission, 27% of asylum applicants in Europe were children [11].

Children entering Europe have often experienced immense traumatic psychological pressures generated by war and conflict and perpetuated by the struggle of finding asylum. Traditionally these experiences are divided into three categories [12]. Firstly, pre-flight stage, in which children bear witness to violence, torture, and loss of family. Some might not even have any memory of a stable period hence fostering general insecurity.

Secondly, flight stage which constitutes the often dangerous and lengthy journey to the host country during which, many children, unintentionally or strategically, are separated from their parents to ensure safe completion of the flight stage. It is also common for these children to be picked up by smugglers offering promises of safe arrival and better chances of gaining refugee status if sent alone and separated from parents. Thirdly, the last stage which begins with arrival in the host country and constitutes processes of acculturation or resettlement. Also referred to as secondary trauma, it can involve culture shock, asylum application, integration process and compounding stresses like identity crisis, bullying, discrimination and general insecurity [12].

For these vulnerable, dependant and developing children, the above three stages may amount to substantial psychological stressors which can manifest as psychopathologies including Post Traumatic Stress Disorder (PTSD) , anxiety, depression, anger and violence, psychic numbing, paranoia, insomnia, and a heightened awareness of death [13]. These children have often been assessed to have higher rates in general measures for psychological distress with levels of 50% for emotional distress, 18% for hyperactivity and 11% for conduct problems [14]. In terms of clinically diagnosable conditions, the UNHCR reported that almost 100% of these children may have PTSD [15] and depression rates may be as high as 85% [14]. Furthermore, people with conditions like PTSD have been reported to have an approximately 80% chance of a co-occurring psychiatric disorder [16]. Therefore, it is undeniable that these children have special needs and mental health issues that can be addressed by relatively well equipped European host nations to allow normal development and deter psychopathologies.

Unfortunately, the special needs of these children are often ignored or only addressed in the broad strokes of policies and interventions aimed to address the mental health needs of adult migrants. So far, specialised research on Child Refugees and Asylum Seekers Mental Health (CRASMH) has rightfully focused on identification of mental health issues but has been limited in evidence generation on interventions that address identified issues. Existing literature highlights this lack and necessitates an extension of research from highlighting the issue to filling in the gap for evidence on the interventions tailored to address the needs of child migrants [17–19]. Concurrently, there has been a limited effort to synthesise available studies into concrete evidence on interventions to improve CRASMH [20]. Succinctly stated by Lloyd et al., this is an immature field of research based mainly on anecdotal and self-reported interventions with little systematic evidence confirming their usability and effectiveness [21]. A major review of refugee mental health interventions confirmed that practice-based evidence on interventions is still in its infancy and concluded that more practice-based evidence is required on the array of

interventions [22]. The call for development and progress of this research area has led to a plethora of publications on development and testing of novel interventions which have been reported in the forms of innovative designs. As highlighted above, the special needs and urgency of their nature make it of paramount importance that these interventions are identified and added to the evidence base with rapidity so they may be utilised to improve CRASMH more effectively. This study will attempt to identify these studies to update the evidence with the vital rapidity required in addressing CRASMH issues in Europe and identify priorities and opportunities for future research. This will be achieved by answering the following question and attempting to achieve the outlined aim and objectives.

1.1 Research Question:

What evidence is available on interventions that improve mental health of child refugees and child asylum seekers in Europe?

1.2 Aim:

This study aims to carry out a rapid review with a systematic methodology to reliably identify and synthesise all the existing evidence on interventions tested in Europe to improve CRASMH.

This will harness evidence on interventions that are tried and tested, and if effective therefore tailored to the needs of refugee and asylum seeking children in Europe. This will serve to clarify evidence concerning existing interventions enabling current practitioners to tailor and enhance their interventions and highlight potential gaps for future research to advance CRASMH.

1.3 Objectives:

Primary objective: To synthesise evidence on interventions addressing CRASMH in Europe.

Secondary objectives:

- ➔ To evaluate the effectiveness of interventions identified
- ➔ To evaluate Quality of Intervention and study designs
- ➔ To identify gaps and opportunities in research on CRASMH

2. Methodology:

The systematic methodology of the review process is outlined in Appendix 1.

2.1. Design:

In view of the complex nature and a multitude of publications using different country populations and disease examples used to assess the mental health interventions for CRASMH, a systematic review was best suited to synthesise evidence to provide clarity on what works for child subgroup. A systematic review would allow identification, appraisal and synthesis of empirical evidence and generate a powerful answer to the question of intervention effectiveness [23]. But in this case a clearer picture was required urgently and the traditional systematic review, regardless of being the gold standard, would be overly time consuming and on average require from 6 months up to 2 years [24]. Similar concerns regarding timely evidence generation on health care and policies have led to the development of a rapid systematic review methodology which will be utilised to achieve the aim of this study. A rapid review is a faster streamlined approach to synthesizing evidence with the shrinkage of timeline from 6 months to 2 years to 3 weeks to 6 weeks [25]. A rapid systematic review is almost identical in methodology to a traditional systematic review and hence follows a systematic flow [26]. As put by Ganann et al. [27], it is essentially a systematic review tailored to speed the process of generating useful insights and summarising literature into powerful results. There is a growing use of rapid reviews especially in healthcare and policy settings as a timely decision is required in these arenas [28]. The rise in significance and usefulness of rapid systematic review is highlighted by the setting up of Cochrane rapid reviews methods group to polish rapid review methodology to promote its use [29].

Therefore, a rapid review was conducted in general with a strict systematic methodology of the traditional systematic review with the following tweaks to streamline the process:

- Narrowed search strategy by
    - Limiting consultation with experts (except developing search strategy)
    - Limiting number of databases searched
    - Limiting or omitting grey literature search
    - Limiting hand searching of reference lists and relevant journals
- Limiting number of reviewers involved in
    - Inclusion/exclusion
    - Data extraction

- Quality assessment

2.2 Review Sources:

The review is comprised of studies identified through keyword search in databases including PsycINFO, MEDLINE, SocINDEX, PubMed, Psychology and Behavioral Sciences Collection and Social Sciences Citation Index (via the Web of Science). The search was conducted on 14th June, 2017 which identified 1338 studies to which another 5 hand-searched studies were added following identification from reference lists of studies selected for full text assessment. The full search strategy including keywords (detailed in appendix 2) was developed with the help of experts in literature search at Maastricht University Library and senior researchers at The Norwegian Centre for Migration and Minority Health (NAKMI).

2.3 Study selection:

The details of literature search and study selection procedure are outlined in *Figure 1* based on PRISMA statement [30]. A total of 1343 studies were de-duplicated leaving 918 studies to be screened for relevance. Abstracts and titles were screened by the first author which identified 41 studies to be considered for full-text acquisition and analysis. These were assessed for inclusion based on the following eligibility criteria:

- Any study design
- Reporting at least one intervention
- Reporting at least one outcome based on measurements/observations made at two points in time.
- Published in English language
- 1990-now
- 5-18 years old children
- Refugee or Asylum Seekers
- World Health Organisation European region

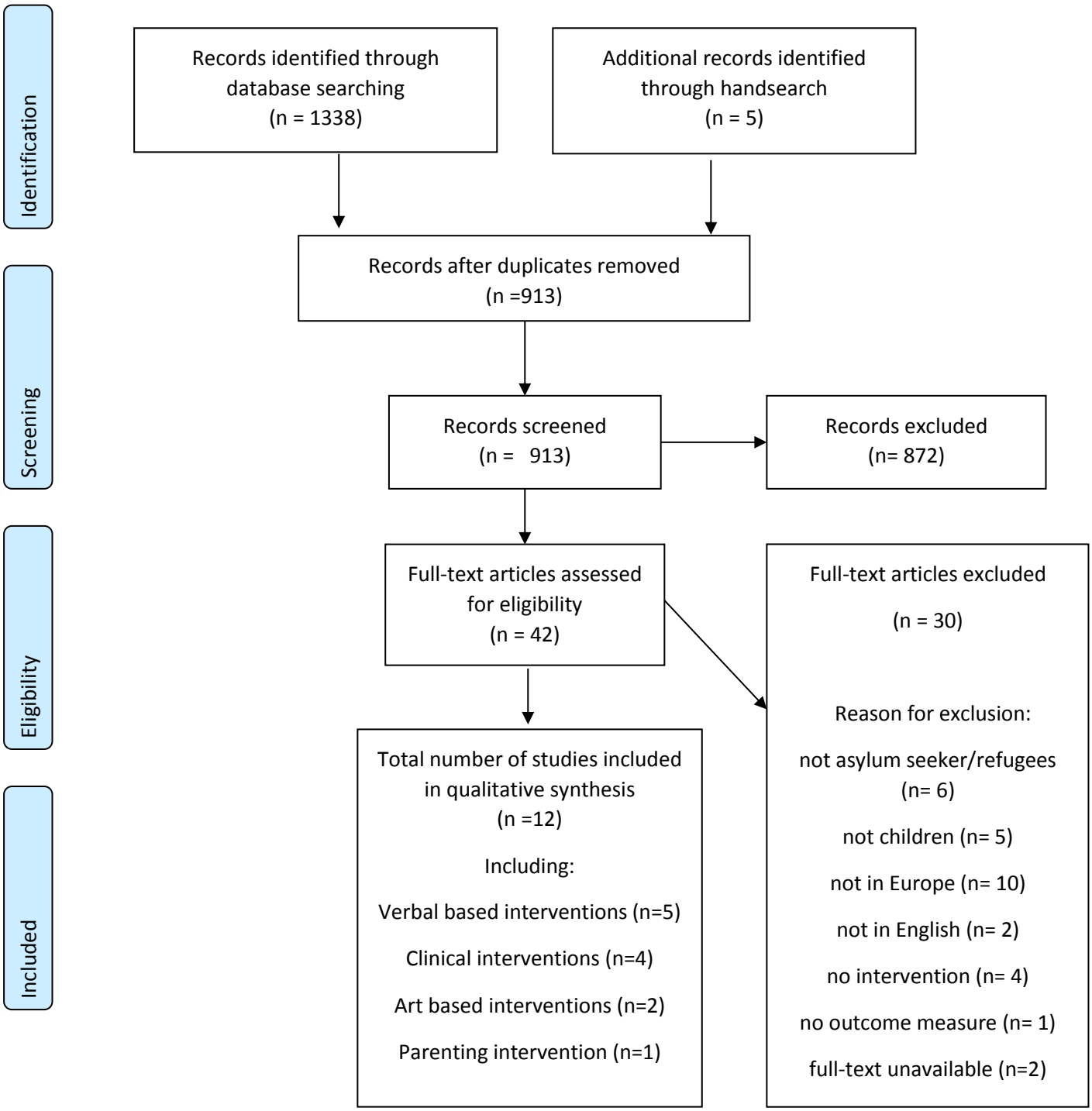

Figure 1: PRISMA 2009 Flow Diagram

All study designs were considered providing they tested a CRASMH intervention with a reported outcome observed over at least 2 points in time. This leniency in study design allowed the conduction of review regardless of the reported lack of Randomised Control Trials (RCT) and inclusion of all potentially valuable interventions and study designs. The concession is justified due to nature of research for intervention for CRASMH as it is unethical and unfeasible to conduct such research in a dynamic population where controlling and randomising are impractical [31]. The use of non-RCT designs is also supported by overwhelming consensus in the scientific community on the usefulness and hence inclusion of observational studies in reviews [32]. Therefore, the review took an inclusive approach in both selection and analyses of the studies to allow examination and synthesis of the maximum amount of evidence. The English language restriction was applied as it was the only European Language of proficiency of first author. The period starting 1990 was chosen due to complete change in the nature and type of refugees and asylum seekers entering Europe in the following years to ensure applicability and relevance of review findings [33]. The upper age limit was operationalised in accordance with United Nations Convention on the Rights of the Child which defines child as "a human being below the age of 18" and the lower age limit of 5 was applied as below 5 children are considered as infants and toddlers who are either not researched or are part of maternal health research [34]. Asylum seekers and refugees were defined according to the UNHCR which defines an asylum seeker as being someone whose request for sanctuary has yet to be processed and a refugee as being someone who has been forced to flee his or her country because of persecution, war, or violence [35,36]. The European region was defined by the World Health Organisation (WHO) European region to allow evidence generation from all relevant regions that lie on the trail to and not only the top destinations in Europe for asylum applications.

2.4 Data extraction and analysis:

Given the heterogenic nature of the methodologies and diagnostic criteria used in the selected studies, a meta-analysis was not possible. To accommodate the heterogeneity and guarantee inclusion of all relevant studies in the analysis, a narrative analysis was conducted. A narrative analyses isn't a descriptive synthesis but follows a systematic approach to avoid susceptibility to author's bias towards different aspects of the studies including theoretical background and methodology [37]. The narrative approach also helped speed up the review process and complemented the nature of a rapid review.

The synthesis proceeded in 3 stages adapted from narrative synthesis guidelines for reviews from Cochrane Consumers and Communication Review Group which often assess complex interventions [37]. The systematic flow is illustrated in the diagram and described below:

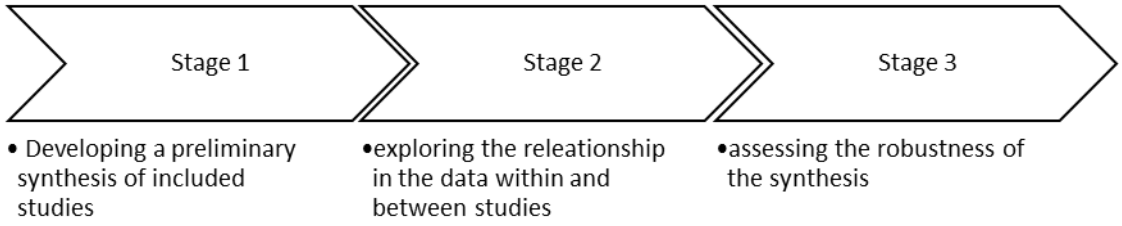

Figure 2: Stages of Narrative Synthesis

Stage 1: Development of a preliminary synthesis:

This involved summarising general characteristics (appendix 3) and summarising significant findings along with effectiveness calculations (appendix 4) to allow cross study assessment and comparison.

General Characteristics:

Each of the included studies was summarised based on general characteristics and intervention specific features in same order for each study by tabulating the data (appendix 3). This allowed identification of patterns using vote counting where appropriate as an interim assessment of the available evidence. Assessment was based on the following features for each study and summarised in the same order:

- Population
- Country
- Recruitment
- Study Design
- Intervention level
- Setting
- Intervention
- Delivery
- Intervention target
- Outcome
- Follow up

Effectiveness of Interventions:

Where possible the statistical data was transformed into effect sizes to allow comparison across studies. Effect sizes are the most important outcome of empirical studies because they provide a way to report practical significance of results in a standardised metric and allow development of a meta-level picture in reviews containing heterogeneous study designs by enabling comparison of magnitude of effects between interventions which can be easily understood [38,39]. They were calculated as *'Cohen's d'* using the methods described in Thalheimer et al. [40] and a web based calculator [41]. As the calculation methods require reporting of standard deviations and means, when missing, attempts were made to convert the reported statistics using the indices from [40,42].

Cohen suggested effect sizes were considered to be small, medium or large based on d= 0.2= small; d= 0.5= medium and d= 0.8= large [43]. Therefore, any change in effect size of below d=0.2 is inconsequential even if statistically significant.

Stage 2: exploring the relationship in the data within and between studies

This followed on from stage 1 using and building upon the collected data to assess the relationships within and between studies. These relationships were explored to assess whether there were characteristics within studies that might have contributed to the observed outcome and differences and similarities within between studies that may have contributed to the observed outcomes.

Stage 3: Assessing the robustness of the synthesis

This assessment included the evaluation of both, the included studies and the review process. It was conducted to provide a gauge for the reader on the strength of evidence generated and its generalisability as it critically reflects on both the matter for this study assessed by using the Yates scale and its assessment process by critically reflecting on process and its limitations.

Studies were assessed for quality using Yates scales (appendix 5) originally developed to evaluate effectiveness of psychological interventions [44]. A systematic review carried out to assess the rigor of the scales used in assessing quality of studies reported that Yates scale is psychometrically strong in face validity, content validity, construct validity and reproducibility [45]. It is a two-part scale with one assessing the quality of treatment/intervention and the second assessing the quality of study design and methods. It has been adapted and used in empirical studies and reviews to assess quality of interventions including a systematic review into school and community-based interventions for refugee and asylum seeking children [46] [47]. The cut-offs used in this

study were adapted from the same review based on the similarity of the nature of reviews. Scores for quality of study design and methodology range from 0 to 26 (0-8= not fulfilled; 9-17= partially fulfilled; 18-26= fulfilled) and for quality of intervention from 0 to 9 (0-3= not fulfilled; 4-6= partially fulfilled; 7-9= fulfilled).

3. Results

The results outline general characteristics of included studies and their interventions, significant findings and effectiveness assessment (Cohen's d) and quality of included studies and interventions (Yates quality scale). The general characteristics of studies and interventions are summarised in appendix 3, significant findings in appendix 4 and quality scale criteria and assessment in appendix 5 and 6 respectively. Possible explanations of observed outcomes and results generated through the narrative analyses will be explored in discussion section.

3.1 General characteristics of included studies:

The review analysed 12 studies of which 11 reported a statistically significant effect on a mental health outcome measure. The review sample comprised of 408 children under the age of 18 who received interventions through various study designs and settings. Of the 408 children, 36 were asylum-seeking children who participated in 3 of the 12 studies [48–50]. The sample sizes were generally quite small ranging from as little as 1 to the biggest sample being 141 participants. Teachers acted as the main recruitment channel for school based interventions as well as referrers to studies outside school settings. Recruitment was complemented by an array of other recruiters acting as a conduit between the children and researchers including voluntary and social workers, refugee associations, social services, lawyers, researchers, mental health workers and nurses. The inclusion criteria for the referred children was generally based on two themes. First, PTSD diagnosis and psychological difficulties related to trauma (n=6). And second, emotional and behavioural issues (n=6). All studies were conducted in 3 western European countries which were England (n=5), Germany (n=4) and Sweden (n=3). As expected from the pre-review literature review, a wide range of interventions were setup in diverse settings. There was a mixture of study designs with cohort studies being most prevalent (n=4), followed by RCTs (n= 3), controlled before after studies (n= 2), case studies (n=2) and a prospective experimental study with pre-post-test design (n=1).

3.2 Intervention Characteristics:

The intervention types, their overall effect sizes and targets are summarised in figure 3 and summary of all significant findings in appendix 4.

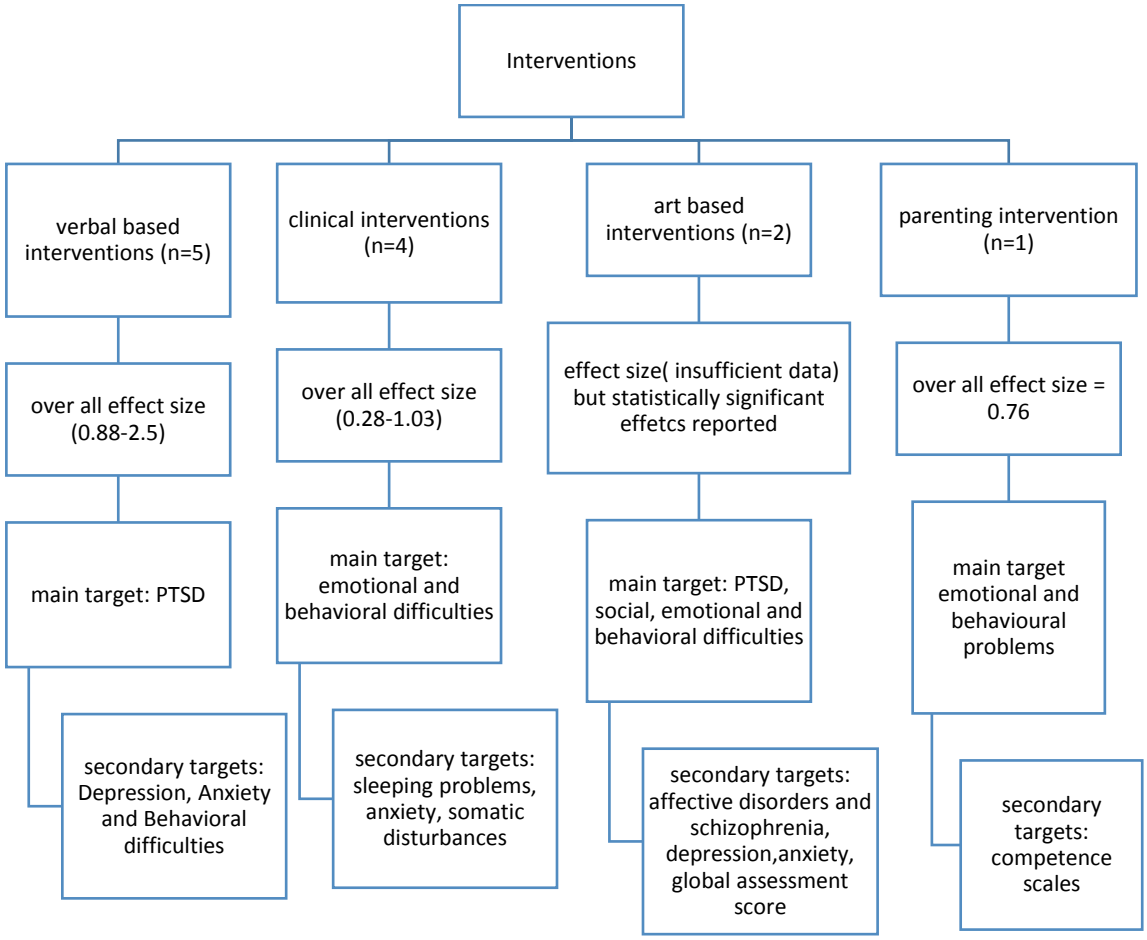

Figure 3: intervention types, effect sizes and targets

Of the 12 interventions, 9 belonged to two major categories, verbal based interventions (n= 5) [48–52] and traditional clinical mental health services (n=4) [53–56]. All the verbal based therapies targeted stress related symptomatology measuring PTSD based on Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) [57] . Whereas all clinical interventions focused on emotional and behavioural aspects assessed through Strength and Difficulty Questionnaire (SDQ) scores (n=3) [53–55] and Erica-play diagnostic (n=1) [56] which measures similar psychological symptoms. The unconventional spectrum included a parenting intervention [58] and two art based interventions [59,60] of which one used art therapy and another combined creative art techniques with trauma and grief focusing activities and relaxation.

These interventions were mostly delivered at individual level with some focusing on more than one level like the school based and community based mental health service. Between the 12 studies individual level was targeted by 9, family by 5 and group level by 3. Only one study targeted parents measuring indirect effects on child mental health. These interventions were delivered in schools (n=4); health facilities including clinics and hospitals (n=5); neighbourhood facility (n=1); refugee accommodation (n=1); patient's homes (n=1).

3.3 Effectiveness based of type of intervention:

Verbal based interventions:

Overall, there is strong evidence for effectiveness of verbal therapy based interventions as 3 studies achieved large effect sizes (d= 0.88-2.5) in reduction of overall PTSD symptoms [48,50,51]. The effect size for one study [49] could not be calculated but it achieved a significant ($p<0.001$) decrease in overall PTSD symptoms. Largest effect size (d=2.5) was reported by Oras et al. who combined Eye Movement Desensitization and Reprocessing (EMDR) with conversational therapy for the adolescents and play therapy for children younger than 13 years [50]. Two studies achieved significant reduction in all three subscales of PTSD symptomatology (intrusion, arousal, hyperactivity) with corresponding increase in overall functioning of the participants [50,51]. Furthermore, Ruf et al. reported stability of achieved symptom levels at 12 months follow-up and Unterhitzenberger et al. at 6 months [51,52].

Only 1 study tested the effectiveness of verbal based intervention on emotional and behavioural difficulties measure by SDQ and reported statistical significance (p=0.027) but only achieved a small effect size (d=0.01) [48]. Two studies [48,50] assessed depression related outcome measures but only 1 study [50] intervening with a combination of verbal therapy with EMDR achieved a large effect size (d=1.48). One study also achieved a reduction in anxiety symptoms (d=0.64) [48].

Clinical management interventions:

All four interventions successfully targeted emotional and behavioural difficulties. The two, school based mental health service interventions had small to large effect size (d=0.28-1.04) [53,54] but one failed to achieve statistical significance [54]. There was limited reporting of intervention effects on subscales. Two studies [53,55] reported non-significant effects on emotional and pro-social behaviour subscales and 1 study [53] managed a

significant decrease only in hyperactivity subscale despite the overall significant (p=0.016) decrease in SDQ score and moderate effect size (d=0.67). O'Shea et al. only reported qualitative improvement in psychological symptoms including sleeping problems, somatic disturbances, anxiety, and aggressiveness [54]. None of the clinical management interventions carried out a follow-up assessment so long-term effectiveness cannot be ascertained.

Art based interventions:

Both art based interventions reported positive outcomes [59,60]. Cumming et al. did not carry out a statistical analysis [60]. Mohlen et al. articulated conventional clinical based therapy with art (painting, dancing, acting) and relaxation techniques [59]. Although effect sizes could not be calculated, a statistically significant reduction in PTSD, depression and anxiety symptoms was achieved. Both studies are standalone and neither conducted a follow-up assessment which doesn't negate their potential effectiveness but need for further evidence is indicated. Although the dynamic intervention in Mohlen et al. achieved reduction in most psychological symptom groups, it failed to have a significant effect on Affective Disorders and Schizophrenia outcome measure despite being the only study that included this symptom group [59]. Therefore, this review was unable to identify any effective intervention for affective disorders in Child refugees and asylum seekers in Europe.

Parenting intervention:

In the parenting intervention of Osman et al., statistically significant with moderate to large effect sizes on children's emotional and behavioural problems were reported [58]. There was a large improvement in symptoms of aggressive behaviour (Cohen's d= 0.76), social problems (d= 0.83), attention problems (d= 0.54), and in externalizing problems (d= 0.60). These findings were not confirmed in a follow-up. Therefore, there is a clear potential in effectiveness of parenting interventions against children's emotional and behavioural issues but evidence on long-term effectiveness cannot be confirmed in this review.

3.4 Quality of interventions:

The quality of interventions was assessed by rating the intervention on its content, setting, duration, manualisation and adherence to it, adequate training of therapists, and participant engagement. Full details of assessment of quality of intervention components

are included in appendix 6. Generally, interventions were good quality with 7 fulfilling the quality criteria [48–52,58,59], 4 partially fulfilling the criteria [53,55,56,60] and only 1 failing to fulfil the criteria [54]. Studies were particularly well at detailing and justifying a coherent rationale for the chosen interventions and the duration including number and length of treatment sessions. Most studies (n=8) had a clearly defined and well established protocol or manual to follow but few reported (n=4) on steps taken to ensure that the delivery of intervention adhered to the manual. The interventions were generally delivered by trained staff in which majority of studies (n=7) employed explicitly trained personnel to deliver the intervention and the remainder holding at least a professional qualification.

3.5 Quality of design and methods:

The quality assessment incorporated study aspects including questions regarding attrition, control groups, minimising allocation and measurement bias, statistical power and reporting in the study and follow up. These should be borne in mind when considering the applicability and generalisability of the tested interventions. A table including the scoring of studies in all aspects is attached in appendix 6.

The review studies generally scored low in the quality assessment for design and methodology. Only two studies completely fulfilled the criteria [51,58], four partially fulfilled the criteria [48–50,53] and six studies did not fulfil the criteria [52,54–56,59,60].

Studies generally scored highly in the criteria of choosing appropriate outcome and providing justification for appropriateness and validity of the chosen outcome measures for the given context. Still only 2 studies reported on the reliability and sensitivity of the chosen outcome measure [51,58]. Generally studies fulfilled criteria in detailing description of samples by including information such as demographics, history and treatment. But since only four studies [48,51,53,58] included control groups, only these could provide evidence on group comparability. Six studies clearly identified the inclusion and exclusion criteria [48-51,58,61]. Only two studies fully [51,58] and one partially [54] reported attrition and out of these only one study provided evidence that observed rates of attrition were not statistically significant [51].

Studies also failed to take steps required by the criteria to minimise biases. Only 2 studies [58,61] randomised to minimise allocation bias and half the studies [49–52,56,59] took

steps to ensure blinding to reduce measurement bias [48–50,54,58,61]. In terms of proving long term effectiveness, only 2 studies reported follow up of up to 6 months or longer [51,52]. The adequacy of statistical analyses generated the lowest scores to contribute to the quality of studies as only one study carried out and satisfied the power calculation of sample size required [58] and 2 studies carried out the intention to treat analyses[51,58]. The studies scored well on summary statistics reporting aspect as only 4 studies failed to provide decent level of summary statistics [49,56,59,60]. Nonetheless only 6 provided enough data to calculate the effect size [48,50,53–55,58] .

4. Discussion

This rapid review into the poorly researched area of child refugee and asylum seeker mental health identified 12 studies. Based on Yates scale assessment, studies selected appropriate samples and devised suitable interventions supported with theoretical background and well-developed manuals. Four main intervention categories were identified. These included verbal based interventions (n=5), clinical management interventions (n=4), art based interventions (n=2) and a parenting intervention (n=1). All but one study [51] reported significant level of success in reducing target symptoms. There were successful reductions in PTSD symptoms and PTSD subscale symptoms resulting from verbal based interventions and art based interventions while clinical management and parenting interventions effectively tackled psychological issues including emotional and behavioural problems (SDQ tested and otherwise). Verbal and art based interventions were also successful in reducing anxiety and depression in standalone studies with no long term follow up hence limiting the strength of evidence. Only one study, an art based intervention, targeted affective disorders and schizophrenia but failed to reach any significance [59]. Overall, there was limited evidence on long-term effectiveness of all intervention groups.

The use of verbal based therapies proved effective in reducing PTSD related symptoms and is supported by the current evidence base [62]. For example, the United Kingdom's NHS (National Health Service) has outlined Cognitive Behavioural Therapy (CBT), a verbal based intervention, as the main therapy for PTSD if symptoms present within 3 months of trauma [63]. Verbal therapies like CBT have also been found to be preventive but there is scope for further research [64]. Within the remits of this review, the greatest effect sizes (PTSD-related d = 2.5) resulted from combining verbal based therapy with Eye

Movement Desensitisation and Reprocessing and Play therapy. While it is not possible to attribute effect to different aspects of intervention on different PTSD subscales, the results certainly highlight the potential of combination therapies as being more effective.

Clinical based interventions addressing psychological issues related to emotional and behavioural problems also proved effective as all but one study reported significant reductions in symptoms. These findings are confirmed in a similar review conducted in a North-American setting [9]. Generally, these interventions required a greater workforce with trained psychotherapists and specialised personnel including specialised child and adolescent psychiatric nurses, consultants in child and adolescent psychiatry and mental health teams including other specialised members. In contrast the verbal based interventions were mainly delivered through psychologists or therapists often explicitly trained to deliver a therapy e.g. Cognitive Behavioural Therapy. Even though the clinical therapy required bigger teams with more varying experts, they failed to achieve the effect sizes of verbal based therapies with the highest reduction in SDQ being d= 1.03. Since the two intervention groups targeted different symptomatology groups no direct effectiveness comparison can be made with accuracy. Nonetheless, the observation highlights that combining the two interventions by incorporating an explicitly trained verbal therapist into clinical intervention teams might achieve greater reductions over a range of symptom groups than seen separately in individual intervention groups.

In terms of symptomatology, the overwhelming majority of the studies (7/12) assessed intervention effectiveness on post-traumatic stress symptoms. There is a strong evidence base warranting a focus on PTSD in this population as the UNHCR has reported that the PTSD rates could be up to 100% in the refugee population[15]. But the rightful attention is resulting in neglect of other major psychological issues often identified in this population. Research has asscoiated the same traumatic experiences that lead to PTSD to be highly related to depression, anxiety, affective disorders like schizophrenia and somatic problems including chronic pain [65–69]. The included studies had a lack of direct investigations into common co-morbidities. Only 2 studies [48,59] included secondary outcome measures on depression and 3 stuides [48,56,59] on anxiety. Of theses only 1 study [59] reported a significant effect on depression and 2 stuides [48,59] on anxiety but none folowed up to confirm long term effectiveness. Therefore, this review cannot confirm any evidence base for suitable intervention for anxiety, depressive, affecticve or somatic disorders and highlights the need for further research.

As PTSD and emotional and behavioural difficulties are the two most commonly addressed symptom groups, the outcome measures used in their assessment are worth discussing. All the outcome measures in the verbal based therapies were based mainly or partly on DSM-IV [57]. Overtime DSM-IV has built a dual status of a reliable tool for assessing this symptomatology but still controversial when used across cultures [70]. On one end of the range of controversy it is a purely western concept built on assessments of western soldiers returning from war which renders all generated concepts implicitly endorsing a Western value system [71]. On the other end, there is extensive research claiming that PTSD is a trauma response that transcends cultural bounds and barriers and hence its application is justified and useful [72]. Another consideration is the development of DSM-IV criteria itself which mainly constitutes adult research and is the cause of frustration to clinicians and families who find that often DSM-IV fails to define or describe some of the clinically significant behaviours and symptoms observed in children[73].

As with DSM-IV based tools for measuring PTSD, the use of SDQ in measuring emotional and behavioural difficulties is also somewhat contested. A study into the feasibility of assessing the mental health of children displaced by the Syrian conflict using the SDQ raised questions about the interpretation of some subscales and reported that another scale i.e. Paediatric Emotional Distress Scale (PEDS) performed better than SDQ [74]. Another study carried out to test cross-cultural applicability in New Zealand reported inadequacy in cultural appropriateness and recommended development of a more culturally sensitive tool [75]. Although use of these tools is contested, it must be appreciated that there is a lack of other tools and a significant amount of research supporting their use hence justifying the use to a certain degree. Moving forward there is clear need for not only cultural but also age sensitive tools to be developed to ensure the validity and generalisability of any significant findings.

The effectiveness of an intervention also depends on feasibility of its delivery which is often determined by the setting. Within this consort of studies, a third were set in schools making it the most popular setting. It is understandable that schools serve as an ideal location considering their role in enabling access to this relatively inaccessible population. They provide an effective entry route into mental health service for children in need and are perfectly placed to liaise with multiple players involved in delivering a balanced mental health service [20]. Furthermore, teachers can act as a natural conduit between the researcher and the child. This also evidenced by the review studies, where they played a major role in recruitment and delivery of intervention of studies within schools and

helped recruitment into research into CRASMH. Researchers have already realised the important roles of schools and teachers and should enlist their help in creating, testing and delivering interventions for CRASMH. These benefits of feasibility must be considered with caution that this setting might restrict inclusion of asylum seeking children who have yet to become part of formal institutions like schools. This is evident in the included set of studies of which only 3 studies recruited asylum seeking children [48–50].

As stated earlier, child refugees and asylum seekers were researched together based on similar backgrounds and experiences that determine their mental health with only legal status setting them apart. However, it became apparent during the synthesis that the uncertainty of legal status might add sufficient pressures, despite being in the resettlement phase, to negate the effects of an intervention. Three authors pointed out that most children respond poorly if children or their family are under threat of deportation [49,50,52]. In one study the only two participants who did not show improvement were living under threat of deportation [50]. Apart from different reactions to interventions, asylum seeking children were underrepresented in the review sample (~9%; n=36). Therefore, it must be stressed that the review findings are to a great degree only applicable to refugee children. These findings also point out an important fact that the effectiveness of the review interventions might be due to a recent change in legal status removing the threat of deportation. As there is a lack of controlled studies in the interventions reviewed, it cannot be assumed that the change in legal status in the refugee children did not confound the effects of intervention. This can only be assessed through further testing with control groups.

Another consideration apart from setting of intervention is its level of delivery. Literature often theorises that socio-ecological or public health level interventions are better suited than clinically based services which cannot adequately address the myriad of mental health issues that affect this population [76]. Although the issue has been identified, current research at the socio-ecological level is still lagging and studies often maintain the separation between the traditional mental health interventions and new unconventional therapies. A major review conducted into interventions for children affected by war found that only 2 multi-level studies had been conducted that may address the needs of CRASMH [77]. One explanation given by Vostanis et al. for this underdevelopment is the absence of a coherent model that facilitates generation of multiple level ecological interventions combining both conventional and new interventions [20]. Despite the lack of a model, the cohort of studies in this review demonstrated these trends are changing directions. Five studies [53,55,56,58,59] intervened above individual level

and included families alongside individual level treatment and three [48,53,59] delivered interventions to groups. Similarly, studies clinical in nature of treatment, studies were set in unconventional surroundings outside clinics including schools, neighbourhood facilities, refugee accommodations and homes [48,53,54,56,58,59].

As these interventions metamorphize into socio-ecological form, they also need to become more culturally appppropriate. According to the UNHCR the interventions should support children in making the transition to the host country culture and interventionist should preferably be suited to the same ethnic background as the refugees or involve professionals who at least have good cross-cultural skills to be able to guide and support those being helped [78]. The added-value of culturally tailored and sensitive interventions has been proven for adult refugees but evidence is still limited for children [79]. This does not necessarily mean that evidence is against it but identifies a general lack of research into CRASMH. This lack of clarity is demostrated by this review as one study concluded that culturally sensitive interventions are not necessary as pre-existing interventions are effective in reducing trauma related symptoms [61]. While another study intervened with an effective culturally tailored parenting intervention [58]. Regardless of lack of clarity on relevance of culture, most of the review studies thougt it to be an important consideration as all but one study mentioned culture in one aspect or another.

4.1 Limitations and Recommendations for future research:

As previously discussed, this review is limited in evidencing identified interventions for asylum-seeking children. Therefore, there is a dire need for new empirical research on interventions that improve child asylum seeker mental health who have been thoroughly ignored in research. Within the remits of applicability of this study for refugee children, further research is also warranted to establish accuracy of action of these interventions on subscales of symptomatology. For example, most interventions failed to achieve significant reduction in all subscales of the two most commonly measured outcomes (three subscales of PTSD or the five subscales of SDQ). This doesn't negate the usefulness of identified evidence in reducing overall symptomatology but simply hints the need for further evidence into specificity of actions which might be helpful in tailoring future interventions to the target group's needs. Furthermore, the long term-effects of these interventions were only reported by two studies that assessed maintenance of improved outcomes for a period longer than 6 months following intervention [52,61]. Therefore, further research is necessary not only on expansion of types of intervention

but also to establish accurate effects on subscale symptomatology and long-term effectiveness.

Although this was a Europe wide review, the assessed studies providing evidence on interventions only came from three countries. This is more likely to be due to the high numbers of refugee and asylum seeking populations in the UK, Germany and Sweden. But this might also be partially due to the language of publication limitation to English. Regardless, a Europe wide-study with a greater number of important languages most commonly used for publishing relevant literature is warranted. During the screening phase, it was identified that a substantial amount of research on similar populations in other recipient nations including Australia, the USA and Canada has been conducted which may add valuable evidence. Similarly, a proportion of studies conducted in Bosnia were excluded in which the affected children have gone through congruent traumatic experiences and the research addressing their issues might increase understanding and add to the arsenal of interventions for CRASMH.

A major limitation identified in the review based on the Yates quality criteria was the relatively poor study designs with regards to both internal and external validity components as outlined in results section. These poor performances were based on the Yates assessment for quality of design and methods of the included studies, which mostly delivered good quality interventions. Studies scored poorly on criteria assessing efforts in minimising biases by failing to include control groups, randomising and blinding. Furthermore, study samples were generally quite small and often failed to carry out follow up assessment. Although these are important limitations essential to understanding and approving the available evidence, any criticism must undergo a few considerations. These limitations in study designs and methodology might demonstrate the problems of setting up and running a trial for long period. Not only it is unethical to hold treatment for highly traumatised participants but also difficult to avoid high attrition and low compliance in this highly mobile population with changing legal status and living circumstances. For example, as Mohlen et al. reports that the lack of follow up was due to deportation of 60% of study participants within 6 weeks of cessation of intervention [59]. This may also explain the lack of gold standard RCTs which only accounted for a sixth of the studies. It is therefore essential to set up and carry out any research possible to develop effective interventions rapidly as required by the nature of needs of this population. The gold standard required by conventional standards is perhaps itself a limitation in this type of research. Therefore, while a scrupulous study design with both internal and external validly should always be the aspiration, new creative designs should

be encouraged and validated to accommodate and promote research in this difficult field where conventional standards are hard to meet with conventional tools.

Adding to the limitations of the findings are the limitations of the rapid review methodology. The rapidity of the process adds some potential limitations which shall be borne in mind when considering findings of this review for future research and intervention development. Selection bias, publication bias and language of publication bias due to a single author and missing information due to rapidity of the nature are threats to the validity and strengths of the study [26]. Whilst it is acknowledged that there might have been releveant litereature not captured by this review, it should not greatly limit its applicability as English is the commonest language of scientific literature in Europe with only a minority of public health related research conducted in non-English language [80]. Still 2 stuides were ecxluded based on lnaguage criteia so it cannot be assumed that this review successfully captured all available evidence and therfore there is need for a wider multilingual review.

5. Conclusion

As aimed, this review was successful in synthesising evidence and identifying effective interventions on CRASMH. Interventions addressing trauma related symptoms and emotional and behavioural difficulties are well established in literature and vetted for use in Europe for this subgroup by the evidence provided in this review. There is also promising prospect for similar interventions to expand their use to other psychological comorbidities like anxiety and depression. With successful appraisal of some interventions, major gaps have been identified which should dictate future research. The interventions must evolve beyond individualised short-term trauma-focused approach. An integrated more mixed method approach with an ecological style targeting considering contextual factors, environments and sociocultural political contexts that refugees come from and find themselves in. It is expected that this will allow greater inclusion of other sub groups like asylum seeking children in research, have long lasting effects and address currently ignored issues like depression, anxiety and affective disorders.

Whilst acknowledging the importance of focus on the populations in Europe, it seems fair to consider the millions who are not in Europe. Given the lack of research in this population in resource rich Europe, the knowledge gap and available interventions must be even more pronounced. Whilst appreciating the difficulties of conducting research in

low resource settings or conflict affected areas, the scientific community should promote efforts to research the subgroup that haven't made it into Europe. Whist serving the basic purpose of any scientific endeavour which is to forward humanity, it might also open new ideas and opportunities in promoting CRASMH in Europe.

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Appendix 1: Methodology Flow Diagram

Appendix 2: Search Strategy

Databases:

Searchers were conducted on 14th June, 2017 through keyword search of databases including PsycINFO, MEDLINE, SocINDEX, PubMed, Psychology and Behavioral Sciences Collection and Social Sciences Citation Index (via the Web of Science). The database search was complemented with a brief hand search.

Search Terms:

Main concepts included the terms "child", "refugee", "asylum seekers", "Europe", "Mental Health" and "interventions". To guarantee comprehensive exploration of these concepts, keywords were identified via a literature review and further developed with the help of experts in literature search at Maastricht University Library and senior researchers at The Norwegian Centre for Migration and Minority Health (NAKMI). The concepts were searched by combing the using the 'AND' and 'OR' Boolean operators. Full list of search terms including how term were combine and operationalised according to the search systems of abovementioned databases is outlined below:

Refugee OR Asylum seeker

asylum seeker OR refugee OR migrant

AND

Child

AND (child OR adolescent OR young OR minor OR youth or teen OR school boy OR school girl OR kid OR youngster OR junior OR pubescent)

AND

Europe

European region OR Europe OR European economic OR European free trade association OR European community OR Schengen OR Scandinavia OR Baltic OR Mediterranean or Albania OR Andorra OR Armenia OR Austria OR Azerbaijan OR Belarus OR Belgium OR Bosnia and Herzegovina OR Bulgaria OR Croatia OR Cyprus OR Czech Republic OR Denmark OR Estonia OR Finland OR France OR Georgia OR Germany OR Greece OR Hungary OR Iceland OR Ireland OR Italy OR Kazakhstan OR Kosovo OR Latvia OR Liechtenstein OR Lithuania Luxembourg OR Macedonia OR Malta OR Moldova OR Monaco OR Montenegro OR Netherlands OR Norway OR Poland OR Portugal OR Romania OR

Russia OR San Marino OR Serbia OR Slovakia OR Slovenia OR Spain OR Sweden OR Switzerland OR Turkey OR Ukraine OR United Kingdom

AND

Mental health

Mental OR Mental health or psychology OR psychiatry OR depression OR trauma OR schizophrenia OR suicide OR psycho OR affective disorder

And to cover major psychological issues highlighted by literature: post-traumatic stress disorder OR mood disorder OR anxiety disorder OR personality disorder OR bipolar disorder

AND

Intervention

Intervention OR primary care OR secondary care OR tertiary care service OR delivery OR provision OR model OR programme OR treat OR therapy OR psychotherapy OR access OR semi-open institutional based reception OR good practice OR community OR community based psychiatry OR community based mental health care OR specialized services OR specialized programmes

Appendix 3: General Characteristics of Included Studies

Verbal Based Interventions

Reference	Population	Country	Recruitment/Inclusion	Study Design	Intervention level	Setting	Intervention	Intervention target	Delivery	Outcome measure	Follow up
Ehntholt et al. 2005	n=26 refugee or asylum-seeking children age=11-15	UK	EMAG teachers selected students based on previous traumatic exposure and observations of psychological and behavioural difficulties	Controlled before-and-after study	Group of up to 8 children	School	CBT (manual based)	PTSD, Depression, Anxiety and Behavioural difficulties	Clinical psychologist trainee	R-IES, DSRS, RCMAS, SDQs	Effects not maintained at 2 months
Oras et al. 2004	n=13 asylum seekers/refugees; age 8-16	Sweden	Referred to hospital; Inclusion based on PTSD criteria (DSM-IV)	Cohort study	Individual	Hospital	EMDR + conversational therapy for age >13 & play therapy for <13	PTSD	A certified psychologist	PTSS-C; GAF	No
Ruf et al. 2010	n=26 refugee children age =7-16	Germany	referred by social workers, volunteers of refugee support organizations, lawyers, researchers; inclusion based on PTSD criteria (DSM-IV)	RCT	Individual	Research outpatient clinic	KIDNET	PTSD	8 clinical psychologists	UCLA PTSD Index for DSM-IV	Stable at 12-month follow-up
Unterhitzenberger et al. 2015	n=6 adolescent unaccompanied refugees age =16-18	Germany	referred to the outpatient clinics by educators, social workers or child and adolescent psychiatrists; Inclusion based on PTSD criteria (DSM-IV)	Cohort study	Individual	Outpatient clinics	TF-CBT	PTSS	CBT therapist	CAPS-CA, PDS	No
Unterhitzenberger et al. 2016	n=1 unaccompanied refugee minor girl age=17	Germany	not reported	Case report	Individual	clinic	TF-CBT	PTSD	Psychotherapist	CAPS-CA;	Stable over 6 months.

Appendix 3 continued…

Clinical management interventions

Reference	Population	Country	Recruitment/Inclusion	Study Design	Intervention level	Setting	Intervention	Intervention target	Delivery	Outcome	Follow up
Björn et al. 2013	n= 10; Refugee families with children aged= 5-12	Sweden	nurse or social workers; Included if: from Bosnia-Herzegovina; permission to stay in Sweden permanently; have at least one child aged 5-12	Cohort study	Family (parents of children)	Homes	family-based therapy	sleeping problems, somatic disturbances, anxiety, and aggression	First author & Interviewer 1.	Erica play-diagnostic method; parental interviews	No
Dura-Vila et al. 2013	n= 35 refugee children age= 3-17	UK	teachers, voluntary & social workers; referral to MHS	Cohort study	Individual, family	Mental health facility	community-based mental health service;	symptoms of psychological disorders predicted by SDQ	family therapists, child psychiatric nurse and psychiatrist	SDQ	No
Fazel et al. 2009	n=141 refugee children age=5-17	UK	teachers selected children displayed emotional and behavioural problems	Controlled before-and-after study	individual, group and family	School	School based mental health service;	Psychological health/ emotional and behavioural problems	teacher, mental health worker, 2 psychiatric consultants, psychiatry trainee, creative arts psychotherapist.	SDQ	No
O' Shea et al. 2007	n=14 refugee pupils age= 7-11	UK	teachers selected refugee pupils with severe psychological difficulties or stage two of the educational Code of Practice pathway (special needs)	Cohort study	Individual	School	School-based mental health service	reduction of psychological difficulties	outreach mental health worker	SDQ	No

Appendix 3 continued…

Art based interventions

Reference	Population	Country	Recruitment/Inclusion	Study Design	Intervention level	Setting	Intervention	Intervention target	Delivery	Outcome	Follow up
Cumming et al. 2009	n=6; refugee children primary school age	UK	Teachers selected pupils at school of consenting parents	Cohort study	Individual	School	Art therapy	Social, emotional and behavioural difficulties	art therapy practioner	1. qualitative subjective observations 2. Elizabeth Morris self-esteem indicator	No
Mohlen et al. 2005	n=10, refugees age =10-16	Germany	recruited from a refugee accommodation; included if aged 10-18	Prospective experimental study with a pre- and post-test design	Individual, family and group sessions	Refugee accommodation	Creative arts (painting, dancing, acting) mixed with relaxation techniques and clinical therapy	Emotional distress and Psychosocial functioning	specially trained medical student.	HTQ Trauma index, K-SADS, HTQ, DISYPS, CGAS	No

Appendix 3 continued…

Parenting Intervention

Reference	Population	Country	Recruitment and inclusion	Study Design	Intervention level	Setting	Intervention	Intervention target	Delivery	Outcome	Follow up
Osman et al. 2017	n= 120 Somali-born parents with children aged 11 to 16 years	Sweden	Recruited through Somali associations, social services, schools, family centre and through key persons; included Somali-born parents with children aged 11 to 16	RCT	Family (parents of children)	Neighbourhood facility	Parenting intervention	children's emotional and behavioural problems	delivered by 9 group leaders of Somali background who received the standardized training program	(CBCL 6–18)	No

CAPS-CA: Clinician Administered PTSD Scale for Children and Adolescents; CBCL 6–18: Child Behaviour Checklist for Ages 6 to 18; CBT: Cognitive Behaviour Therapy; CGAS: Children's Global Assessment Scale; DISYPS: Diagnostic System for Mental Disorders in Childhood and Adolescence –Depression Scale/Anxiety Scale; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; DSRS: Depression Self-Rating Scale; EMAG Ethnic Minority Achievement Group teachers; EMDR: Eye Movement Desensitization and Reprocessing; GAF: Global Assessment of Functioning; HTQ: Harvard Trauma Questionnaire Trauma Index; KIDNET: Narrative Exposure Therapy adapted for children; K-SADS: Schedule for Affective; Disorders and Schizophrenia for School-Age Children; MHS: Mental Health Service; PDS: Posttraumatic Diagnostic Scale; PTSD: Post-traumatic Stress Disorder; PTSS: Post Traumatic Stress Symptoms; PTSS-C: Post-Traumatic Stress Symptoms for Children; RCMAS: Revised Children's Manifest Anxiety Scale ; RCT: Randomised Control Trial; R-IES: Revised Impact of Event Scale for PTSD symptoms; SDQ: Strengths and Difficulties Questionnaire; TF-CBT: Trauma-Focused Cognitive Behaviour Therapy; UCLA PTSD: University of California at Los Angeles post-traumatic stress disorder reaction index

Appendix 4: Summary of Significant Findings

Verbal based interventions		
Reference	**statistically significant effects**	**effect size Cohen's d**
Ehntholt et al. 2005	Decrease in PTSD symptom severity between groups p = .003; overall decrease in PTSD symptoms (refugee group p= .011 (only significant change see in intrusion symptoms) decrease overall SDQ score (behavioural difficulties) p= .027 emotional symptoms p = .010 anxiety score p = .018; no significant difference in depression symptoms no significant change in any outcome measures in control group	Decrease in overall PTSD symptoms d= 0.88 Decrease in intrusion symptom (p = 0.01) d = 0.68 Decrease in overall SDQ (behavioural) score d = 0.01 Decrease in emotional problems d= 0.32; Decrease in anxiety symptoms d= 0.64
Oras et al. 2004	PTSD symptom scores decreased p<0.01; all the sub-scores of PTSD symptom categories showed improvement (the re-experiencing, p <0.01; the avoidance, p<0.05 and the hyperarousal subscale, p<0.01) PTSD non-related symptoms decreased p<0.01 decrease in depression scores p< p<0.01 GAF scores improved p <0.01;	PTSS-C Total (d = 1.76) PTSD-related (d = 2.5) PTSD non-related (d = 1.48)
Ruf et al. 2010	Decrease in overall PTSD symptom severity p = .001, Decrease in subscales symptom clusters (intrusions p < .001, avoidance and numbing p = .001, hyperarousal p < .05, and functional impairment p < .001. there was statistically significant change in intrusion symptom in the controls p < .05	decrease in overall PTSD symptom severity = 1.9 decrease in intrusion subscale cluster = 2.2 decrease in avoidance subscale cluster =2.1 decrease in hyperarousal subscale cluster = 1.0 decrease in functional impairment subscale cluster = 1.7
Unterhitzenberger et al. 2015	At post-test symptom severity scores for p < .001 a for both CAPS-CA and PDS group	insufficient statistical data
Unterhitzenberger et al. 2016	no statistically significance observations reported; Symptoms decreased in a clinically significant manner	insufficient statistical data

Appendix 4 continued...		
Clinical management interventions		
Reference	**statistically significant effects**	**effect size Cohen's d**
Björn et al. 2013	interviews: fewer overt psychological symptoms; more children built normal sandboxes p= 0.046 (showing no pathological findings)	insufficient statistical data
Dura-Vila et al. 2013	Decrease in SDQ score teacher assessed: p = 0.010; parents assessed, p = 0.006 Decrease in Conduct problems: teacher-rated: insignificant; parent-rated (p = 0.043) Decrease in hyperactivity: teacher-rated p = 0.015); parent-rated (p = 0.001) Decrease in Peer Problems: teacher-rated p = 0.017; parent-rated= insignificant Community based MHS had no significant effect on emotional and pro-social scores	Decrease in SDQ score (teacher-assessed) = 0.57; Decrease in SDQ score (parents assessed) 1.03
Fazel et al. 2009	the total SDQ score in all groups (including controls) decreased significantly p = 0.016) hyperactivity scores decreased significantly more in the refugee group than in the control groups p = 0.037 non-significant difference between refugee and controls in emotional symptoms, conduct disorder, peer problems and prosocial behaviour sub-scales	Comparison with Indigenous white SDQ total d =0.28) Comparison with Ethnic minority SDQ total =.067)
O' Shea et al. 2007	reduction in SDQ insignificant p=0.109	insignificant
Art based interventions		
Reference	**statistically significant effects**	**effect size Cohen's d**
Cumming 2009	No statistical analyses but improvement in indicators of self-esteem	insufficient statistical data
Mohlen et al. 2005	PTSD symptom severity score declined p = 0.018, decrease in depression symptoms p = 0.014 decrease in anxiety symptoms p = 0.006 CGAS & K-SAD = no statistically significant difference reported	insufficient statistical data

Appendix 4 continued…		
Parenting Intervention		
Reference	**statistically significant effects**	**effect size Cohen's d**
Osman et al. 2017	improvement in the total problems scores p=0.002; problem score subscales (improvement in the externalizing problems p<0.001; no significant improvement in internalising problems) improvement in symptoms of aggressive behaviour p<0.001; improvement in symptoms of social problems p<0.001; improvement in symptoms of attention problems p<0.001; no significant improvement in total competence scores or subscales including (social, activities, school) or	improvement in symptoms of aggressive behaviour; effect size, d = 0.76), social problems p<0.001 d= 0.83), attention problems p<0.001 d = 0.54), and in the externalizing problems (95% CI, 0.96 to 3.53; d = 0.60) the total problems core p=0.002; d = 0.50)
CAPS-CA: Clinician Administered PTSD Scale for Children and Adolescents; CBCL 6–18: Child Behaviour Checklist for Ages 6 to 18; CBT: Cognitive Behaviour Therapy; CGAS: Children's Global Assessment Scale; DISYPS: Diagnostic System for Mental Disorders in Childhood and Adolescence –Depression Scale/Anxiety Scale; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; DSRS: Depression Self-Rating Scale; EMAG Ethnic Minority Achievement Group teachers; EMDR: Eye Movement Desensitization and Reprocessing; GAF: Global Assessment of Functioning; HTQ: Harvard Trauma Questionnaire Trauma Index; KIDNET: Narrative Exposure Therapy adapted for children; K-SADS: Schedule for Affective; Disorders and Schizophrenia for School-Age Children; MHS: Mental Health Service; PDS: Posttraumatic Diagnostic Scale; PTSD: Post-traumatic Stress Disorder; PTSS: Post Traumatic Stress Symptoms; PTSS-C: Post-Traumatic Stress Symptoms for Children; RCMAS: Revised Children's Manifest Anxiety Scale ; RCT: Randomised Control Trial; R-IES: Revised Impact of Event Scale for PTSD symptoms; SDQ: Strengths and Difficulties Questionnaire; TF-CBT: Trauma-Focused Cognitive Behaviour Therapy; UCLA PTSD: University of California at Los Angeles post-traumatic stress disorder reaction index		

Appendix 5: The Yates Scale

Treatment quality			
item number	**question**	**item**	**response**
1	Has a clear rationale for the treatment been given and an adequate description of its content?	Treatment Content / Setting	**0 1 2**
2	Has the total treatment duration been reported?	Treatment duration	
3 (2 parts)	Is there a treatment manual that describes the active components of treatment?	Manualisation	**0 1 2**
		Adherence to manual	**0 1**
4	Have the therapists been appropriately trained in the relevant procedures for this trial?	Therapist training	**0 1 2**
5	Is there evidence that the patients have actively engaged in the treatment?	Patient engagement	**0 1**
QUALITY OF STUDY DESIGN AND METHOD			
item number	**question**	**item**	**response**
1 (2 parts)	Are the inclusion and exclusion criteria clearly specified?	Sample criteria	**0 1**
		Evidence criteria met	**0 1**
2 (2 parts)	Is there evidence that CONSORT guidelines for reporting attrition have been followed?	attrition	**0 1 2**
		Rates of attrition	**0 1**
3 (2 parts)	Is there a good description of the sample in the trial?	Sample characteristics	**0 1**
		Group equivalence	**0 1**
4 (4 parts)	Have adequate steps been taken to minimise biases?	Randomisation	**0 1 2**
		Allocation bias	**0 1**
		Measurement bias	**0 1**
		Treatment expectations	**0 1**

Appendix 5 continued…			
5 (3 parts)	Are the outcomes that have been chosen justified, valid and reliable?	Justification of outcomes	**0 1 2**
		Validity of outcomes for context	**0 1 2**
		Reliability and sensitivity to change	**0 1 2**
6	Has there been a measure of any sustainable change between the 6 treatment and control groups?	Follow up	**0 1**
7 (5 parts)	Are the statistical analyses adequate for the trial?	Power calculation	**0 1**
		Sufficient example	**0 1**
		Planned data analysis	**0 1**
		Statistics reporting	**0 1**
		Intention to treat analysis	**0 1**
	Has a good, well-matched alternative treatment group been used?	Control group	**0 1 2**

Appendix 6: Quality Score breakdown of Included Studies

	Björn et al. 2013	Cumming et al. 2009	Dura-Vila, et al. 2013	Ehntholt et al. 2005	Fazel et al. 2009	Mohlen et al. 2005	O' Shea et al. 2007	Oras et al. 2004	Osman et al. 2017	Ruf et al. 2010	Unterhitzenberger et al. 2015	Unterhitzenberger et al. 2016
Intervention quality												
Treatment content/setting	2	2	2	2	1	2	1	2	2	2	2	2
Treatment duration	1	1	0	1	1	1	0	1	1	1	1	1
Manualisation	1	1	0	2	0	2	0	1	2	2	2	2
Adherence to manual	0	0	0	1	0	1	0	0	1	0	1	0
Therapist training	1	1	2	2	1	2	1	2	2	2	2	1
Patient engagement	1	1	1	1	1	1	1	1	1	1	1	1
treatment quality score	**6**	**6**	**5**	**9**	**4**	**9**	**3**	**7**	**9**	**8**	**9**	**7**
	◉	◉	◉	●	◉	●	○	●	●	●	●	●
Study design and methodology quality												
Sample criteria	0	0	0	1	0	0	1	1	1	1	1	0
Evidence criteria met	0	0	0	1	0	0	0	1	1	1	1	0
attrition	0	0	0	0	0	0	1	0	2	2	0	0
Rates of attrition	0	0	0	0	0	0	0	0	0	1	0	0
Sample characteristics	1	1	1	1	1	1	1	1	1	1	1	1
Group equivalence	0	0	0	1	1	0	0	0	1	1	0	0
Randomisation	0	0	0	0	0	0	0	0	2	2	0	0
Allocation bias	0	0	0	0	0	0	0	0	1	1	0	0
Measurement bias	1	0	0	0	0	1	0	1	0	1	1	1
Treatment expectations	0	0	0	0	1	1	0	1	1	1	1	1

Appendix 6 continued…

Justification of outcomes	1	2	2	0	2	2	1	2	2	2	0	2
Validity of outcomes for context	1	2	2	1	2	2	0	2	2	2	2	2
Reliability and sensitivity to change	0	0	0	0	0	0	0	0	1	1	0	0
Follow up	0	0	0	0	0	0	0	0	0	1	0	1
Power calculation	0	0	0	0	0	0	0	0	1	0	0	0
Sufficient sample	0	0	0	0	0	0	0	0	1	0	0	0
Planned data analysis	0	1	0	1	1	1	1	1	1	1	1	0
Statistics reporting	0	0	1	1	1	0	1	1	1	1	1	0
Intention to treat analysis	0	0	0	0	0	0	0	0	1	1	0	0
Control group	0	0	0	2	2	0	0	0	2	2	0	0
study design and methods score	**4**	**6**	**6**	**9**	**11**	**8**	**6**	**11**	**22**	**23**	**9**	**8**
	○	○	○	◎	◎	○	○	◎	●	●	◎	○

○ = not fulfilled ◎ =partially fulfilled ● = fulfilled