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# BMJ Open

## Understanding Behavioral Changes After a Participatory Research Informed Activities to Promote Oral Health

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## ***Understanding Behavioral Changes After a Participatory Research Informed Activities to Promote Oral Health***

***Rathi Ramji, M Sc.,***<sup>1</sup>

E-mail: rathi.ramji@mau.se

***Elisabeth Carlson, RN MNEd, PhD,***<sup>1</sup>

E-mail: elisabeth.carlson@mau.se

***Susanne Brogårdh-Roth ST, Ph.D.***<sup>2</sup>

E-mail: susanne.brogardh@mau.se

***Anna Nilvéus Olofsson, DDS, Odont. Lic.***<sup>3</sup>

E-mail : anna.olofsson@tepe.com

***Anders Kottorp Reg. OT, PhD***<sup>1</sup>

E-mail: anders.kottorp@mau.se

***Margareta Rämgård PhD***<sup>1</sup>

E-mail: margareta.ramgard@mau.se

<sup>1</sup> *Department of Care Science, Faculty of Health and Society, Malmö University, Jan Waldenströms Gata 25, SE-20506 Malmö, Sweden*

<sup>2</sup> *Department of Pediatric Dentistry, Faculty of Odontology: Malmö University, SE 205 06, Malmö, Sweden*

<sup>3</sup> *TePe Oral Hygiene Products AB, Bronsåldersgatan 5, SE 213 76 Malmö, Sweden*

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***Word count:*** 7370

## *Abstract*

**Objectives:** Inequalities in oral health have been on the rise globally. It is not the least in Sweden, where differences exist not between regions, but among subgroups living in vulnerable situations. This study aims at understanding behavioral change after participation in participatory oral health promotional activity among families living in socially disadvantaged neighborhoods in Southern Sweden.

**Setting:** The current study involved citizens from a socially disadvantaged neighborhood in Malmö city together with actors from academic, public and private sectors. Residents in these neighborhoods have low education levels, high rate of unemployment, crime and most importantly poor health.

**Participants:** Families with children aged 7–14 years, from the neighborhood were invited to participate in the health promotional activities by a community representative known as health promoter using snowball-sampling. Between 8-12 families participated in the multi-staged focus groups over a period of six months. Data was analyzed using qualitative content analysis.

**Results:** Three main themes emerged from the analysis including meaningful social interactions, family dynamics, and health trajectories. The mothers in the study appreciated the social aspects associated with their participation; however, they also felt that gaining knowledge was the focus not mere social interaction. Aside of social interactions participants also recognized the role of family dynamics primarily the interactions within the family, family structure and traditional practices as influencing oral health related behavior among children. Participants also reported to have experienced a change in general health through behavioral change. They started to understand the association between general health and oral health after participation that further motivated them to follow healthy behavioral routines.

**Conclusions:** The results from this study show that oral health promotion through reflection and dialogue with the communities together with other actors may have the potential to influence behavioral change and empower participants to be future ambassadors for change.

### **Strengths and limitations of this study**

- Involving community members throughout the research process contributed to the development and implementation of need-based health promotional activities.
- Change in behavior was influenced by knowledge mobilization, reflection and dialogue among participants and not through a pre-determined intervention.
- The health promoter had a critical role in bridging between the research team and the community.
- The discussions in the group led to the development of a culturally adaptive sugar brochure that was useful to the community as well as health care providers.
- Non- participation of fathers may have been a potential source of selection bias.

## Introduction

There has been an overall improvement in oral health status of the Swedish population in the past decades owing to the advancements in public dental services and state financed insurance policies [1, 2]. However, large discrepancies in oral health do exist [1, 3-7]. The level of inequalities are not substantially different between the different regions in Sweden but rather between small areas within the major cities, where there is a concentration of subgroups in marginal or vulnerable situations [3]. These socially deprived groups frequently include heterogeneous populations who differ by their ethnicity, historical background, culture, and practices related to health in comparison to the majority population [8]. Oral health disparities have been on the rise owing to challenges like lack of knowledge and poor social policies, unavailability of context-based information, and most importantly the disjunction between oral and general health [9]. The disjunction is owing to the fact that the current dental care system globally as well as in Sweden, consider merely the individual behavioral risk factors while addressing oral health problems. However, socio-cultural as well as policy related aspects which are key determinants of not only oral health but also general health and well-being is widely ignored. Health care providers tend to look at diseases in isolation rather than employing a collaborative approach to address health from a broader perspective. Thus widening the gap between oral and general health and increasing the burden of disease among socio-culturally different and disadvantaged subgroups of the population [10-13]

Since the early part of the twentieth century, there has been a global drive in reducing health inequalities [14, 15]. Health inequalities in general are associated with various social determinants including living conditions, employment status, and childhood conditions as well as aging [16]. These determinants also apply to oral health disparities. Moreover, oral diseases also share risk factors with other non-communicable diseases and are associated with cardiovascular disorders, and diabetes [17-22]. According to the World Health Organization,

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3 oral health is an integral part of general health and is fundamental to overall wellbeing and  
4 quality of life. Thus, addressing oral health disparities is an inevitable part in health  
5 promotional activities aiming to reduce health disparities [23]. Oral health impairments have a  
6 considerable impact on the quality of life of affected individuals both functionally and  
7 esthetically [24-26]. Dietary habits, oral hygiene and use of fluoride are cornerstones for good  
8 oral health, preventing the occurrence of caries and periodontal disease. Irregular dietary  
9 habits and excessive sugar intake between meals, and frequent intake of high sugar diet are  
10 leading causes for caries in young children [27]. Numerous studies have explored the  
11 association between diet and oral health since the early nineteenth century. The production  
12 and consumption of food containing added sugars such as fruit juice concentrates, syrups and  
13 sweet candies has been on the rise particularly among young adults and children [28]. Poor  
14 oral hygiene is the key determinant in the occurrence of dental caries and periodontal disease  
15 as it initiates bacterial infestation, but the bacterial action in the oral cavity is triggered by the  
16 diet consumed [29]. High consumption of fermentable carbohydrates, which predominantly  
17 contain free sugars and starch, provokes bacterial action leading to destruction of tooth  
18 structure. Therefore, the WHO recommends limiting free sugar intake and replacing it by  
19 increasing the consumption of fresh fruits and vegetables, nuts, seeds and wholegrain starch-  
20 rich foods in an attempt to promote healthy diet and prevent dental caries and periodontal  
21 disease [28-30].

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Dental caries also known as tooth decay is one of the most common preventable disease in  
children globally [23, 31, 32]. Cariological risk assessment among younger children is  
important as caries in early childhood progresses more rapidly since the enamel is thinner in  
the primary teeth than in the permanent teeth. Caries incidence in preschool age increases the  
risk of caries in adolescence and later in life [33]. Moreover, caries impairs the quality of life  
of children by disrupting vital everyday functions including eating, swallowing and speaking

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3 [2]. Children with dental caries tend to have poor self-image and self-esteem [21, 23, 34].

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5 Furthermore, caries may lead to adverse effects including reduced social interaction, pain,  
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7 discomfort, disturbances in the development of occlusion, stress and depression [31].

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10 According to previous studies, dental caries was twice as common among non-Swedish  
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12 children and adolescents belonging to socioeconomically distressed families compared to  
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14 their Swedish counterparts [1, 3-7]. Determinants for dental caries in immigrant children  
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16 include parents' education level and ability to assimilate to Swedish dietary conditions since  
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18 they are not often similar to the dietary patterns of immigrant families [3]. Parents in a  
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20 socially vulnerable environment may need community support to establish good dietary and  
21  
22 oral hygiene habits, including using fluorides, as part of preventing diseases of the oral cavity.  
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24 In vulnerable areas, oral health problems may be part of a number of different social problems  
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26 and a number of actors in the community, such as maternal care, child health care, pharmacies  
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28 may need to make joint efforts to provide health interventions for families with different  
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30 cultural backgrounds [5-7].  
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36 The Swedish dental care have had a strong tradition of preventing caries in children and  
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38 adolescents. In cooperation with the National Board of Health and Welfare, the county  
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40 councils have carried out caries risk assessment among children and adolescents since 1985  
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42 and continuous statistics on children and young people's oral health enables monitoring of  
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44 caries development over time. Since the 1960s, there has been a steady decrease in caries  
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46 prevalence among children owing to the effective and timely preventive measures  
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48 implemented by the Swedish dental care. Despite these efforts caries prevalence is  
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50 considerably higher among selected subgroups of the Swedish population who are more often  
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52 from socially disadvantaged backgrounds. Studies based on Eurobarometer surveys have  
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54 identified that socially disadvantaged populations frequently lack knowledge on self-care  
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56 including practice of good oral hygiene, and other factors influencing oral diseases like diet  
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3 and use of fluorides [35]. This is especially true concerning children in disadvantaged  
4 communities who experience more caries than their Swedish peers. The Swedish dental  
5 services are provided free of cost for those under 23 years and frequently prioritize promotion  
6 and prevention. Nevertheless, these efforts have been insufficient in providing dental care  
7 without disparities. Children and young adults are invited through a recall system by the  
8 public dental service. However, children from socially disadvantaged settings are less regular  
9 in attending these visits. There has been a lower level of utilization of dental care despite the  
10 increased need among socially disadvantaged migrant groups [1, 3, 4]. A study in the  
11 Stockholm region showed that teenagers frequently missed the yearly visits and consulted the  
12 dentist only when in pain, most often with advanced carious lesion, which could have been  
13 identified and treated in time with regular contact [35]. Oral health behaviors are mediated to  
14 children through their parents with the support of the regional dental care [3, 4]. Often  
15 immigrant parents are unaware of the support services that are available due to recognized  
16 practical barriers such as language difficulties and health literacy. Parents also have different  
17 expectations from the health care system, which are based on their experiences from their own  
18 home country [36, 37].

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41 Most of the information available in the Swedish dental care is evidence-based, but lacking  
42 contextual adaption. Traditional values and family practices influences the attitude towards  
43 health and how communities value oral health as well as what is considered as a standard for  
44 good health [3, 4, 9, 37]. An understanding of specific populations, their socio-economic  
45 position and the influence of their traditional practices and above all the influence of all of  
46 these factors on their health behavior is necessary to improve utilization of dental care in  
47 socially disadvantaged groups. This will in turn contribute to reduced oral health disparities  
48 [3, 4, 6]

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3 There is an acute need for appropriate interventions and services to effectively address the  
4 oral health disparities of the underserved. These interventions must be culture and context  
5 sensitive novel oral health promoting solutions and not merely based on the views of the  
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7 concerned, but rather influenced by the active participation of the populations in need [38].  
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10 Active participation by representatives from the target groups is crucial for reducing the gap  
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12 in knowledge as well as tackling and allocating resources that support specific community  
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14 needs [39].  
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20 Community based participatory research (CBPR) is one such a method, which focuses on  
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22 addressing the determinants of health from a social as well as environmental perspective  
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24 through active engagement of the community members and other concerned actors throughout  
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26 the research process [39]. Taking into account specific social requirements and increasing  
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28 community engagement to improve health, CBPR has emerged as an alternative paradigm for  
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30 health and social research [38, 39]. CBPR is considered a significant part of translational  
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32 research, which helps to improve the health of specific communities, eliminate inequality and  
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34 achieve equality in health through community empowerment [40]. The principles of CBPR  
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36 are based on core concepts including, partnership and co-learning, capacity building or  
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38 training community members to become future health ambassadors, knowledge production for  
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40 societal transformation and prolonged commitment which facilitates achieving higher level  
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42 goals like reducing disparities [38]. CBPR is a systematic effort to integrate active  
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44 participation by the community in the process of decision making by creating a mutual  
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46 understanding of local phenomena and practices specific to the community which contributes  
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48 to the development of innovative strategies to promote social change [39]. Empowerment has  
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50 been considered critical in the CBPR process although the phenomenon was not frequently  
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52 explored while evaluating CBPR based health promotional activities. Empowerment is  
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54 defined as the ability to control one's own life especially in relation to own health and well-  
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3 being [41]. Studies addressing oral health disparities focusing on diet and oral hygiene using  
4 the CBPR method involving multiple actors from the community, public sector, private sector  
5 as well as non-profit organizations are sparse.  
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10 The current study was part of a larger project Health Promoting Innovation in Collaboration.  
11 The aims of the main project was to develop and study health-promoting activities based on  
12 participatory research methods. Focus group interviews based on CBPR principles were  
13 conducted with residents in a socially disadvantaged neighborhood in year 2016. The  
14 interviews aimed at identifying measures to improve health among the residents. During the  
15 discussions the citizens in the neighborhood identified several problem areas where they  
16 needed help with including poor oral health, lack of access to physical activity, poor mental  
17 health, and lack of knowledge concerning health and healthy behaviors.  
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29 Health promotional activities were held as part of the larger project focusing on the challenges  
30 identified by the community members. The health promotional activities targeted behavioral  
31 change through knowledge mobilization using a participatory design focusing on key factors  
32 such as empowerment [39]. Knowledge mobilization is a process where reciprocal and  
33 complementary knowledge is shared between multiple actors, to promote multidirectional co-  
34 construction of knowledge. The basis for knowledge mobilization is interactions  
35 that create knowledge and reflections during and after the interactions that facilitate sense-  
36 making of the acquired knowledge [39]. Community members participated in all stages of the  
37 project including planning, implementation and evaluation. Representatives from the  
38 neighborhood known as health promoters were integral in coordinating the activities in the  
39 different workshops. In an international context, they are known as community health  
40 workers, and their role has been proven promising in participatory research driven initiatives  
41 [42, 43]. The health promoters are instrumental in identifying and recruiting participants,  
42 assists with language interpretation and above all inform about the cultural nuances of the  
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3 community to be considered by the research team, while approaching individuals for various  
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5 activities. As members of the group of interest, they also have deep knowledge and  
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7 experience of the common problems faced by these communities particularly in relation to  
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9 access to health care [42].  
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13 Oral health was one of the challenge areas identified by the community and addressed among  
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15 the activities initiated as a part of the larger project. This was considered a priority area since  
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17 dental caries was on the rise in families with young children. The initiatives focused on oral  
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19 hygiene, the role of fluoride as well as diet since the residents also perceived a lack of access  
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21 to personal advice on diet and health in their area.  
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25 *The aim of the current study was to explore the behavioral change initiated by a*  
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27 *participatory community based health promotion targeting oral health in children and*  
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29 *parents living in a socially disadvantage neighborhood in Southern Sweden.*  
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## Method

### Context

The current study was based in a socially distressed neighborhood located in Malmö city in Southern Sweden. Majority of the population living in this neighborhood are non-Swedish speaking. According to a report from Swedish Intelligence Unit, this neighborhood has been considered one among the fifteen most vulnerable localities in the country [44]. The report also highlights challenges like high rate of unemployment, crime, low education levels and poor health among residents which was also supported by prior research concerning high incidence of risky health behaviors among citizens in this neighborhood [45, 46].

### Participants and Actors

The health promoter involved with the oral health related activities sent information about the activities and invited families with children between 7-14 years to participate in the meetings. Initially a few families identified by the health promoter volunteered to participate during the first session. More participants were later recruited through purposeful snowball sampling, mainly through spreading information through word of mouth. A total of 12 families were regularly involved in the activities. Although no specific demographic information was collected from the parents concerning the family structure, parental educational status and employment, it emerged from the discussions that quite a few of the mothers in the group were employed. Almost all families had three children, aged between 2 years – 12 years. Most of the families were from Middle Eastern countries. During the initial meetings, children were present together with their fathers and mothers. Eventually only the mothers participated regularly together with their children. There were 8-12 mothers during each of these 9 sessions and about 15 children during each meeting.

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3 Aside from the participants and academic partners the research team included representatives  
4 from the public and private sectors as well as non-profit organizations affiliated to the project  
5 such as the Primary care, Pharmacy, Save the Children and TePe Oral Hygiene Products were  
6 also present. The private actors were present to listen and understand participant needs and  
7 not for marketing their products. Not all actors were however present in all meetings; their  
8 presence was determined by the theme discussed on the different occasions.  
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## 20 **Design**

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23 The current study is a participative action research study with a qualitative approach where  
24 multistage focus group interviews were the mode of data collection. Multistage focus groups  
25 are characterized by the same group of persons exploring different themes during several  
26 meetings [47]. This method was inspired by Paul Freire's culture circles where the aim is to  
27 foster a participatory experience with an emphasis on dialogue and reflective action in  
28 response to an emancipatory health education [48]. The power relations are balanced within  
29 the circle, where one-person facilitates the discussions and debates by initiating the process.  
30 The facilitator then leaves it to the group to take responsibility for the progress in the inquiry  
31 process through self-reflections and sharing individual knowledge and experiences with each  
32 other. The dialogues help elevate the participants' experiences to a higher level of abstraction.  
33 The focus groups deduce individual learning, as well as collective ways of thinking through  
34 reflection and dialogue within the group. Freire states that the consequence of offering  
35 knowledge via dialogue as a tool empowers groups [49] and such an empowerment may lead  
36 to behavioral change [50]. During each meeting, the participants try to identify a common  
37 problem in the community, explore the problem further to identify resources and solutions  
38 while simultaneously implementing them to bring about transformation [48, 51].  
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## Data Collection

### *Preliminary meeting*

The families who agreed to participate met at nine different occasions once in two weeks over a period of six months beginning in September 2018. The first step in the multistage focus groups was to understand the participants' perceptions on oral health. Prior to the initiation of the actual activity sessions, the research team used a participatory research approach photovoice, to assess the complex phenomenon of diet from a sociocultural perspective among children. In this method photography is used a tool to understand the factors surrounding the actual problem in consideration, from within the context of the participants. This is also a form of qualitative research where the photos act, as a focal point to initiate discussion and promote better understanding of participants needs. This method helps overcome language and communication barriers and enhances discussions within the group [52, 53].

The children were requested to bring pictures of healthy and unhealthy food and discussions were initiated based on their photos. In addition, they were also asked to take pictures of their toothbrush, as a base for discussing oral hygiene habits. Children sent the photographs via Whatsapp to the health promoter a few days prior to the scheduled introductory meeting. Photographs sent by the children were compiled, printed and later presented to the children for review together with the rest of the group. One of the team members initiated the discussion with the children using the pictures they sent and led the discussions.

### *Actions points from the preliminary meeting*

Through the discussions during the preliminary meeting, it emerged that the children consumed a high amount of sugar as part of their daily diet. The children also expressed a dislike for the lunch served at school. It came to be known that most of the children did not

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3 eat breakfast owing to time constraints, family situation and cultural aspects. Through post  
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5 discussion with parents it was understood that parents had limited control over their  
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7 children's' dietary choices. With regard to oral health and oral hygiene children frequently  
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9 visited the dentist as they had pain in the tooth and some had fillings and a few even had teeth  
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11 extracted in early childhood. Concerning oral hygiene, there was a lack of awareness  
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13 concerning fluoride use and its importance for oral health in children. It appeared that despite  
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15 having several tooth decays they were not informed about the role of fluorides in caries  
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17 prevention. The session was followed by debriefing and discussion with parents to understand  
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19 their concerns about oral health of their children and the families in general. When discussing  
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21 with their parents, it emerged that parents were not satisfied with the tooth brushing done by  
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23 their children. The children did not permit parents to help them with brushing despite being  
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25 advised by the dentist or dental hygienist. In conclusion, parents felt the need for dietary  
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27 advice focusing on the different meals, breakfast, lunch and dinner. In addition, they also  
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29 wanted to gain more knowledge on oral hygiene habits. They preferred all sessions to be in  
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31 the presence of the children since they would follow the advice of others better than they  
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33 would do if the parents told them the same thing.  
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40 In the consecutive occasions, dialogue-based teachings or reflective dialogues were facilitated  
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42 by experts in the fields related to address different challenges that emerged in the first  
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44 meeting. Behavioral change through educating parents was driven by the reflective dialogues.  
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46 Previous studies [54] state that reflective dialogue-parental education is an effective method  
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48 to enhance parental awareness and improve parenting skills through confidence building  
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50 which is promoted by social support and peer influence. The discussions in the groups were  
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52 predominantly held in Swedish and interpreted in Arabic by the health promoter for the  
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54 benefit of some parents who could not speak Swedish. At the beginning of every meeting,  
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56 families had the opportunity to provide feedback from the previous session. They also  
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3 discussed their ability to make changes inspired by what was learnt from their participation  
4 and the challenges faced in doing so. All discussions were audiotaped with the consent of the  
5 families. A member of the researcher team also acted as an observer and was responsible for  
6 taking notes during each meeting.  
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## 16 **Data Analysis**

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18 One of team members [RR] reviewed audio recordings repeatedly to develop a content log of  
19 the discussions as well as summary. Listening to the recordings, several times facilitated rapid  
20 identification of codes together with the help of the observational notes. Two other members  
21 from the research team who were not involved in the data assimilation process listened to the  
22 recordings to complement the preliminary analysis performed by the first researcher [EC,  
23 MR]. Following this, the researchers discussed and reflected on their findings together and  
24 came to consensus over a final list of codes. Another researcher [SB] who was also involved  
25 with the focus group discussions further read the final list of codes and confirmed them. The  
26 discussed codes were placed under categories and each category was further defined in detail  
27 to identify overarching themes. While data extraction was done using rapid identification of  
28 themes from audio recordings (RITA) method, qualitative content analysis with an inductive  
29 approach [55], was used to identify themes relevant to the research goals. The RITA method  
30 has previously been established as a method that yields prompt and detail results from  
31 qualitative data while also being less time consuming and less labor intensive [56-58].  
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## 54 **Qualitative Rigor**

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57 Results from qualitative studies are evaluated based on certain criteria such following Guba  
58 and Lincoln's criteria [59] as factors that predict the authenticity of the results. According to  
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3 these criteria, the quality of results depends on the methods of data collection and the  
4  
5 technique of data interpretation. The current study is built on the CBPR principles of co-  
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7 learning and sharing thereby holding the contact between the researcher and community  
8  
9 member's closer; thus, enabling better understanding and interpretation of information  
10  
11 provided. Furthermore, the involvement of the health promoter at the different stages of the  
12  
13 research process ensured open communication. This provided an opportunity for the  
14  
15 participants to share trustworthy accounts of experiences to other members in the group  
16  
17 ensuring credibility. The research team made observational notes describing the context to  
18  
19 support the audiotaped data which contributed to transferability of the findings. Dependability  
20  
21 was attained by involving a third researcher who was not involved in the initial data collection  
22  
23 and analysis to review the coded data. To achieve confirmability, audio recordings and the  
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25 observational notes were rechecked in iterations also by the third member from the research  
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27 team.  
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32 Findings were shared with participants and reconfirmed when necessary.

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35 Issues related to reflexivity was address using constant communication with the participants  
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37 after each meeting, through peer debriefing, as well as triangulation by including several  
38  
39 members in the research team in the focus groups as well as analysis of audio recordings.

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41  
42 Self-reflexivity or personal reflexivity of the members of research team was considered rather  
43  
44 positive since it gave the possibility for the team to reflect on power and privilege issues in  
45  
46 relation to the context. This is also in line with guidelines indicated by prior work in  
47  
48 participatory research [60].  
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### 53 **Ethical Considerations**

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56 The Regional Ethical Review Board in Lund approved the study (DNR 2016/824). All  
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58 participation was voluntary, and the participants were informed that they could leave the  
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3 discussions at any time without any explanation or consequences. The parents received  
4  
5 detailed information regarding the purpose and nature of the study, and were requested to  
6  
7 provide written informed consent before enrollment. Parents were requested to consent their  
8  
9 own as well as their children's participation. All invited participants consented both their own  
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11 participation as well as that of their children. The children also gave a verbal consent.  
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## Findings

Three main themes including meaningful social interactions, family dynamics, and health trajectories were identified on exploring reflective thoughts and discussions in the focus groups with an aim to understand the process of changed behavior within the group. Social interactions, family dynamics, and health trajectories were considered as factors influencing behavioral change among mothers and children.

### *Meaningful social interactions*

The mothers reported in the beginning that they agreed to participate in this study since they trusted the health promoters. However, after a few meetings they began to enjoy the social aspects of being with new people especially since they would otherwise sit idly at home.

*“In the beginning I came here because we knew the “health promoter”. After coming here a few times, we started to interact with the others in the group. Now we do activities outside of this group, for example we go out on picnics or barbeque together. Coming here and meeting people is definitely better than sitting idle.” (Mother of child aged 9 years, Meeting 8)*

Although the mothers enjoyed the social aspects during the initial meetings, they began to look forward to interactions that are more purposeful and considered gaining knowledge as primary focus.

*“It is not just for meeting others. It is good that I get information about healthy food and what is a good breakfast for both my children and me. I just do not go there every time to meet someone else. We can do that in a different way.” (Mother of children aged 2-11 years, Meeting 8)*

The mothers in the group believed that the discussions and information they received were better than what they had received from the nurses at the primary care. They highlighted the

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2  
3 importance of being in a group in the learning process since the discussions were interactive  
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5 and not controlled or determined by the facilitators or field experts  
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8 *“When we meet a nurse at a primary care center, they sound tired and disinterested and*  
9 *hence do not provide the same information we get here. It was not of good quality neither*  
10 *educational or motivating as we do here within the group.” (Mother of child aged 6-10 years,*  
11 *Meeting 6)*  
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17  
18 The mothers felt that they were given not only the opportunity to gain new knowledge and  
19  
20 learn, but also the possibility to discuss and share their own knowledge and experiences. They  
21  
22 also gave and received tips from each other in the group.  
23  
24

25  
26 *“It was not just a lecture, we got to ask, discuss and learn from the experts and from each*  
27 *other. It was fun to give tips and suggestions to each other based on our experiences.”*  
28 *(Mother of children aged 2-11 years, Meeting 7)*  
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33 Some of the mothers were unsure from the beginning if they could make changes to their diet.  
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35 After participation for a few weeks, they felt motivated and gradually started to make  
36  
37 changes.  
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40  
41 *“In the beginning I was drinking 5-6 liters of juice a day, after being here I have reduced it to*  
42 *1 liter per week. I initially thought that I can't but when I was told about the sugar content of*  
43 *the juice and learnt about others changing their dietary patterns, I too decided to change.”*  
44 *(Mother of children aged 6-12 years, Meeting 7)*  
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51 Towards the end of the sessions, several mothers expressed their interest in communicating  
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53 the knowledge they gained to the rest of the community, as they believed that the information  
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55 was important. They even went a step further and mentioned that they would like to join the  
56  
57 research team in the future to support the mission to improve oral health among the  
58  
59 population in the neighborhood.  
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3 *"I want to be one among your team, you are few and there are many people who need help so*  
4 *I want to help others as you do." (Mother of children aged 2-11 years, Meeting 8)*  
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8 Children in the group were also interested in spreading their knowledge to their friends and  
9 classmates. One of the children in the group had already begun speaking about sugar intake  
10 and oral health to his class.  
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16 *"I told my classmates about why eating sugary things is harmful and how sugar affects the*  
17 *teeth. My teacher was impressed with me and wanted me to share more information in the*  
18 *class after each meeting." (Child 11 years, Meeting 6)*  
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## 23 24 25 26 **Family dynamics**

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29 The role of individual members in the family, bonding and interactions between family  
30 members together with socio-cultural or traditional values carried within the family, influence  
31 lifestyle and behavior of the children. Acculturation and migration also have an influence on  
32 the relationship between children and parents, specifically mothers. Thus, a sustainable  
33 change in diet of children is influenced by family dynamics.  
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41 Mothers in this study perceived that they had important responsibilities but were merely  
42 limited to executing actions with little influence on decision-making. This was considered as  
43 direct challenge in promoting dietary changes in the family.  
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49 *"I am a woman I can decide only for myself, I cannot tell my husband what he has to eat. My*  
50 *children eat what their father eats. I drink a lot of tea and my children drink tea too. It is our*  
51 *tradition." (Mother of children aged 3-14 years, Meeting 2)*  
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3 Children in the families acknowledged their traditional practices and consumed high amount  
4 of sugar as part of it. They believed that following parent's action was also associated with  
5  
6 culture.  
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10 *We drink tea as a family in the evenings and during weekend. I cannot drink tea without sugar*  
11 *in it. I usually put four teaspoons of sugar in my tea. That is how my parents drink too. It is a*  
12 *cultural thing.” (Child aged 9 years, Meeting 1)*  
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17  
18 From the discussions with the children it emerged that they were almost alone when they ate  
19 breakfast so they ate whatever they found in this refrigerator.  
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23 *“I eat breakfast alone and I eat whatever is available in the refrigerator. I mostly eat bread*  
24 *with Nutella, as it is easy to make. My mother goes to work and my father is still sleeping*  
25 *then. My brother never helps me even if I ask.” (Child aged 8 years, Meeting 3)*  
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31 Some mothers also believed they could not provide enough attention to their children's diet  
32 due to lack of time and a stressful life in Sweden. Mothers also believed that fathers could not  
33 help children as good as the mothers as men have low involvement in the upbringing of  
34 children. After participation in the activities, the mothers found a solution to this through the  
35 tips they got from fellow participants.  
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43 *“I leave early to work and my children eat breakfast by themselves. My husband cannot*  
44 *prepare food and take care of the children, sometimes he forgets everything, he miss to put on*  
45 *their wooly caps in winter. It is cultural (Mother of children aged 6-10 years, Meeting 2)*  
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51 Mothers valued the involvement of children in the activities since they recognized changes in  
52 children's behavior at home after participation. Children were more cautious about their diet  
53 and sought their parents' help while brushing their teeth, which they refused to do earlier.  
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3 *"The good thing is that we got to be here with our children, and that they also got to listen*  
4 *and learn. They have become more responsible at home; my son does not want to eat as many*  
5 *bananas as he did earlier because he has learned that it has more sugar. He wants me to help*  
6 *him brush his teeth; he would never allow me to do it before even if I insisted. "(Mother of*  
7 *children aged 2-11 years, Meeting 5)*

15 Mothers were initially unsure about influencing the diet and lifestyle of their spouses, but  
16 when they made changes for themselves their husbands chose to do so too. In some  
17 households, women brought home information material from the meetings to convince their  
18 husbands.  
19

25 *"At first I thought it might be hard for me to influence my husband, but when I changed my*  
26 *own diet he chose to change his too" (Mother of children aged 2-11 years, Meeting 8)*

31 *"When I told him about sugar content in each food and showed the sugar brochure my*  
32 *husband was shocked and immediately decided to change." (Mother of child aged 11 years,*  
33 *Meeting 8)*

## 41 **Health trajectories**

44 When the mothers initially volunteered to participate in the activity and attended the  
45 meetings, they were concerned about their children's oral health behavior and diet. From the  
46 initial discussions with parents and children it emerged that children frequently consumed  
47 sugar in form of candies, juices and drank tea with sugar, which was a part of their tradition.  
48 Parents were also worried since children frequently complained of toothache and some of  
49 them had several fillings or a lost tooth.  
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3 Some parents even believed that they needed some amount of added sugar for normal body  
4 function. Parents were unable to monitor and control their children's' sugar intake.  
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8 *"I must have juice in the refrigerator all the time because my children want to drink juice*  
9 *once every hour. I cannot say no to them because they will not eat anything else. I can't help*  
10 *but buy juice as I also like it."* (Mother of children aged 6-12 years, Meeting 1)  
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16 After participation in the activities, mothers reported a sense of satisfaction and relief since  
17 they were able to take control over their situation and bring about change, promoting a  
18 healthier lifestyle for their children. This in turn made them happier and they slept better.  
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22  
23 *"I felt bad when I realized that it was me who bought juice and sweets. I understood that if I*  
24 *stop buying things it would help my family. Since I did that, I sleep better because I know I*  
25 *have provided healthy food to my children."* (Mother of children aged 6-12 years, Meeting 8)  
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31 Children in the group were particularly excited about learning to brush their teeth from  
32 experts and the use of different kind of toothbrushes. They also spoke about the relationship  
33 between healthy teeth and healthy living after participation in the discussions.  
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37  
38 *"It was fun to see all the different brushes. I never knew there existed so many. I learnt to*  
39 *brush my teeth. I think that we must brush our teeth well since it makes us feel healthy."*  
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43 *(Child aged 8 years, Meeting 7)*  
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47 Mothers began to understand the influence of diet on their health more distinctly after  
48 participation in the activities. Mothers reported change in self-perceived health owing to  
49 behavioral change after participation in the activities.  
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53  
54 *"Since I made changes to my diet, I started feeling fresher and healthier. I was at the doctor*  
55 *last week and he was surprised because I have lost weight."* (Mother of child aged 9 years,  
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58  
59 *Meeting 8)*  
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3 Participants began to understand the connection between oral health and general health and  
4 well-being after having participated in the activities.  
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8 *"Through participation in this activity I have learned about the connection between oral*  
9 *health with general health. I have actually seen a change in my physical health." (Mother of*  
10 *children aged 2-11 years, Meeting 8)*  
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## Discussion

Participation in the health promotional activities led to changed oral health related behavior, together with a tendency of increased empowerment, and an increased control over health among both mothers and children, which in turn extended into the entire family as illustrated in the main findings social interactions, family dynamics and course of health in general.

The current study shows that a participatory dialogue and reflection targeting behavioral change taking into account the actual needs of the community may initiate lifestyle changes among socially disadvantaged immigrant families compared to mere personal dietary counselling in primary care centers or at the dental clinics. This is in line with a previous study [61] which shows that dietary counselling offered by health care workers is frequently inconsistent, unclear and beyond all not culturally tailored and hence is not effective in promoting dietary changes. Participants in this study, especially mothers from socially disadvantaged backgrounds viewed this activity as a facilitator for change in oral health related lifestyle through provision of need driven support and knowledge. The role of mothers as important channels for behavioral change in the families is in line with a previous study based on oral health educational interventions involving immigrant families with children living in Australia [62]. However, the intervention offered in the Australian study was predetermined intervention provided by trained members from the community unlike in the case of this study the health promotional activities were purely participatory in that all the oral health related education was in the form of dialogue exchange between participants and the different actors within the project. In addition, the health promotional activities targeting behavioral change in the current study was implemented over a longer period with frequent visits and involved children aged 7-14 years in contrary to the Australian study where the intervention was provided for 3-4 weeks and children of younger age (1-3 years) were included. Involving older children in the discussions benefitted in that they were also active

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3 during all sessions, had the opportunity to ask questions, learn from experts, and thereby  
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5 reported to have made changes in their lifestyle.  
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8 The interaction between individuals in a group exerted a strong influence on the behaviors,  
9  
10 which was beyond the mere social aspect of meeting people to break isolation. The process  
11  
12 involved utilization of collective knowledge to bring about changes in daily life through  
13  
14 mutual sharing and motivating each other. These results are in line with discussions in a  
15  
16 review study [63] that shows that participation in interactive lifestyle interventions in small  
17  
18 groups composed of individuals in similar situations who are motivated to change their  
19  
20 lifestyle are known to promote behavioral and lifestyle changes even among harder to  
21  
22 convince participants in the group by being role models [63]. Similarly, according to an  
23  
24 earlier study , social interaction between children is known to help in shaping their cognition,  
25  
26 altering their attitudes, beliefs as well as understanding of reality that in turn promotes  
27  
28 behavioral changes [64].  
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34 The stages leading to change in parental conception which facilitated behavioral changes also  
35  
36 reflect on the four conditions described by a prior study on the effects of reflective dialogue  
37  
38 parental education including awareness of one's current conception, dissatisfaction with one's  
39  
40 current conceptions, support and understanding from others, exposure to alternate ways,  
41  
42 opportunities for encouragement and reflection [54]. During the initial meetings, mothers in  
43  
44 the group became more conscious and aware of what constituted the meals they served their  
45  
46 families through reflecting on the images of their own breakfast. Many of them had not  
47  
48 thought about the health aspects of ingredients they used to prepare meals. They merely  
49  
50 followed family traditions. However, through participation in the group meetings they  
51  
52 realized that they had a significant role in promoting healthier diet to the rest of their family.  
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54 Although they were frustrated in the beginning, they found support from other participants in  
55  
56 the group who were in similar situations. The support, understanding, mutual respect and  
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3 caring shared among each other in the group made the mothers psychologically stronger and  
4  
5 thus they did not feel pressured or guilty. They rather became determined and welcomed the  
6  
7 alternative conceptions they were exposed to both from the different actors providing  
8  
9 knowledge as well as through interaction with other members in the group with varying  
10  
11 perceptions. The participants moved from a stage of seeking knowledge to sharing knowledge  
12  
13 through providing tips to one and another as well as to their friends and relatives in the  
14  
15 community. The mothers expressed a feeling of confidence in self and reflected a tendency of  
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17 being empowered, which they were lacking in the beginning of the study when they really felt  
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19 powerless due to their inability to take control over their children's oral health related  
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21 lifestyle.  
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## 30 **Practical Implications**

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33 It became known through this study that brochures and health education material used in the  
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35 Swedish health care were adapted to the Swedish context and were considered less useful for  
36  
37 needy communities. The participants believed that an educational material showing sugar  
38  
39 content in various food products would help understand sugar intake among families in  
40  
41 socially disadvantaged neighborhoods. As a part of the activities, participants learnt to read  
42  
43 and understand the ingredients list printed in the package of different food products. They also  
44  
45 learnt to convert the quantity of sugar in grams to sugar cubes since children which helped  
46  
47 them communicate and spread the knowledge they gained with others. Participants gathered  
48  
49 photographs of food products and some culturally specific dishes which they wanted to  
50  
51 include in a new brochure. Together with the actors in the research team and a trained dietist,  
52  
53 the participants developed a sugar brochure. The sugar brochures were printed in multiple  
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55 copies by TePe and were distributed to the participants. The private actor TePe had the role of  
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3 only listening and understanding participant needs as they played a central role in printing the  
4 brochure material. It must be noted that they did not have an influence on participants with  
5 regard to the development of the brochure. The brochure was also shared with the primary  
6 care, dental care and pharmacy for further dispersal of the material. The participants, both  
7 mothers and children found the brochure as a concrete tool for informing their family and  
8 friends in the community about the harmful effects of sugar consumption. The mothers in the  
9 group became oral health ambassadors in the community and started an initiative “Fight  
10 against sugar intake. They organized small gatherings with other women in the community to  
11 talk about the knowledge they gained from their participation in this study, together with the  
12 help of the brochure. Some of the children in the group who expressed interest to learn more  
13 about oral health, diet and healthy lifestyle were specially educated by experts in TePe over a  
14 period of one month with one lecture a week. After participation in the educational sessions,  
15 the children were certified as child oral health ambassadors. These child oral health  
16 ambassadors began spreading their knowledge in their respective schools.  
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## 40 **Limitations**

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43 A notable feature in multistage focus groups used in the current study is that participant  
44 dynamics may change during subsequent meetings in that new families take part or some of  
45 the original families do not taken part in some of the meeting series. According to previous  
46 studies, the introduction of new members have a positive effect in that new discussions that  
47 emerge and more knowledge is generated [48]. However, in the current study it must be noted  
48 that eight to twelve families attended almost all meetings while there were also few new  
49 families in every occasion, which steered new discussions and new perspectives that  
50 benefitted even those families that come regularly. However, the participants were reassured  
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3 at the beginning of each meeting that all of their opinions and views within the group were  
4  
5 equally important. In addition, the presence of the health promoter, who was also a  
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7 representative of the community as facilitator of the discussions also helped participants to be  
8  
9 more involved during the discussions and thereby helped reducing power issues. The rapid  
10  
11 identification of themes from audio recordings may be considered a methodological  
12  
13 limitation. However, in contrast to the original method of listening to the audio for three  
14  
15 minutes [56], the themes were identified after listening to the entire audio recording several  
16  
17 times. In addition, extensive field notes were collected during each of the nine sessions,  
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19 which was used as complementary information to the audio recordings during analysis. Aside  
20  
21 of this the research team also had a deeper understanding of the participants views from a  
22  
23 contextual perspective owing to their prior engagement with participants in the trust-building  
24  
25 phase, which was also enhanced by the involvement of health promoter. Another potential  
26  
27 limitation in this study is the non-participation of fathers, which may have introduced a  
28  
29 selection bias. This however does not undermine the value of the findings from this study.  
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31 Fathers in this study decided not to participate in the activities since mothers had the primary  
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33 role of raising children and steering their behavior in these communities. This is also in line  
34  
35 with prior research on family traditions and significant role of mothers in raising children [65,  
36  
37 66]. The current study could also have benefited from inclusion of a quantitative assessment  
38  
39 to explore actual behavior change and improvement in oral health after participation in the  
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41 activities. Such an evaluation is also planned within the groups using a participatory approach  
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43 where health promoters will have an active role in distributing health surveys and analyzing  
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45 them together with researchers.  
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54 The presence of a private company among the actors involved in the project may raise  
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56 questions related to conflict of interest. However, the relationship between the private  
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58 company and the research project was mediated by the mutual goal of creating of social value  
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3 for disadvantaged populations. Through their presence in the project, the company aimed at  
4 understanding user needs in order to develop user-driven products and solutions for improved  
5 oral health in socioeconomically distressed communities. The company had no financial gains  
6 through their participation in the research project. The head of their research and development  
7 section was the primary representative of the company in the project. Additionally, the  
8 representative is also a specialist in pediatric dentistry, which made her presence useful since  
9 she could share her valuable knowledge, and experiences with the research team as well as  
10 participants. Previous studies have also considered academic-private partnerships in health  
11 research as an advantage rather than a limitation, because through such partnership emerges  
12 innovative strategies and positive effects which helps achieve higher public health goals [67,  
13 68].  
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## 33 **Conclusion**

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37 The current study highlights the importance of working with the whole family, to ensure  
38 sustainable lifestyle changes. Placing the focus on both the process of change as well as the  
39 action paved ways to explore how families experienced their participation in the activities  
40 offered as well the determinants of behavioral change. Providing mothers and children with  
41 the knowledge and skills to promote oral health behaviors influences not only their immediate  
42 family but also their communities or social groups. However, the success of knowledge  
43 transfer is mediated by the principles of participatory research that strengthens and empowers  
44 individuals thereby building a healthy society decrease from health disparities.  
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## Conflicts of interest

The authors declare no financial, personal or other conflicts of interest.

## Availability of data and materials

The audio recordings analyzed during the current study are not publicly available due to copyrights issues and GDPR regulations but are available from the corresponding author on reasonable request.

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## Authors' Contributions

All authors participated in the design of the study. RR, SB, AO and MR performed the study. RR, MR, SB and EC analyzed the data. RR wrote the manuscript. RR, AK, EC, SB, AO and MR revised the manuscript critically. All authors read and approved the final manuscript.

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# Reporting checklist for qualitative study.

Based on the SRQR guidelines.

## Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the SRQR reporting guidelines, and cite them as:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. *Acad Med.* 2014;89(9):1245-1251.

	Reporting Item	Page Number
<b>Title</b>		
	<a href="#">#1</a> Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g. ethnography, grounded theory) or data collection methods (e.g. interview, focus group) is recommended	1
<b>Abstract</b>		
	<a href="#">#2</a> Summary of the key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results and conclusions	2
<b>Introduction</b>		
Problem formulation	<a href="#">#3</a> Description and significance of the problem / phenomenon studied: review of relevant theory and empirical work; problem statement	3-8

1	Purpose or research	<a href="#">#4</a>	Purpose of the study and specific objectives or	9
2	question		questions	
3				
4	<b>Methods</b>			
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7	Qualitative approach and	<a href="#">#5</a>	Qualitative approach (e.g. ethnography, grounded	11
8	research paradigm		theory, case study, phenomenology, narrative research)	
9			and guiding theory if appropriate; identifying the	
10			research paradigm (e.g. postpositivist, constructivist /	
11			interpretivist) is also recommended; rationale. The	
12			rationale should briefly discuss the justification for	
13			choosing that theory, approach, method or technique	
14			rather than other options available; the assumptions	
15			and limitations implicit in those choices and how those	
16			choices influence study conclusions and transferability.	
17			As appropriate the rationale for several items might be	
18			discussed together.	
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26	Researcher characteristics	<a href="#">#6</a>	Researchers' characteristics that may influence the	16
27	and reflexivity		research, including personal attributes, qualifications /	
28			experience, relationship with participants, assumptions	
29			and / or presuppositions; potential or actual interaction	
30			between researchers' characteristics and the research	
31			questions, approach, methods, results and / or	
32			transferability	
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37	Context	<a href="#">#7</a>	Setting / site and salient contextual factors; rationale	10
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40	Sampling strategy	<a href="#">#8</a>	How and why research participants, documents, or	10-11
41			events were selected; criteria for deciding when no	
42			further sampling was necessary (e.g. sampling	
43			saturation); rationale	
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46	Ethical issues pertaining to	<a href="#">#9</a>	Documentation of approval by an appropriate ethics	15
47	human subjects		review board and participant consent, or explanation for	
48			lack thereof; other confidentiality and data security	
49			issues	
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53	Data collection methods	<a href="#">#10</a>	Types of data collected; details of data collection	11
54			procedures including (as appropriate) start and stop	
55			dates of data collection and analysis, iterative process,	
56			triangulation of sources / methods, and modification of	
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1		procedures in response to evolving study findings;	
2		rationale	
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4	Data collection	<a href="#">#11</a> Description of instruments (e.g. interview guides,	11
5	instruments and	questionnaires) and devices (e.g. audio recorders) used	
6	technologies	for data collection; if / how the instruments(s) changed	
7		over the course of the study	
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11	Units of study	<a href="#">#12</a> Number and relevant characteristics of participants,	10-11
12		documents, or events included in the study; level of	
13		participation (could be reported in results)	
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16	Data processing	<a href="#">#13</a> Methods for processing data prior to and during	14
17		analysis, including transcription, data entry, data	
18		management and security, verification of data integrity,	
19		data coding, and anonymisation / deidentification of	
20		excerpts	
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24	Data analysis	<a href="#">#14</a> Process by which inferences, themes, etc. were	14
25		identified and developed, including the researchers	
26		involved in data analysis; usually references a specific	
27		paradigm or approach; rationale	
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31	Techniques to enhance	<a href="#">#15</a> Techniques to enhance trustworthiness and credibility	14-15
32	trustworthiness	of data analysis (e.g. member checking, audit trail,	
33		triangulation); rationale	
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36	<b>Results/findings</b>		
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39	Syntheses and	<a href="#">#16</a> Main findings (e.g. interpretations, inferences, and	16-22
40	interpretation	themes); might include development of a theory or	
41		model, or integration with prior research or theory	
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44	Links to empirical data	<a href="#">#17</a> Evidence (e.g. quotes, field notes, text excerpts,	16-22
45		photographs) to substantiate analytic findings	
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48	<b>Discussion</b>		
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50	Intergration with prior	<a href="#">#18</a> Short summary of main findings; explanation of how	23-26
51	work, implications,	findings and conclusions connect to, support, elaborate	
52	transferability and	on, or challenge conclusions of earlier scholarship;	
53	contribution(s) to the field	discussion of scope of application / generalizability;	
54		identification of unique contributions(s) to scholarship in	
55		a discipline or field	
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1	Limitations	<a href="#">#19</a>	Trustworthiness and limitations of findings	26-27
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3	<b>Other</b>			
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6	Conflicts of interest	<a href="#">#20</a>	Potential sources of influence of perceived influence on	28
7			study conduct and conclusions; how these were	
8			managed	
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11	Funding	<a href="#">#21</a>	Sources of funding and other support; role of funders in	29
12			data collection, interpretation and reporting	
13				

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16 American Medical Colleges. This checklist was completed on 23. October 2019 using  
17 <https://www.goodreports.org/>, a tool made by the [EQUATOR Network](#) in collaboration with  
18 [Penelope.ai](#)  
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# BMJ Open

## Understanding behavioral changes through community based participatory research to promote oral health in socially disadvantaged neighborhoods in Southern Sweden

Journal:	<i>BMJ Open</i>
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<b>Primary Subject Heading</b>:	Public health
Secondary Subject Heading:	Dentistry and oral medicine, Nutrition and metabolism, Qualitative research
Keywords:	Community child health < PAEDIATRICS, PUBLIC HEALTH, QUALITATIVE RESEARCH, SOCIAL MEDICINE

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3 1 ***Understanding behavioral changes through community based participatory***  
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10 5 ***Rathi Ramji, M Sc.,<sup>1</sup>***

11  
12 6 E-mail: rathi.ramji@mau.se  
13  
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15  
16 8 ***Elisabeth Carlson, RN MNEd, PhD,<sup>1</sup>***

17 9 E-mail: elisabeth.carlson@mau.se  
18  
19  
20 10

21 11 ***Susanne Brogårdh-Roth, DDS, Ph.D.<sup>2</sup>***

22 12 E-mail: susanne.brogardh@mau.se  
23  
24 13

25  
26  
27 14 ***Anna Nilvéus Olofsson, DDS, Odont. Lic.<sup>3</sup>***

28 15 E-mail : anna.olofsson@tepe.com  
29  
30 16

31  
32 17 ***Anders Kottorp Reg. OT, PhD<sup>1</sup>***

33 18 E-mail: anders.kottorp@mau.se  
34  
35 19

36  
37  
38 20 ***Margareta Rämgård PhD<sup>1</sup>***

39 21 E-mail: margareta.ramgard@mau.se  
40  
41  
42 22

43  
44 23 <sup>1</sup> *Department of Care Science, Faculty of Health and Society, Malmö University, Jan Waldenströms*  
45 24 *Gata 25, SE-20506 Malmö, Sweden*

46  
47 25 <sup>2</sup> *Department of Pediatric Dentistry, Faculty of Odontology: Malmö University, SE 205 06, Malmö,*  
48 26 *Sweden*

49  
50 27 <sup>3</sup> *TePe Oral Hygiene Products AB, Bronsåldersgatan 5, SE 213 76 Malmö, Sweden*  
51  
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53 29 ***Keywords:*** Participatory Action Research, Oral hygiene, Dental Caries, Sugar consumption, Migrants

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## Abstract

**Objectives:** Inequalities in oral health have been on the rise globally. In Sweden, these differences exist not between regions, but among subgroups living in vulnerable situations. This study aims at understanding behavioral change after taking part in participatory oral health promotional activity among families living in socially disadvantaged neighborhoods in Southern Sweden.

**Setting:** The current study involved citizens from a socially disadvantaged neighborhood in Malmö, together with actors from the academic, public and private sectors. These neighborhoods were characterized by high rates of unemployment, crime, low education levels and most importantly poor health.

**Participants:** Families with children aged 7–14 years, from the neighborhood were invited to participate in the health promotional activities by a community representative, known as a health promoter, using snowball sampling. Between 8-12 families participated in the multistage focus groups over six months. Data were analyzed using qualitative content analysis.

**Results:** Three main themes emerged from the analysis, providing an understanding of the determinants for behavioral change, including meaningful social interactions, family dynamics, and health trajectories. The mothers in the study valued the social aspects of their participation; however, they believed that gaining knowledge in combination with social interaction, made their presence also meaningful. Further, the participants recognized the role of family dynamics primarily the interactions within the family, family structure and traditional practices as influencing oral health related behavior among children. Participants reported having experienced a change in general health owing to changed behaviour. They started to understand the association between general health and oral health that further motivated them to follow healthier behavioral routines.

**Conclusions:** The results from this study show that oral health promotion through reflection and dialogue with the communities, together with other stakeholders may have the potential to influence behavioral change and empower participants to be future ambassadors for change.

### Strengths and limitations of this study

- Involvement of community members in the development health of promotional activities.
- Working with both parents and children together to promote oral health.
- Triggering knowledge mobilization through reflection and dialogue.
- Partnership between community members and different stakeholders facilitated by health promoters.
- Non- participation of fathers may have been a potential source of selection bias.

## Introduction

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2  
3 65 There has been an overall improvement in oral health of the Swedish population in the past  
4  
5 66 decades owing to the advancements in public dental services and state financed insurance  
6  
7 67 policies [1, 2]. However, large discrepancies in oral health do exist [1, 3-7]. The level of  
8  
9 68 inequalities are not substantially different between regions in Sweden but rather between  
10  
11 69 small areas within the major cities, where there is a concentration of subgroups in marginal or  
12  
13 70 vulnerable situations [3]. These socially deprived groups frequently include heterogeneous  
14  
15 71 populations who differ by their ethnicity, migration status, historical background, culture, and  
16  
17 72 practices related to health, in comparison to the majority population [8]. Oral health  
18  
19 73 disparities have been on the rise owing to challenges such as lack of knowledge and poor  
20  
21 74 social policies, unavailability of context-based information, and most importantly the  
22  
23 75 disconnection between oral and general health [9]. This disconnection is a result of the current  
24  
25 76 dental care system globally, as well as in Sweden, considering merely individual behavioral  
26  
27 77 risk factors while addressing oral health problems. However, socio-cultural as well as policy  
28  
29 78 related aspects are key determinants of not only oral health but also general health and well-  
30  
31 79 being. Health care providers tend to look at diseases in isolation rather than employing a  
32  
33 80 collaborative approach to address health from a broader perspective. Thus widening the gap  
34  
35 81 between oral and general health and increasing the burden of disease among socio-culturally  
36  
37 82 different and disadvantaged subgroups of the population [10-13]

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39  
40 83 Since the early part of the twentieth century, there has been a global drive in reducing health  
41  
42 84 inequalities [14, 15]. Health inequalities in general are associated with various social  
43  
44 85 determinants including living conditions, employment status, childhood conditions as well as  
45  
46 86 aging [16]. These determinants also apply to oral health disparities. Moreover, oral diseases  
47  
48 87 also share risk factors with other non-communicable diseases and are associated with  
49  
50 88 cardiovascular disorders and diabetes [17-22]. According to the World Health Organization  
51  
52 89 (WHO), oral health is an integral part of general health and is fundamental to overall well-

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3 90 being and quality of life. Thus, addressing oral health disparities is an inevitable part in health  
4  
5 91 promotional activities aiming to reduce health disparities [23]. Oral health impairments have a  
6  
7 92 considerable impact on the quality of life of affected individuals both functionally and  
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9  
10 93 esthetically [24-26].

11  
12  
13 94 Poor oral hygiene and excessive or frequent intake of sugar between meals are leading causes  
14  
15 95 for caries and poor oral health in general [27]. The consumption of fermentable carbohydrates  
16  
17 96 containing added sugars have been on the rise, particularly among children and young adults  
18  
19  
20 97 [28]. High consumption of fermentable carbohydrates provokes bacterial action leading to the  
21  
22 98 demineralization of tooth enamel, that might lead to the development of caries [29]. The  
23  
24 99 WHO recommends limiting free sugar intake and replacing it by increasing the consumption  
25  
26  
27 100 of fresh fruits and vegetables, nuts, seeds and wholegrain starch-rich foods, together with  
28  
29 101 practicing good oral hygiene as measures to prevent dental caries, periodontal disease and  
30  
31 102 promote oral health. Tooth brushing with fluoridated toothpaste in combination with a well-  
32  
33 103 balanced diet is the foundation for good oral health [28, 30, 31].

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35  
36 104 Dental caries is one of the most common preventable disease in children globally [23, 32, 33].  
37  
38 105 Cariological risk assessment among younger children is important as caries in early childhood  
39  
40 106 progresses more rapidly since the enamel is thinner in the primary teeth than in the permanent  
41  
42  
43 107 teeth. Caries incidence in preschool age increases the risk of caries in adolescence and later in  
44  
45 108 life [34]. Moreover, caries impairs the quality of life of children by disrupting vital everyday  
46  
47 109 functions [2]. Children with dental caries tend to have poor self-image and self-esteem [21,  
48  
49 110 23, 35]. Furthermore, caries may lead to adverse effects including reduced social interaction,  
50  
51  
52 111 pain, discomfort, disturbances in the development of occlusion, stress and depression [32].  
53  
54 112 According to previous studies, Dental caries has been shown to be twice as common  
55  
56 113 among non-Swedish children and adolescents belonging to socioeconomically distressed  
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58  
59 114 families compared to their Swedish counterparts [1, 3-7]. Determinants for dental caries in



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3 115 immigrant children include parents' education level and ability to assimilate to Swedish  
4  
5 116 dietary conditions since they are not often similar to the dietary patterns of immigrant families  
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7 117 [3]. Parents in a socially vulnerable environment may need community support to establish  
8  
9 118 good dietary and oral hygiene habits, including using fluoride, as part of caries prevention. In  
10  
11 119 vulnerable areas, oral health problems may be part of a number of different social problems  
12  
13 120 and a number of actors in the community, such as maternal care, child health care, and  
14  
15 121 pharmacies may need to make joint efforts to provide health interventions for families with  
16  
17 122 different cultural backgrounds [5-7].

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21  
22 123 The Swedish dental care system has a strong tradition of preventive dental care in children  
23  
24 124 and adolescents. Since the 1960s, there has been a steady decrease in caries prevalence among  
25  
26 125 children owing to the effective and timely preventive measures implemented by the Swedish  
27  
28 126 dental care system. Despite these efforts, caries prevalence is considerably higher among  
29  
30 127 selected subgroups of the Swedish population who are more often from socially  
31  
32 128 disadvantaged backgrounds. Studies based on Eurobarometer surveys have identified that  
33  
34 129 socially disadvantaged populations frequently lack knowledge on self-care, including practice  
35  
36 130 of good oral hygiene, diet and use of fluorides [36]. This is especially true concerning  
37  
38 131 children in disadvantaged communities who experience more caries than their Swedish peers.  
39  
40 132 Swedish dental care including preventive measures and treatment are provided free until the  
41  
42 133 age of 23. Nevertheless, these efforts have been insufficient in providing dental care without  
43  
44 134 disparities. Children from socially disadvantaged settings are less regularly attending these  
45  
46 135 visits. There has been a lower level of utilization of dental care despite the increased need  
47  
48 136 among socially disadvantaged migrant groups [1, 3, 4]. Oral health behaviors are mediated to  
49  
50 137 children through their parents with the support of the regional dental care [3, 4]. Often  
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52 138 immigrant parents are unaware of the support services that are available due to recognized  
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54 139 practical barriers such as language difficulties and health literacy. Parents also have different  
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3 140 expectations from the health care system, which are based on their experiences from their own  
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5 141 home country [37, 38].  
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8 142 Most of the information available in the Swedish dental care is evidence-based, but lacking  
9  
10 143 contextual adaption. Traditional values and family practices influences the attitude towards  
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12 144 health and how communities value oral health as well as what is considered as a standard for  
13  
14 145 good health [3, 4, 37]. An understanding of specific populations, their socio-economic  
15  
16 146 position, the influence of their traditional practices and above all the influence of all of these  
17  
18 147 factors on their health behavior is necessary to improve utilization of dental care in socially  
19  
20 148 disadvantaged groups. This will in turn contribute to reduced oral health disparities [3, 4, 6, 9]  
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25 149 There is an acute need for appropriate interventions and services to effectively address the  
26  
27 150 oral health disparities of the underserved. These interventions must be culture and context  
28  
29 151 sensitive novel oral health promoting solutions and not merely based on the views of the  
30  
31 152 concerned, but rather influenced by the active participation of the populations in need [39].  
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34 153 Active participation by representatives from the target groups is crucial for reducing the gap  
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36 154 in knowledge as well as tackling and allocating resources that support specific community  
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38 155 needs [40].  
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42 156 Community based participatory research (CBPR) is one such a method, which focuses on  
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44 157 addressing the determinants of health from a social as well as environmental perspective  
45  
46 158 through active engagement of the community members and other concerned actors throughout  
47  
48 159 the research process [40]. Taking into account specific social requirements and increasing  
49  
50 160 community engagement to improve health, CBPR has emerged as an alternative paradigm for  
51  
52 161 health and social research [39, 40]. CBPR is considered a significant part of translational  
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54 162 research, which helps to improve the health of specific communities, eliminate inequality and  
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56 163 achieve equality in health through community empowerment [41]. The principles of CBPR  
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3 164 are based on core concepts including, partnership and co-learning, capacity building or  
4  
5 165 training community members to become future health ambassadors, knowledge production  
6  
7 166 for societal transformation and prolonged commitment which facilitates achieving higher  
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9  
10 167 level goals like reducing disparities [39]. CBPR is a systematic effort to integrate active  
11  
12 168 participation by the community in the process of decision making by creating a mutual  
13  
14 169 understanding of local phenomena and practices specific to the community which contributes  
15  
16  
17 170 to the development of innovative strategies to promote social change [40]. Empowerment has  
18  
19 171 been considered critical in the CBPR process although the phenomenon was not frequently  
20  
21 172 explored while evaluating CBPR based health promotional activities. Empowerment is  
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23  
24 173 defined as the ability to control one's own life especially in relation to own health and well-  
25  
26 174 being [42]. Studies addressing oral health disparities focusing on diet and oral hygiene using  
27  
28 175 the CBPR approach involving multiple actors from the community, public sector, private  
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30 176 sector as well as non-profit organizations are sparse.

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32  
33 177 The current study was part of a larger project Health Promoting Innovation in Collaboration.  
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35 178 The aims of the main project was to develop and study health-promoting activities based on  
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37 179 participatory research methods. Focus group interviews based on CBPR principles were  
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40 180 conducted with residents in a socially disadvantaged neighborhood in 2016. The interviews  
41  
42 181 aimed at identifying measures to improve health among the residents. During the discussions,  
43  
44 182 the citizens in the neighborhood identified several problem areas where they needed help,  
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47 183 including poor oral health, lack of access to physical activity, poor mental health, and lack of  
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49 184 knowledge concerning health and healthy behaviors.

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52 185 Health promotional activities were held as part of the larger project focusing on the challenges  
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54 186 identified by the community members. The health promotional activities targeted behavioral  
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57 187 change through knowledge mobilization using a participatory design focusing on key factors  
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59 188 such as empowerment [40]. Knowledge mobilization is a process where reciprocal and

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3 189 complementary knowledge is shared between multiple actors, to promote multidirectional co-  
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5 190 construction of knowledge. The basis for knowledge mobilization is interactions  
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8 191 that create knowledge and reflections during and after the interactions that facilitate sense-  
9  
10 192 making of the acquired knowledge [40]. Community members participated in all stages of the  
11  
12 193 project including planning, implementation and evaluation. Representatives from the  
13  
14 194 neighborhood, known as health promoters, were integral in coordinating the activities in the  
15  
16 195 different workshops. In an international context, they are known as culture brokers, and their  
17  
18 196 role has been proven promising in participatory research driven initiatives [43, 44]. However,  
19  
20 197 the health promoters working in this project had a unique role since they were educated in  
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22 198 participatory research methods. These health promoters were instrumental in identifying and  
23  
24 199 recruiting participants, assisting with language interpretation and most importantly to inform  
25  
26 200 the research team about the cultural nuances of the community.  
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31 201 As members of the community, they also had deep knowledge and experience of the  
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33 202 common problems faced by these communities particularly in relation to access to health care  
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35 203 [43].  
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39 204 Oral health was one of the challenge areas identified by the community and addressed among  
40  
41 205 the activities initiated as a part of the larger project. This was considered a priority area since  
42  
43 206 dental caries was on the rise in families with young children. The initiatives focused on oral  
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45 207 hygiene, the role of fluoride as well as diet since the residents also perceived a lack of access  
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47 208 to personal advice on diet and health in their area.  
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51 209 *The aim of the current study was to explore the behavioral change initiated by a*  
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53 210 *participatory community based health promotion targeting oral health in children and*  
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55 211 *parents living in a socially disadvantage neighborhood in Southern Sweden.*  
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## 213 **Method**

### 214 **Context**

215 The current study was based in a socially distressed neighborhood located in Malmö city in  
216 Southern Sweden. The majority of the population living in this neighborhood are non-  
217 Swedish speaking. According to a report from the Swedish Intelligence Unit, this  
218 neighborhood has been considered one of the fifteen most vulnerable localities in the country  
219 [45]. The report also highlights challenges like high rates of unemployment, crime, low  
220 education levels and poor health among residents which was also supported by prior research  
221 concerning high incidence of risky health behaviors among citizens in this neighborhood [46,  
222 47].

### 223 **Participants and Actors**

224 The health promoter involved with the oral health related activities sent information about the  
225 activities two weeks ahead of the first meeting and invited families with children between 7-  
226 14 years to participate in the meetings. Initially a few families identified by the health  
227 promoter volunteered to participate during the first session. More participants were later  
228 recruited through purposeful snowball sampling, mainly through spreading information  
229 through word of mouth. A total of 12 families were regularly involved in the activities.  
230 Although no specific demographic information was collected from the parents concerning the  
231 family structure, parental educational status and employment, it emerged from the discussions  
232 that quite a few of the mothers in the group were employed. Almost all families had three  
233 children, aged between 2 years – 12 years. Most of the families were from Middle Eastern  
234 countries such as Iraq, Iran, Syria and Lebanon. During the initial meetings, children were  
235 present together with their fathers and mothers. Eventually only the mothers participated  
236 regularly together with their children. There were 8-12 mothers during each of these 9

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3 237 sessions and about 15 children during each meeting (See Figure 1). Each meeting lasted for  
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5 238 about two hours with 15 minutes break after the first hour.  
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8 239 Please include figure 1 about here  
9

10  
11 240 Aside from the participants and academic partners, the research team included representatives  
12  
13 241 from the public and private sectors as well as non-profit organizations affiliated to the project  
14  
15 242 such as the Primary care, Pharmacy, Save the Children and TePe Oral Hygiene Products. Not  
16  
17 243 all actors were however present in all meetings; their presence was determined by the theme  
18  
19 244 discussed on the different occasions. The presence of a private company among the actors  
20  
21 245 involved in the project may raise questions related to conflict of interest. However, the  
22  
23 246 relationship between the private company and the research project was mediated by the  
24  
25 247 mutual goal of creating of social value for disadvantaged populations. Through their presence  
26  
27 248 in the project, the company aimed at understanding user needs in order to develop products  
28  
29 249 and solutions for improved oral health in socioeconomically distressed communities. The  
30  
31 250 company had no financial gains through their participation in the research project. The head  
32  
33 251 of their odontology and scientific affairs section was the primary representative of the  
34  
35 252 company in the project. Additionally, the representative is also a specialist in pediatric  
36  
37 253 dentistry, which made her presence useful since she could share her valuable knowledge, and  
38  
39 254 experiences with the research team as well as participants. Previous studies have also  
40  
41 255 considered academic-private partnerships in health research as an advantage rather than a  
42  
43 256 limitation, because through such partnership emerges innovative strategies and positive  
44  
45 257 effects which helps achieve higher public health goals [48, 49].  
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### 53 258 **Patient and Public Involvement**

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56 259 The CBPR approach not only promotes involvement of the citizens of the community, but  
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58 260 also relevant representatives of public and private organizations together with academic  
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3 261 researchers in power-balanced environment while working to identify and implement  
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5 262 contextually relevant health promotional activities to promote behavioral change.  
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### 8 263 **Design**

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11 264 The current study is a participative action research study with a qualitative approach where  
12  
13 265 multistage focus group interviews were the mode of data collection. Multistage focus groups  
14  
15 266 are characterized by the same group of persons exploring different themes during several  
16  
17 267 meetings [50]. This method was inspired by Paul Freire's culture circles where the aim is to  
18  
19 268 foster a participatory experience with an emphasis on dialogue and reflective action in  
20  
21 269 response to an emancipatory health education [51]. The power relations are balanced within  
22  
23 270 the circle, where one-person facilitates the discussions and debates by initiating the process.  
24  
25 271 The facilitator then leaves it to the group to take responsibility for the progress in the inquiry  
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27 272 process through self-reflections and sharing individual knowledge and experiences with each  
28  
29 273 other. The dialogues help elevate the participants' experiences to a higher level of abstraction.  
30  
31 274 The focus groups deduce individual learning, as well as collective ways of thinking through  
32  
33 275 reflection and dialogue within the group. During each meeting, the participants try to identify  
34  
35 276 a common problem in the community, explore the problem further to identify resources and  
36  
37 277 solutions while simultaneously implementing them to bring about transformation [51, 52]. As  
38  
39 278 a first step in this process, the participants gained knowledge from experts like dieticians,  
40  
41 279 nurses or dentists, in the form of a dialogue exchange. Some examples of the topics selected  
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43 280 by the participants include discussions on sugar content in their routine diet and possible  
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45 281 healthy alternatives to it (with a dietician). Pediatric nurses provided information regarding  
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47 282 psychosocial support for behavioral change. The dental experts in this study were present  
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49 283 during all occasions and added knowledge concerning oral hygiene, fluoride and the role of  
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51 284 diet in relation to oral health.  
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## 285 **Data Collection**

### 286 *Preliminary meeting*

287 The families who agreed to participate met at nine different occasions once in two weeks over  
288 a period of six months beginning in September 2018. The first step in the multistage focus  
289 groups was to understand the participants' perceptions on oral health. Prior to the initiation of  
290 the actual activity sessions, the research team used a participatory research approach  
291 photovoice, to assess the complex phenomenon of diet from a sociocultural perspective  
292 among children. In this method, photography was used as a tool to understand the factors  
293 surrounding the actual problem in consideration, from within the context of the participants.  
294 This is also a form of qualitative research where the photos act, as a focal point to initiate  
295 discussion and promote better understanding of participants needs. This method helps  
296 overcome language and communication barriers and enhances discussions within the group  
297 [53, 54].

298 The children were requested to bring pictures of healthy and unhealthy food and discussions  
299 were initiated based on their photos. In addition, they were also asked to take pictures of their  
300 toothbrush, as a base for discussing oral hygiene habits. The children sent the photographs via  
301 WhatsApp to the health promoter a few days prior to the scheduled introductory meeting.  
302 Photographs sent by the children were compiled, printed and later presented to the children  
303 for review together with the rest of the group. One of the team members initiated the  
304 discussion with the children using the pictures they sent and led the discussions.

305

### 306 *Actions points from the preliminary meeting*

307 Through the discussions during the preliminary meeting, it emerged that the children  
308 consumed a high amount of sugar as part of their daily diet. The children also expressed a



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3 309 dislike for the lunch served at school. It came to be known that most of the children did not  
4  
5 310 eat breakfast owing to time constraints, family situation and cultural aspects. Through  
6  
7 311 discussions with parents, it was understood that they had limited control over their children's  
8  
9 312 dietary choices. Regarding oral health and oral hygiene children frequently visited the dentist  
10  
11 313 when they suffered pain, some had fillings and a few even had teeth extracted in early  
12  
13 314 childhood. Concerning oral hygiene, there was a lack of awareness of fluoride use and its  
14  
15 315 importance for oral health among children. It appeared that despite suffering tooth decay they  
16  
17 316 were not informed about the role of fluorides in caries prevention. The session was followed  
18  
19 317 by a debriefing and discussion with parents to understand their concerns about oral health of  
20  
21 318 their children and the families in general. It emerged that parents were not satisfied with the  
22  
23 319 tooth brushing carried out e by their children. The children did not permit parents to help  
24  
25 320 them with brushing despite being advised by the dentist or dental hygienist. In conclusion,  
26  
27 321 parents felt the need for dietary advice focusing on the different meals, breakfast, lunch and  
28  
29 322 dinner. In addition, they also wanted to gain more knowledge on oral hygiene habits. They  
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31 323 preferred all sessions to be in the presence of the children since they would follow the advice  
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33 324 of others better than they would do if the parents told them the same thing.  
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40 325 In the consecutive occasions, dialogue-based teachings or reflective dialogues were facilitated  
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42 326 by experts in the related fields to address different challenges that emerged in the first  
43  
44 327 meeting. Behavioral change in children through educating parents was also driven by the  
45  
46 328 reflective dialogues. Previous studies [55] state that reflective dialogue-parental education is  
47  
48 329 an effective method to enhance parental awareness and improve parenting skills. This is  
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50 330 achieved through confidence building, which is promoted, by social support and peer  
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52 331 influence. The discussions in the group were predominantly held in Swedish and interpreted  
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54 332 in Arabic by the health promoter for the benefit of some parents who could not speak  
55  
56 333 Swedish. At the beginning of every meeting, families had the opportunity to provide feedback  
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3 334 from the previous session. They also discussed their ability to make changes inspired by what  
4  
5 335 was learnt from their participation and the challenges faced in doing so. All discussions were  
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7 336 audiotaped with the consent of the families. A member of the researcher team also acted as an  
8  
9 337 observer and was responsible for taking notes during each meeting.  
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### 16 339 **Data Analysis**

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19 340 One team member [RR] reviewed audio recordings repeatedly to develop a content log of the  
20  
21 341 discussions as well as summary. Listening to the recordings, several times facilitated rapid  
22  
23 342 identification of codes together with the help of the observational notes. Two other members  
24  
25 343 from the research team who were not involved in the data assimilation process listened to the  
26  
27 344 recordings to complement the preliminary analysis performed by the first researcher [EC,  
28  
29 345 MR]. Following this, the researchers discussed and reflected on their findings together and  
30  
31 346 came to consensus over a final list of codes which were finally confirmed by [SBR]. The  
32  
33 347 discussed codes were placed under categories and each category was further defined in detail  
34  
35 348 to identify overarching themes. While data extraction was done using rapid identification of  
36  
37 349 themes from audio recordings (RITA) method, qualitative content analysis with an inductive  
38  
39 350 approach [56], was used to identify themes relevant to the research goals. The RITA method  
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41 351 has previously been established as a method that yields prompt and detail results from  
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43 352 qualitative data while also being less time consuming and less labor intensive [57-59].  
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### 52 354 **Qualitative Rigor**

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55 355 Results from qualitative studies are evaluated based on certain criteria such following Guba  
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57 356 and Lincoln's criteria [60] as factors that predict the authenticity of the results. According to  
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59 357 these criteria, the quality of results depends on the methods of data collection and the  
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3 358 technique of data interpretation. The current study is built on the CBPR principles of co-  
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5 359 learning and sharing thereby holding the contact between the researcher and community  
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7 360 member's closer; thus, enabling better understanding and interpretation of information  
8  
9 361 provided. Furthermore, the involvement of the health promoter at the different stages of the  
10  
11 362 research process ensured open communication. This provided an opportunity for the  
12  
13 363 participants to share trustworthy accounts of experiences to other members in the group  
14  
15 364 ensuring credibility. The research team made observational notes describing the context to  
16  
17 365 support the audiotaped data, which contributed to transferability of the findings.  
18  
19 366 Dependability was attained by involving a third researcher who was not involved in the initial  
20  
21 367 data collection and analysis to review the coded data. To achieve confirmability, the third  
22  
23 368 member from the research team rechecked audio recordings and the observational notes in  
24  
25 369 iterations. Findings were shared with participants and reconfirmed when necessary.  
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27 370 Issues related to reflexivity was address using constant communication with the participants  
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29 371 after each meeting, through peer debriefing, as well as triangulation by including several  
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31 372 members in the research team in the focus groups as well as analysis of audio recordings.  
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33 373 Self-reflexivity or personal reflexivity of the members of research team was considered rather  
34  
35 374 positive since it gave the possibility for the team to reflect on power and privilege issues in  
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37 375 relation to the context. This is also in line with guidelines indicated by prior work in  
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39 376 participatory research [61].  
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### 378 **Ethical Considerations**

379 The Regional Ethical Review Board in Lund approved the study (DNR 2016/824). All  
380 participation was voluntary, and the participants were informed that they could leave the  
381 discussions at any time without any explanation or consequences. The parents received  
382 detailed information regarding the purpose and nature of the study, and were requested to

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3 383 provide written informed consent before enrollment. Parents were requested to consent their  
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5 384 own as well as their children's participation. All invited participants consented both their own  
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7 385 participation as well as that of their children. The children also gave a verbal consent.  
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9 386 Participants were ensured confidentiality at the time of data collection. In addition,  
10  
11 387 participants were also informed that all results were to be presented abstracted and presented  
12  
13 388 at a group level and no individual shall be identifiable through their expressions in neither  
14  
15 389 reports nor scientific articles that emerge from this study. This information was explained  
16  
17 390 verbally, as well as, included in the information letter that they received when they signed the  
18  
19 391 informed consent. Considering the nature and design of the multistage focus group, it may be  
20  
21 392 difficult to ascertain confidentiality however, the research team explained to the mothers  
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23 393 concerning this and requested them to refrain from discussing sensitive or personal opinions  
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25 394 shared in the group elsewhere.  
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## 404 Findings

405 Three main themes including meaningful social interactions, family dynamics, and health  
406 trajectories were identified on exploring reflective thoughts and discussions in the focus  
407 groups with an aim to understand the process of changed behavior within the group.

### 408 *Meaningful social interactions*

409 The mothers reported in the beginning that they agreed to participate in this study since they  
410 trusted the health promoter. However, after a few meetings they began to enjoy the social  
411 aspects of being with new people especially since they would otherwise sit idly at home.

412 *“In the beginning I came here because we knew the “health promoter”. After coming here a  
413 few times, we started to interact with the others in the group. Now we do activities outside of  
414 this group, for example we go out on picnics or barbeque together. Coming here and meeting  
415 people is definitely better than sitting idle.” (Mother of child aged 9 years, Meeting 8)*

416 Although the mothers enjoyed the social aspects during the initial meetings, they began to  
417 look forward to interactions that were more purposeful and considered gaining knowledge as  
418 primary focus.

419 *“It is not just for meeting others. It is good that I get information about healthy food and what  
420 a good breakfast is for both my children and me. I just do not go there every time to meet  
421 someone else. We can do that in a different way.” (Mother of children aged 2-11 years,  
422 Meeting 8)*

423 The mothers in the group believed that the discussions and information they received were  
424 better than what they had received from the nurses at the primary care. They highlighted the  
425 importance of being in a group in the learning process since the discussions were interactive  
426 and not controlled or determined by the facilitators or field experts

1  
2  
3 427 *“When we meet a nurse at a primary care center, they sound tired and disinterested and*  
4  
5 428 *hence do not provide the same information we get here. It was not of good quality neither*  
6  
7 429 *educational nor motivating as we do here within the group.” (Mother of children aged 6-10*  
8  
9 430 *years, Meeting 6)*

10  
11  
12  
13 431 The mothers felt that they were given not only the opportunity to gain new knowledge and  
14  
15 432 learn, but also the possibility to discuss and share their own knowledge and experiences. They  
16  
17 433 also gave and received tips from each other within the group.

18  
19  
20 434 *“It was not just a lecture, we got to ask, discuss and learn from the experts and from each*  
21  
22 435 *other. It was fun to give tips and suggestions to each other based on our experiences.”*  
23  
24 436 *(Mother of children aged 2-11 years, Meeting 7)*

25  
26  
27  
28 437 Some of the mothers were unsure from the beginning if they could make changes to their diet.  
29  
30 438 After participation for a few weeks, they felt motivated and gradually started to make  
31  
32 439 changes.

33  
34  
35  
36 440 *“In the beginning I was drinking 5-6 liters of juice a day, after being here I have reduced it to*  
37  
38 441 *1 liter per week. I initially thought that I can't but when I was told about the sugar content of*  
39  
40 442 *the juice and learnt about others changing their dietary patterns, I too decided to change.”*  
41  
42 443 *(Mother of children aged 6-12 years, Meeting 7)*

43  
44  
45  
46 444 Towards the end of the sessions, several mothers expressed their interest in communicating  
47  
48 445 the knowledge they gained to the rest of the community, as they believed that the information  
49  
50 446 was important. They even went a step further and mentioned that they would like to join the  
51  
52 447 research team in the future to support the mission to improve oral health among the  
53  
54 448 population in the neighborhood.

55  
56  
57  
58 449 *"I want to be one among your team, you are few and there are many people who need help so*  
59  
60 450 *I want to help others as you do." (Mother of children aged 2-11 years, Meeting 8)*

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2  
3 451 Children in the group were also interested in spreading their knowledge to their friends and  
4  
5 452 classmates. One of the children in the group had already begun speaking about sugar intake  
6  
7 453 and oral health to his class.  
8  
9

10 454 *"I told my classmates about why eating sugary things is harmful and how sugar affects the*  
11  
12 *teeth. My teacher was impressed with me and wanted me to share more information in the*  
13 455 *class after each meeting."* (Child 11 years, Meeting 6)  
14  
15 456  
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18 457

### 21 458 **Family dynamics**

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23  
24 459 The role of individual members in the family, bonding and interactions between family  
25  
26 460 members together with socio-cultural or traditional values carried within the family, influence  
27  
28 461 lifestyle and behavior of the children. Acculturation and migration also have an influence on  
29  
30 462 the relationship between children and parents, specifically mothers. Thus, a sustainable  
31  
32 463 change in diet of children is influenced by family dynamics.  
33  
34  
35

36 464 Mothers in this study perceived that they had important responsibilities but were merely  
37  
38 465 limited to executing actions with little influence on decision-making. This was considered as  
39  
40 466 direct challenge in promoting dietary changes in the family.  
41  
42  
43

44 467 *"I am a woman I can decide only for myself, I cannot tell my husband what he has to eat. My*  
45  
46 468 *children eat what their father eats. I drink a lot of tea and my children drink tea too. It is our*  
47  
48 469 *tradition."* (Mother of children aged 3-14 years, Meeting 2)  
49  
50

51 470 Children in the families acknowledged their traditional practices and consumed high amount  
52  
53 471 of sugar as part of it. They believed that following parent's action was also associated with  
54  
55 472 culture.  
56  
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58  
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1  
2  
3 473 *"We drink tea as a family in the evenings and during weekend. I cannot drink tea without*  
4  
5 474 *sugar in it. I usually put four teaspoons of sugar in my tea. That is how my parents drink too.*  
6  
7 475 *It is a cultural thing."* (Child aged 9 years, Meeting 1)

8  
9  
10 476 From the discussions with the children, it emerged that they were often alone when they ate  
11  
12 477 breakfast so they ate whatever they found in their refrigerators.

13  
14  
15 478 *"I eat breakfast alone and I eat whatever is available in the refrigerator. I mostly eat bread*  
16  
17 479 *with Nutella, as it is easy to make. My mother goes to work and my father is still sleeping*  
18  
19 480 *then. My brother never helps me even if I ask."* (Child aged 8 years, Meeting 3)

20  
21  
22  
23 481 Some mothers believed they could not provide enough attention to their children's diet due to  
24  
25 482 lack of time and a stressful life in Sweden. Mothers also believed that fathers could not help  
26  
27 483 children, as well as, the mothers as men have low involvement in the upbringing of children.  
28  
29 484 After participation in the activities, the mothers found a solution to this through the tips they  
30  
31 485 got from fellow participants.

32  
33  
34  
35 486 *"I leave early to work and my children eat breakfast by themselves. My husband cannot*  
36  
37 487 *prepare food and take care of the children, sometimes he forgets everything, he miss to put on*  
38  
39 488 *their wooly caps in winter. It is cultural"* (Mother of children aged 6-10 years, Meeting 2)

40  
41  
42  
43 489 Mothers valued the involvement of children in the activities since they recognized changes in  
44  
45 490 children's behavior at home after participation. Children were more cautious about their diet  
46  
47 491 and sought their parents' help while brushing their teeth, which they refused to do previously.

48  
49  
50  
51 492 *"The good thing is that we got to be here with our children, and that they also got to listen*  
52  
53 493 *and learn. They have become more responsible at home; my son does not want to eat as many*  
54  
55 494 *bananas as he did earlier because he has learned that it has more sugar. He wants me to help*  
56  
57 495 *him brush his teeth; he would never allow me to do it before even if I insisted."* (Mother of  
58  
59 496 *children aged 2-11 years, Meeting 5)*



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2  
3 497 Mothers were initially unsure about influencing the diet and lifestyle of their spouses, but  
4  
5 498 when they made changes for themselves their husbands chose to do so too. In some  
6  
7 499 households, women brought home information material from the meetings to convince their  
8  
9 husbands.  
10  
11

12  
13 501 *"At first I thought it might be hard for me to influence my husband, but when I changed my*  
14  
15 502 *own diet he chose to change his too," (Mother of children aged 2-11 years, Meeting 8)*

16  
17  
18 503 *"When I told him about sugar content in each food and showed the sugar brochure my*  
19  
20 504 *husband was shocked and immediately decided to change." (Mother of child aged 11 years,*  
21  
22 *Meeting 8)*

23  
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### 27 28 29 507 **Health trajectories**

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31  
32 508 When the mothers initially volunteered to participate in the activity and attended the  
33  
34 509 meetings, they were concerned about their children's oral health behavior and diet. From the  
35  
36 510 initial discussions with parents and children it emerged that children frequently consumed  
37  
38 511 sugar in form of candies, juices and tea with sugar, which was a part of their tradition. Parents  
39  
40 512 were also worried since children frequently complained of toothache and some of them had  
41  
42 513 several fillings or a lost tooth.

43  
44  
45  
46 514 Some parents even believed that they needed some amount of added sugar for normal body  
47  
48 515 function. Parents were unable to monitor and control their children's' sugar intake.

49  
50  
51 516 *"I must have juice in the refrigerator all the time because my children want to drink juice*  
52  
53 517 *once every hour. I cannot say no to them because they will not eat anything else. I can't help*  
54  
55 518 *but buy juice as I also like it." (Mother of children aged 6-12 years, Meeting 1)*

1  
2  
3 519 After participation in the activities, mothers reported a sense of satisfaction and relief since  
4  
5 520 they were able to take control over their situation and bring about change, promoting a  
6  
7 521 healthier lifestyle for their children. This in turn made them happier and they slept better.  
8  
9

10 522 *"I felt bad when I realized that it was me who bought juice and sweets. I understood that if I*  
11  
12 523 *stop buying things it would help my family. Since I did that, I sleep better because I know I*  
13  
14 524 *have provided healthy food to my children."* (Mother of children aged 6-12 years, Meeting 8)  
15  
16  
17

18 525 Children in the group were particularly excited about learning to brush their teeth from  
19  
20 526 experts and the use of different kind of toothbrushes. They also spoke about the relationship  
21  
22 527 between healthy teeth and healthy living after participation in the discussions.  
23  
24  
25

26 528 *"It was fun to see all the different brushes. I never knew there existed so many. I learnt to*  
27  
28 529 *brush my teeth. I think that we must brush our teeth well since it makes us feel healthy."*  
29  
30

31 530 *(Child aged 8 years, Meeting 7)*  
32  
33

34 531 Mothers began to understand the influence of diet on their health more distinctly after  
35  
36 532 participation in the activities. Mothers reported change in self-perceived health owing to  
37  
38 533 behavioral change after participation in the activities.  
39  
40

41 534 *"Since I made changes to my diet, I started feeling fresher and healthier. I was at the doctor*  
42  
43 535 *last week and he was surprised because I have lost weight."* (Mother of child aged 9 years,  
44  
45

46 536 *Meeting 8)*  
47  
48

49 537 Participants began to understand the connection between oral health and general health and  
50  
51 538 well-being after having participated in the activities.  
52  
53

54 539 *"Through participation in this activity I have learned about the connection between oral*  
55  
56 540 *health with general health. I have actually seen a change in my physical health."* (Mother of  
57  
58 541 *children aged 2-11 years, Meeting 8)*  
59  
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## 542 Discussion

543 Participation in the health promotional activities led to changed oral health related behaviour,  
544 and appeared to empower mothers and children, to gain control over their health, which in  
545 turn extended into the entire family as illustrated in the main findings social interactions,  
546 family dynamics and health trajectories. The analysis also draws on Zimmerman's (1995)  
547 definition of psychological empowerment, which includes the dimensions of people's  
548 perceived control of their lives related to their level of participation in community change  
549 [62].

550 The current study shows that a participatory dialogue and reflection, targeting behavioral  
551 change considering the actual needs of the community may initiate lifestyle changes among  
552 socially disadvantaged immigrant families compared to mere personal dietary counselling in  
553 primary care centers or at the dental clinics. This is in line with a previous study [63] which  
554 shows that dietary counselling offered by health care workers is frequently inconsistent,  
555 unclear - and beyond all - not culturally tailored and hence not effective in promoting dietary  
556 changes. On the other hand, in participatory research, participants are engaged in a  
557 collaborative process of social transformation, which enhances the possible uptake of  
558 knowledge through reflection within a social circle [64]. The role of mothers as important  
559 channels for behavioral change in the families is in line with a previous study based on oral  
560 health educational interventions involving immigrant families with children living in  
561 Australia [65]. However, the intervention offered in the Australian study was a predetermined  
562 intervention, unlike in the case of this study were the participants determined the health  
563 promotional activities. In addition, the health promotional activities in the current study was  
564 implemented over a longer period with frequent visits and involved children aged 7-14 years  
565 in contrary to the Australian study where the intervention was provided for 3-4 weeks and  
566 children of younger age (1-3 years) were included. Involving older children in the discussions

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3 567 offered an additional benefit, as they were also active during the sessions, had the opportunity  
4  
5 568 to ask questions, learn from experts, and thereby made changes in their lifestyle.  
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8 569 The interaction between individuals in a group appeared to exert a strong influence on the  
9  
10 570 behaviors, which was beyond the mere social aspect of meeting people to break isolation. The  
11  
12  
13 571 process involved utilization of collective knowledge to bring about changes in daily life  
14  
15 572 through mutual sharing and motivating each other. These results are in line with discussions  
16  
17 573 in a review study [66] that shows that participation in interactive lifestyle interventions in  
18  
19 574 small groups better promotes behavioral and lifestyle changes. This is because individuals in a  
20  
21 575 group are often in similar situations and through being role models to each other even the  
22  
23 576 harder to convince participants in the group tend to change [66]. Similarly, according to an  
24  
25 577 earlier study , social interaction between children is known to help in shaping their cognition,  
26  
27 578 altering their attitudes, beliefs as well as understanding of reality that in turn promotes  
28  
29 579 behavioral changes [67].  
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34 580 The finding from the current study are in line with a previous study which describes the  
35  
36 581 process of change in parental conception following reflective dialogues which facilitated  
37  
38 582 behavioral changes in four stages including awareness of one's current conception,  
39  
40 583 dissatisfaction with one's current conceptions, support and understanding from others,  
41  
42 584 exposure to alternate ways, opportunities for encouragement and reflection [55]. According to  
43  
44 585 Freirean principles which states that the consequence of offering knowledge via dialogue as a  
45  
46 586 tool enhances individuals control over self and their beliefs thereby leading to self-  
47  
48 587 empowerment [68] and such an empowerment may result in behavioral change [69]. These  
49  
50 588 principles were exemplified in the current study where the mothers in the group became  
51  
52 589 conscious and aware of what constituted the meals they served their families through  
53  
54 590 reflecting on the images of their own breakfast during the initial meeting. Further, through  
55  
56 591 participation in the group meetings they realized that they had a significant role in promoting  
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3 592 healthier diet to the rest of their family. Despite being frustrated in the beginning, they  
4  
5 593 eventually found support from other participants in the group who were in similar situations.  
6  
7 594 The support, understanding, mutual respect and caring shared among each other in the group  
8  
9 595 tended to have made the mothers psychologically stronger to accept the fact that their families  
10  
11 596 did not consume healthy diets. They began welcoming alternative conceptions that they were  
12  
13 597 exposed to both from the different actors providing knowledge as well as through interaction  
14  
15 598 with other members in the group with varying perceptions. Over time, the participants  
16  
17 599 progressed from a stage of seeking knowledge to sharing knowledge through providing tips to  
18  
19 600 one and another as well as to their friends and relatives in the community. The mothers  
20  
21 601 expressed a feeling of confidence in self and appeared to be empowered after participation,  
22  
23 602 which they were lacking in the beginning of the study when they really felt powerless due to  
24  
25 603 their inability to take control over their children's oral health related lifestyle.  
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## 34 605 **Practical Implications**

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38 606 It became known through this study that brochures and health education material used in the  
39  
40 607 Swedish health care were adapted to the Swedish context and were considered less useful for  
41  
42 608 needy communities. The participants believed that educational material showing sugar  
43  
44 609 content in various food products would help understand sugar intake among families in  
45  
46 610 socially disadvantaged neighborhoods. As a part of the activities, participants learnt to read  
47  
48 611 and understand the ingredients list printed on the package of different food products. They  
49  
50 612 also learnt to convert the quantity of sugar in grams to sugar cubes, which helped them  
51  
52 613 communicate and spread the knowledge they gained. Participants gathered photographs of  
53  
54 614 food products and some culturally specific dishes which they wanted to include in a new  
55  
56 615 brochure. Together with the actors in the research team and a dietician, the participants  
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3 616 developed a sugar brochure. The sugar brochures were printed in multiple copies by TePe and  
4  
5 617 distributed to the participants. The brochure was also shared with the primary care, dental care  
6  
7 618 and pharmacy for further dispersal of the material. The participants, both mothers and  
8  
9 619 children found the brochure as a concrete tool for informing their family and friends in the  
10  
11 620 community about the harmful effects of sugar consumption. The mothers in the group became  
12  
13 621 oral health ambassadors in the community and started an initiative “Fight against sugar  
14  
15 622 intake”. They organized small gatherings with other women in the community to talk about  
16  
17 623 the knowledge they gained from their participation in this study, together with the help of the  
18  
19 624 brochure. Some of the children in the group who expressed interest to learn more about oral  
20  
21 625 health, diet and healthy lifestyle were specially educated by experts from TePe over a period  
22  
23 626 of one month with one lecture a week. After participation in the educational sessions, the  
24  
25 627 children were certified as child oral health ambassadors. These child oral health ambassadors  
26  
27 628 began spreading their knowledge in their respective schools.  
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## 38 **Limitations**

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41 631 The current study could have been complemented with a quantitative assessment to explore  
42  
43 632 changes in oral health related behaviours after participation in the activities. Such an  
44  
45 633 evaluation is planned with this group using a participatory approach where health promoters  
46  
47 634 will have an active role in distributing health surveys and analyzing them together with  
48  
49 635 researchers.  
50  
51  
52

53 636 Another potential limitation in this study is the non-participation of fathers, which may have  
54  
55 637 introduced a selection bias. This however does not undermine the value of the findings from  
56  
57 638 this study. Fathers in this study decided not to participate in the activities since mothers had  
58  
59 639 the primary role of raising children and steering their behavior in these communities. This is  
60

1  
2  
3 640 also in line with prior research on family traditions and significant role of mothers in raising  
4  
5 641 children [70, 71]. A notable feature in multistage focus groups used in the current study is that  
6  
7 642 participant dynamics may change during subsequent meetings in that new families take part  
8  
9 643 or some of the original families do not take part in some of the meeting series. According to  
10  
11 644 previous studies, the introduction of new members have a positive effect in that new  
12  
13 645 discussions that emerge and more knowledge is generated [51]. However, in the current study  
14  
15 646 it must be noted that eight to twelve families attended almost all meetings while there were  
16  
17 647 also few new families in every occasion, which steered new discussions and new perspectives  
18  
19 648 that benefitted even those families who came regularly.

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23  
24 649 The rapid identification of themes from audio recordings may be considered a methodological  
25  
26 650 limitation. However, in contrast to the original method of listening to the audio for three  
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28 651 minutes [57], the themes were identified after listening to the entire audio recording several  
29  
30 652 times. In addition, extensive field notes were collected during each of the nine sessions,  
31  
32 653 which was used as complementary information to the audio recordings during analysis. Aside  
33  
34 654 of this the research team also had a deeper understanding of the participants views from a  
35  
36 655 contextual perspective owing to their prior engagement with participants in the trust-building  
37  
38 656 phase, which was also enhanced by the involvement of health promoter.

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## 45 46 47 48 658 **Conclusion**

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51 659 The current study highlights the importance of working with the family, to ensure sustainable  
52  
53 660 lifestyle changes. Placing the focus on both the process of change as well as the action paved  
54  
55 661 ways to explore how families experienced their participation in the activities offered as well  
56  
57 662 the determinants of behavioral change. Providing mothers and children with the knowledge  
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3 663 and skills to promote oral health behaviors influences not only their immediate family but also  
4  
5 664 their communities or social groups. However, the success of knowledge transfer is mediated  
6  
7 665 by the principles of participatory research that strengthens and appeared to empower  
8  
9 666 individuals, and may contribute to a healthier society and reduced health disparities.  
10  
11  
12  
13 667 Reflective dialogue and interactions within the social context influences the health promotion  
14  
15 668 process, and through the participatory approach, individuals seem to gain empowerment that  
16  
17 669 in turn can lead to behavioral change. Such a strategy can be considered in future work  
18  
19 670 targeting to promote health in disadvantaged populations.  
20  
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23 671

## 26 672 **Conflicts of interest**

27  
28  
29  
30 673 The authors declare no financial, personal or other conflicts of interest.  
31  
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33 674

## 36 675 **Availability of data and materials**

37  
38  
39  
40 676 The audio recordings analyzed during the current study are not publicly available due  
41  
42 677 copyrights issues and GDPR regulations but are available from the corresponding author on  
43  
44 678 reasonable request.  
45  
46

47 679

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51  
52  
53  
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55  
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57  
58  
59  
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1  
2  
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4  
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6  
7

8 685  
9

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16  
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18  
19

20  
21 689  
22

## 23 24 690 **Authors' Contributions** 25 26

27  
28 691 RR, EC, SBR, ANF, AK and MR conceptualised and designed the study. RR, SBR, ANF and  
29  
30 692 MR collected data. RR, EC, MR and SBR analysed the audio recordings. RR wrote the initial  
31  
32 693 version of the manuscript under the guidance of AK, EC and MR. All authors gave detailed  
33  
34 694 feedback on early iterations of the manuscript. All authors have read and approved the final  
35  
36 695 version of the manuscript.  
37  
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## 42 43 697 **Data Sharing Statement** 44 45

46  
47 698 The audio recordings from the focus groups generated and analyzed during the current study  
48  
49 699 are not publicly available due institutional policy and GDPR regulations but are available  
50  
51 700 from the corresponding author on reasonable request.  
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703 **Legend of Figure 1**

704 Chronological timeline of the multistage focus group interviews.

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For peer review only

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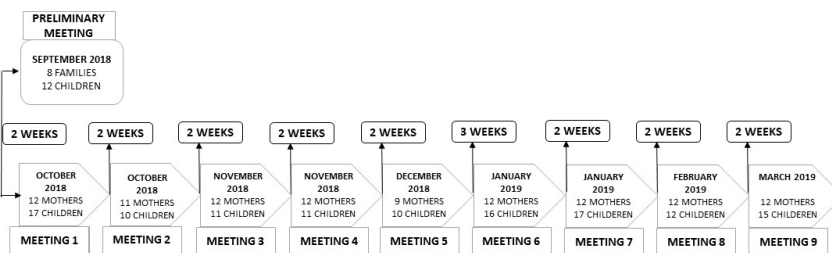


Figure 1: Chronological timeline of the multistage focus group interviews

338x190mm (96 x 96 DPI)

# Reporting checklist for qualitative study.

Based on the SRQR guidelines.

## Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the SRQR reporting guidelines, and cite them as:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. *Acad Med.* 2014;89(9):1245-1251.

	Reporting Item	Page Number
<b>Title</b>		
	<a href="#">#1</a> Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g. ethnography, grounded theory) or data collection methods (e.g. interview, focus group) is recommended	1
<b>Abstract</b>		
	<a href="#">#2</a> Summary of the key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results and conclusions	2
<b>Introduction</b>		
Problem formulation	<a href="#">#3</a> Description and significance of the problem / phenomenon studied: review of relevant theory and empirical work; problem statement	3-7



1	Purpose or research	<a href="#">#4</a>	Purpose of the study and specific objectives or	8
2	question		questions	
3				
4	<b>Methods</b>			
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7	Qualitative approach and	<a href="#">#5</a>	Qualitative approach (e.g. ethnography, grounded	11
8	research paradigm		theory, case study, phenomenology, narrative research)	
9			and guiding theory if appropriate; identifying the	
10			research paradigm (e.g. postpositivist, constructivist /	
11			interpretivist) is also recommended; rationale. The	
12			rationale should briefly discuss the justification for	
13			choosing that theory, approach, method or technique	
14			rather than other options available; the assumptions	
15			and limitations implicit in those choices and how those	
16			choices influence study conclusions and transferability.	
17			As appropriate the rationale for several items might be	
18			discussed together.	
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26	Researcher characteristics	<a href="#">#6</a>	Researchers' characteristics that may influence the	15
27	and reflexivity		research, including personal attributes, qualifications /	
28			experience, relationship with participants, assumptions	
29			and / or presuppositions; potential or actual interaction	
30			between researchers' characteristics and the research	
31			questions, approach, methods, results and / or	
32			transferability	
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37	Context	<a href="#">#7</a>	Setting / site and salient contextual factors; rationale	9
38				
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40	Sampling strategy	<a href="#">#8</a>	How and why research participants, documents, or	9-10
41			events were selected; criteria for deciding when no	
42			further sampling was necessary (e.g. sampling	
43			saturation); rationale	
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46	Ethical issues pertaining to	<a href="#">#9</a>	Documentation of approval by an appropriate ethics	15-16
47	human subjects		review board and participant consent, or explanation for	
48			lack thereof; other confidentiality and data security	
49			issues	
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53	Data collection methods	<a href="#">#10</a>	Types of data collected; details of data collection	12
54			procedures including (as appropriate) start and stop	
55			dates of data collection and analysis, iterative process,	
56			triangulation of sources / methods, and modification of	
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1		procedures in response to evolving study findings;	
2		rationale	
3			
4	Data collection	<a href="#">#11</a> Description of instruments (e.g. interview guides,	12
5	instruments and	questionnaires) and devices (e.g. audio recorders) used	
6	technologies	for data collection; if / how the instruments(s) changed	
7		over the course of the study	
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11	Units of study	<a href="#">#12</a> Number and relevant characteristics of participants,	10-11
12		documents, or events included in the study; level of	
13		participation (could be reported in results)	
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16	Data processing	<a href="#">#13</a> Methods for processing data prior to and during	14
17		analysis, including transcription, data entry, data	
18		management and security, verification of data integrity,	
19		data coding, and anonymisation / deidentification of	
20		excerpts	
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24	Data analysis	<a href="#">#14</a> Process by which inferences, themes, etc. were	14
25		identified and developed, including the researchers	
26		involved in data analysis; usually references a specific	
27		paradigm or approach; rationale	
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31	Techniques to enhance	<a href="#">#15</a> Techniques to enhance trustworthiness and credibility	15
32	trustworthiness	of data analysis (e.g. member checking, audit trail,	
33		triangulation); rationale	
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36	<b>Results/findings</b>		
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39	Syntheses and	<a href="#">#16</a> Main findings (e.g. interpretations, inferences, and	17-22
40	interpretation	themes); might include development of a theory or	
41		model, or integration with prior research or theory	
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44	Links to empirical data	<a href="#">#17</a> Evidence (e.g. quotes, field notes, text excerpts,	17-22
45		photographs) to substantiate analytic findings	
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48	<b>Discussion</b>		
49			
50	Intergration with prior	<a href="#">#18</a> Short summary of main findings; explanation of how	23-25
51	work, implications,	findings and conclusions connect to, support, elaborate	
52	transferability and	on, or challenge conclusions of earlier scholarship;	
53	contribution(s) to the field	discussion of scope of application / generalizability;	
54		identification of unique contributions(s) to scholarship in	
55		a discipline or field	
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1	Limitations	<a href="#">#19</a>	Trustworthiness and limitations of findings	26-27
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3	<b>Other</b>			
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6	Conflicts of interest	<a href="#">#20</a>	Potential sources of influence of perceived influence on	28
7			study conduct and conclusions; how these were	
8			managed	
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11	Funding	<a href="#">#21</a>	Sources of funding and other support; role of funders in	29
12			data collection, interpretation and reporting	
13				

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17 <https://www.goodreports.org/>, a tool made by the [EQUATOR Network](#) in collaboration with  
18 [Penelope.ai](#)  
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# BMJ Open

## Understanding behavioral changes through community based participatory research to promote oral health in socially disadvantaged neighborhoods in Southern Sweden

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2019-035732.R2
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<b>Primary Subject Heading</b>:	Public health
Secondary Subject Heading:	Dentistry and oral medicine, Nutrition and metabolism, Qualitative research
Keywords:	Community child health < PAEDIATRICS, PUBLIC HEALTH, QUALITATIVE RESEARCH, SOCIAL MEDICINE

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3 1 ***Understanding behavioral changes through community based participatory***  
4 2 ***research to promote oral health in socially disadvantaged neighborhoods in***  
5 3 ***Southern Sweden***  
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8 4  
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10 5 ***Rathi Ramji, M Sc.,<sup>1†</sup>***

11  
12 6 E-mail: rathi.ramji@mau.se  
13  
14 7

15  
16 8 ***Elisabeth Carlson, RN MNEd, PhD,<sup>1</sup>***

17  
18 9 E-mail: elisabeth.carlson@mau.se  
19  
20 10

21 11 ***Susanne Brogårdh-Roth, DDS, Ph.D.<sup>2</sup>***

22  
23 12 E-mail: susanne.brogardh@mau.se  
24  
25 13

26  
27 14 ***Anna Nilvéus Olofsson, DDS, Odont. Lic.<sup>3</sup>***

28  
29 15 E-mail : anna.olofsson@tepe.com  
30  
31 16

32 17 ***Anders Kottorp Reg. OT, PhD<sup>1</sup>***

33  
34 18 E-mail: anders.kottorp@mau.se  
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38 20 ***Margareta Rämgård PhD<sup>1</sup>***

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40 21 E-mail: margareta.ramgard@mau.se  
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44 23 <sup>1</sup> *Department of Care Science, Faculty of Health and Society, Malmö University, Jan Waldenströms*  
45 24 *Gata 25, SE-20506 Malmö, Sweden*

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47 25 <sup>2</sup> *Department of Pediatric Dentistry, Faculty of Odontology: Malmö University, SE 205 06, Malmö,*  
48 26 *Sweden*

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50 27 <sup>3</sup> *TePe Oral Hygiene Products AB, Bronsåldersgatan 5, SE 213 76 Malmö, Sweden*  
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60 ***Corresponding author:*** Rathi Ramji; rathi.ramji@mau.se

## Abstract

**Objectives:** Inequalities in oral health have been on the rise globally. In Sweden, these differences exist not between regions, but among subgroups living in vulnerable situations. This study aims at understanding behavioral change after taking part in participatory oral health promotional activity among families living in socially disadvantaged neighborhoods in Southern Sweden.

**Setting:** The current study involved citizens from a socially disadvantaged neighborhood in Malmö, together with actors from the academic, public and private sectors. These neighborhoods were characterized by high rates of unemployment, crime, low education levels and most importantly poor health.

**Participants:** Families with children aged 7–14 years, from the neighborhood were invited to participate in the health promotional activities by a community representative, known as a health promoter, using snowball sampling. Between 8-12 families participated in the multistage focus groups over six months. Data were analyzed using qualitative content analysis.

**Results:** Three main themes emerged from the analysis, providing an understanding of the determinants for behavioral change, including meaningful social interactions, family dynamics, and health trajectories. The mothers in the study valued the social aspects of their participation; however, they believed that gaining knowledge in combination with social interaction, made their presence also meaningful. Further, the participants recognized the role of family dynamics primarily the interactions within the family, family structure and traditional practices as influencing oral health related behavior among children. Participants reported having experienced a change in general health owing to changed behaviour. They started to understand the association between general health and oral health that further motivated them to follow healthier behavioral routines.

**Conclusions:** The results from this study show that oral health promotion through reflection and dialogue with the communities, together with other stakeholders may have the potential to influence behavioral change and empower participants to be future ambassadors for change.

### Strengths and limitations of this study

- Involvement of community members in the development health of promotional activities.
- Working with both parents and children together to promote oral health.
- Triggering knowledge mobilization through reflection and dialogue.
- Partnership between community members and different stakeholders facilitated by health promoters.
- Non- participation of fathers may have been a potential source of selection bias.

## 64 Introduction

65 There has been an overall improvement in oral health of the Swedish population in the past  
66 decades owing to the advancements in public dental services and state financed insurance  
67 policies [1, 2]. However, large discrepancies in oral health do exist [1, 3-7]. The level of  
68 inequalities are not substantially different between regions in Sweden but rather between  
69 small areas within the major cities, where there is a concentration of subgroups in marginal or  
70 vulnerable situations [3]. These socially deprived groups frequently include heterogeneous  
71 populations who differ by their ethnicity, migration status, historical background, culture, and  
72 practices related to health, in comparison to the majority population [8]. Oral health  
73 disparities have been on the rise owing to challenges such as lack of knowledge and poor  
74 social policies, unavailability of context-based information, and most importantly the  
75 disconnection between oral and general health [9]. This disconnection is a result of the current  
76 dental care system globally, as well as in Sweden, considering merely individual behavioral  
77 risk factors while addressing oral health problems. However, socio-cultural as well as policy  
78 related aspects are key determinants of not only oral health but also general health and well-  
79 being. Health care providers tend to look at diseases in isolation rather than employing a  
80 collaborative approach to address health from a broader perspective. Thus widening the gap  
81 between oral and general health and increasing the burden of disease among socio-culturally  
82 different and disadvantaged subgroups of the population [10-13]

83 Since the early part of the twentieth century, there has been a global drive in reducing health  
84 inequalities [14, 15]. Health inequalities in general are associated with various social  
85 determinants including living conditions, employment status, childhood conditions as well as  
86 aging [16]. These determinants also apply to oral health disparities. Moreover, oral diseases  
87 also share risk factors with other non-communicable diseases and are associated with



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3 88 cardiovascular disorders and diabetes [17-22]. According to the World Health Organization  
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5 89 (WHO), oral health is an integral part of general health and is fundamental to overall well-  
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7 90 being and quality of life. Thus, addressing oral health disparities is an inevitable part in health  
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9 91 promotional activities aiming to reduce health disparities [23]. Oral health impairments have a  
10  
11 92 considerable impact on the quality of life of affected individuals both functionally and  
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13 93 esthetically [24-26].  
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17 94 Poor oral hygiene and excessive or frequent intake of sugar between meals are leading causes  
18  
19 95 for caries and poor oral health in general [27]. The consumption of fermentable carbohydrates  
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21 96 containing added sugars have been on the rise, particularly among children and young adults  
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23 97 [28]. High consumption of fermentable carbohydrates provokes bacterial action leading to the  
24  
25 98 demineralization of tooth enamel, that might lead to the development of caries [29]. The  
26  
27 99 WHO recommends limiting free sugar intake and replacing it by increasing the consumption  
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29 100 of fresh fruits and vegetables, nuts, seeds and wholegrain starch-rich foods, together with  
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31 101 practising good oral hygiene as measures to prevent dental caries, periodontal disease and  
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33 102 promote oral health. Tooth brushing with fluoridated toothpaste in combination with a well-  
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35 103 balanced diet is the foundation for good oral health [28, 30, 31].  
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41 104 Dental caries is one of the most common preventable disease in children globally [23, 32, 33].  
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43 105 Cariological risk assessment among younger children is important as caries in early childhood  
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45 106 progresses more rapidly since the enamel is thinner in the primary teeth than in the permanent  
46  
47 107 teeth. Caries incidence in preschool age increases the risk of caries in adolescence and later in  
48  
49 108 life [34]. Moreover, caries impairs the quality of life of children by disrupting vital everyday  
50  
51 109 functions [2]. Children with dental caries tend to have poor self-image and self-esteem [21,  
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53 110 23, 35]. Furthermore, caries may lead to adverse effects including reduced social interaction,  
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55 111 pain, discomfort, disturbances in the development of occlusion, stress and depression [32].  
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59 112 According to previous studies, Dental caries was has been shown to be twice as common  
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3 113 among non-Swedish children and adolescents belonging to socioeconomically distressed  
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5 114 families compared to their Swedish counterparts [1, 3-7]. Determinants for dental caries in  
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7 115 immigrant children include parents' education level and ability to assimilate to Swedish  
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9 116 dietary conditions since they are not often similar to the dietary patterns of immigrant families  
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11 117 [3]. Parents in a socially vulnerable environment may need community support to establish  
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13 118 good dietary and oral hygiene habits, including using fluoride, as part of caries prevention. In  
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15 119 vulnerable areas, oral health problems may be part of a number of different social problems  
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17 120 and a number of actors in the community, such as maternal care, child health care, and  
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19 121 pharmacies may need to make joint efforts to provide health interventions for families with  
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21 122 different cultural backgrounds [5-7].  
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27 123 The Swedish dental care system has a strong tradition of preventive dental care in children  
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29 124 and adolescents. Since the 1960s, there has been a steady decrease in caries prevalence among  
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31 125 children owing to the effective and timely preventive measures implemented by the Swedish  
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33 126 dental care system. Despite these efforts, caries prevalence is considerably higher among  
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35 127 selected subgroups of the Swedish population who are more often from socially  
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37 128 disadvantaged backgrounds. Studies based on Eurobarometer surveys have identified that  
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39 129 socially disadvantaged populations frequently lack knowledge on self-care, including practice  
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41 130 of good oral hygiene, diet and use of fluorides [36]. This is especially true concerning  
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43 131 children in disadvantaged communities who experience more caries than their Swedish peers.  
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45 132 Swedish dental care including preventive measures and treatment are provided free until the  
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47 133 age of 23. Nevertheless, these efforts have been insufficient in providing dental care without  
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49 134 disparities. Children from socially disadvantaged settings are less regularly attending these  
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51 135 visits. There has been a lower level of utilization of dental care despite the increased need  
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53 136 among socially disadvantaged migrant groups [1, 3, 4]. Oral health behaviors are mediated to  
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55 137 children through their parents with the support of the regional dental care [3, 4]. Often  
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3 138 immigrant parents are unaware of the support services that are available due to recognized  
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5 139 practical barriers such as language difficulties and health literacy. Parents also have different  
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8 140 expectations from the health care system, which are based on their experiences from their own  
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10 141 home country [37, 38].

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13 142 Most of the information available in the Swedish dental care is evidence-based, but lacking  
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15 143 contextual adaption. Traditional values and family practices influences the attitude towards  
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17 144 health and how communities value oral health as well as what is considered as a standard for  
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19 145 good health [3, 4, 37]. An understanding of specific populations, their socio-economic  
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21 146 position, the influence of their traditional practices and above all the influence of all of these  
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23 147 factors on their health behavior is necessary to improve utilization of dental care in socially  
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25 148 disadvantaged groups. This will in turn contribute to reduced oral health disparities [3, 4, 6, 9]

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29 149 There is an acute need for appropriate interventions and services to effectively address the  
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31 150 oral health disparities of the underserved. These interventions must be culture and context  
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33 151 sensitive novel oral health promoting solutions and not merely based on the views of the  
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35 152 concerned, but rather influenced by the active participation of the populations in need [39].

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37 153 Active participation by representatives from the target groups is crucial for reducing the gap  
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39 154 in knowledge as well as tackling and allocating resources that support specific community  
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41 155 needs [40].

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46 156 Community based participatory research (CBPR) is one such a method, which focuses on  
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48 157 addressing the determinants of health from a social as well as environmental perspective  
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50 158 through active engagement of the community members and other concerned actors throughout  
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52 159 the research process [40]. Taking into account specific social requirements and increasing  
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54 160 community engagement to improve health, CBPR has emerged as an alternative paradigm for  
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56 161 health and social research [39, 40]. CBPR is considered a significant part of translational  
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3 162 research, which helps to improve the health of specific communities, eliminate inequality and  
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5 163 achieve equality in health through community empowerment [41]. The principles of CBPR  
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7 164 are based on core concepts including, partnership and co-learning, capacity building or  
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10 165 training community members to become future health ambassadors, knowledge production  
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12 166 for societal transformation and prolonged commitment which facilitates achieving higher  
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14 167 level goals like reducing disparities [39]. CBPR is a systematic effort to integrate active  
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17 168 participation by the community in the process of decision making by creating a mutual  
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19 169 understanding of local phenomena and practices specific to the community which contributes  
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21 170 to the development of innovative strategies to promote social change [40]. Empowerment has  
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24 171 been considered critical in the CBPR process although the phenomenon was not frequently  
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26 172 explored while evaluating CBPR based health promotional activities. Empowerment is  
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28 173 defined as the ability to control one's own life especially in relation to own health and well-  
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30 174 being [42]. Studies addressing oral health disparities focusing on diet and oral hygiene using  
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33 175 the CBPR approach involving multiple actors from the community, public sector, private  
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35 176 sector as well as non-profit organizations are sparse.

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38 177 The current study was part of a larger project Health Promoting Innovation in Collaboration.  
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40 178 The aims of the main project were to develop and study health-promoting activities based on  
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43 179 participatory research methods. Focus group interviews based on CBPR principles were  
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45 180 conducted with residents in a socially disadvantaged neighborhood in 2016. The interviews  
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47 181 aimed at identifying measures to improve health among the residents. During the discussions,  
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50 182 the citizens in the neighborhood identified several problem areas where they needed help,  
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52 183 including poor oral health, lack of access to physical activity, poor mental health, and lack of  
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54 184 knowledge concerning health and healthy behaviors.

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57 185 Health promotional activities were held as part of the larger project focusing on the challenges  
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59 186 identified by the community members. The health promotional activities targeted behavioral

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3 187 change through knowledge mobilization using a participatory design focusing on key factors  
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5 188 such as empowerment [40]. Knowledge mobilization is a process where reciprocal and  
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7 189 complementary knowledge is shared between multiple actors, to promote multidirectional co-  
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9 construction of knowledge. The basis for knowledge mobilization is interactions  
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11 190 that create knowledge and reflections during and after the interactions that facilitate sense-  
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13 191 making of the acquired knowledge [40]. Community members participated in all stages of the  
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15 192 project including planning, implementation and evaluation. Representatives from the  
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17 193 neighborhood, known as health promoters, were integral in coordinating the activities in the  
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19 194 different workshops. In an international context, they are known as culture brokers, and their  
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21 195 role has been proven promising in participatory research driven initiatives [43, 44]. However,  
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23 196 the health promoters working in this project had a unique role since they were educated in  
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25 197 participatory research methods. These health promoters were instrumental in identifying and  
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27 198 recruiting participants, assisting with language interpretation and most importantly to inform  
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29 199 the research team about the cultural nuances of the community.  
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36 201 As members of the community, they also had deep knowledge and experience of the  
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38 202 common problems faced by these communities particularly in relation to access to health care  
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40 203 [43].  
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43 204 Oral health was one of the challenge areas identified by the community and addressed among  
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45 205 the activities initiated as a part of the larger project. This was considered a priority area since  
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47 206 dental caries was on the rise in families with young children. The initiatives focused on oral  
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49 207 hygiene, the role of fluoride as well as diet since the residents also perceived a lack of access  
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51 208 to personal advice on diet and health in their area.  
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3 209 *The aim of the current study was to explore the behavioral change initiated by a*  
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5 210 *participatory community based health promotion targeting oral health in children and*  
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7 211 *parents living in a socially disadvantaged neighborhood in Southern Sweden.*  
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**228 Method****229 Context**

230 The current study was based in a socially distressed neighborhood located in Malmö city in  
231 Southern Sweden. The majority of the population living in this neighborhood are non-  
232 Swedish speaking. According to a report from the Swedish Intelligence Unit, this  
233 neighborhood has been considered one of the fifteen most vulnerable localities in the country  
234 [45]. The report also highlights challenges like high rates of unemployment, crime, low  
235 education levels and poor health among residents which was also supported by prior research  
236 concerning high incidence of risky health behaviors among citizens in this neighborhood [46,  
237 47].

**238 Participants and Actors**

239 The health promoter involved with the oral health related activities sent information about the  
240 activities two weeks ahead of the first meeting and invited families with children between 7-  
241 14 years to participate in the meetings. Initially a few families identified by the health  
242 promoter volunteered to participate during the first session. More participants were later  
243 recruited through purposeful snowball sampling, mainly through spreading information  
244 through word of mouth. A total of 12 families were regularly involved in the activities.  
245 Although no specific demographic information was collected from the parents concerning the  
246 family structure, parental educational status and employment, it emerged from the discussions  
247 that quite a few of the mothers in the group were employed. Almost all families had three  
248 children, aged between 2 years – 12 years. Most of the families were from Middle Eastern  
249 countries such as Iraq, Iran, Syria and Lebanon. During the initial meetings, children were  
250 present together with their fathers and mothers. Eventually only the mothers participated  
251 regularly together with their children. There were 8-12 mothers during each of these 9

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3 252 sessions and about 15 children during each meeting (See Figure 1). Each meeting lasted for  
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5 253 about two hours with 15 minutes break after the first hour.  
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8 254 Please include figure 1 about here  
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11 255 Aside from the participants and academic partners, the research team included representatives  
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13 256 from the public and private sectors as well as non-profit organizations affiliated to the project  
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15 257 such as the Primary care (Region Skåne), Pharmacy (Apotek Hjärtat), Save the Children and  
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17 258 TePe Oral Hygiene Products. Not all actors were however present in all meetings; their  
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19 259 presence was determined by the theme discussed on the different occasions. The presence of a  
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21 260 private company among the actors involved in the project may raise questions related to  
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23 261 conflict of interest. However, the relationship between the private company TePe Oral  
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25 262 Hygiene Products and the research project was mediated by the mutual goal of creating social  
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27 263 value for disadvantaged populations. Through their presence in the project, the company TePe  
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29 264 Oral Hygiene Products aimed at understanding user needs in order to develop products and  
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31 265 solutions for improved oral health in socioeconomically distressed communities. TePe Oral  
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33 266 Hygiene Products had no financial gains through their participation in the research project.  
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35 267 The head of their odontology and scientific affairs section was the primary representative of  
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37 268 the company in the project. Additionally, the representative is also a specialist in pediatric  
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39 269 dentistry, which made her presence useful since she could share her valuable knowledge, and  
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41 270 experiences with the research team as well as participants. Previous studies have also  
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43 271 considered academic-private partnerships in health research as an advantage rather than a  
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45 272 limitation, because through such partnership emerges innovative strategies and positive  
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47 273 effects which helps achieve higher public health goals [48, 49].  
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## 276 **Patient and Public Involvement**

277 The CBPR approach not only promotes involvement of the citizens of the community, but  
278 also relevant representatives of public and private organizations together with academic  
279 researchers in a power-balanced environment while working to identify and implement  
280 contextually relevant health promotional activities to promote behavioral change.

## 281 **Design**

282 The current study is a participative action research study with a qualitative approach where  
283 multistage focus group interviews were the mode of data collection. Multistage focus groups  
284 are characterized by the same group of persons exploring different themes during several  
285 meetings [50]. This method was inspired by Paul Freire's culture circles where the aim is to  
286 foster a participatory experience with an emphasis on dialogue and reflective action in  
287 response to an emancipatory health education [51]. The power relations are balanced within  
288 the circle, where one-person facilitates the discussions and debates by initiating the process.  
289 The facilitator then leaves it to the group to take responsibility for the progress in the inquiry  
290 process through self-reflections and sharing individual knowledge and experiences with each  
291 other. The dialogues help elevate the participants' experiences to a higher level of abstraction.  
292 The focus groups deduce individual learning, as well as collective ways of thinking through  
293 reflection and dialogue within the group. During each meeting, the participants try to identify  
294 a common problem in the community, explore the problem further to identify resources and  
295 solutions while simultaneously implementing them to bring about transformation [51, 52]. As  
296 a first step in this process, the participants gained knowledge from experts like dieticians,  
297 nurses or dentists, in the form of a dialogue exchange. Some examples of the topics selected  
298 by the participants include discussions on sugar content in their routine diet and possible  
299 healthy alternatives to it (with a dietician). Pediatric nurses provided information regarding

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3 300 psychosocial support for behavioral change. The dental experts in this study were present  
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5 301 during all occasions and added knowledge concerning oral hygiene, fluoride and the role of  
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7 302 diet in relation to oral health.  
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### 10 303 **Data Collection**

#### 11 304 *Preliminary meeting*

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16 305 The families who agreed to participate met at nine different occasions once in two weeks over  
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18 306 a period of six months beginning in September 2018. The first step in the multistage focus  
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20 307 groups was to understand the participants' perceptions on oral health. Prior to the initiation of  
21  
22 308 the actual activity sessions, the research team used a participatory research approach  
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24 309 photovoice, to assess the complex phenomenon of diet from a sociocultural perspective  
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26 310 among children. In this method, photography was used as a tool to understand the factors  
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28 311 surrounding the actual problem in consideration, from within the context of the participants.  
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30 312 This is also a form of qualitative research where the photos act, as a focal point to initiate  
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32 313 discussion and promote better understanding of participants' needs. This method helps  
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34 314 overcome language and communication barriers and enhances discussions within the group  
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36 315 [53, 54].  
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42 316 The children were requested to bring pictures of healthy and unhealthy food and discussions  
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44 317 were initiated based on their photos. In addition, they were also asked to take pictures of their  
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46 318 toothbrush, as a base for discussing oral hygiene habits. The children sent the photographs via  
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48 319 WhatsApp to the health promoter a few days prior to the scheduled introductory meeting.  
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50 320 Photographs sent by the children were compiled, printed and later presented to the children  
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52 321 for review together with the rest of the group. One of the team members initiated the  
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54 322 discussion with the children using the pictures they sent and led the discussions.  
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3 324 *Actions points from the preliminary meeting*  
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6 325 Through the discussions during the preliminary meeting, it emerged that the children  
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8 326 consumed a high amount of sugar as part of their daily diet. The children also expressed a  
9  
10 327 dislike for the lunch served at school. It came to be known that most of the children did not  
11  
12 328 eat breakfast owing to time constraints, family situation and cultural aspects. Through  
13  
14 329 discussions with parents, it was understood that they had limited control over their children's  
15  
16 330 dietary choices. Regarding oral health and oral hygiene, children frequently visited the dentist  
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18 331 when they suffered pain, some had fillings and a few even had teeth extracted in early  
19  
20 332 childhood. Concerning oral hygiene, there was a lack of awareness of fluoride use and its  
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22 333 importance for oral health among children. It appeared that despite suffering tooth decay they  
23  
24 334 were not informed about the role of fluorides in caries prevention. The session was followed  
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26 335 by a debriefing and discussion with parents to understand their concerns about oral health of  
27  
28 336 their children and the families in general. It emerged that parents were not satisfied with the  
29  
30 337 tooth brushing carried out by their children. The children did not permit parents to help them  
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32 338 with brushing despite being advised by the dentist or dental hygienist. In conclusion, parents  
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34 339 felt the need for dietary advice focusing on the different meals, breakfast, lunch and dinner. In  
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36 340 addition, they also wanted to gain more knowledge on oral hygiene habits. They preferred all  
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38 341 sessions to be in the presence of the children since they would follow the advice of others  
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40 342 better than they would do if the parents told them the same thing.  
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48 343 In the consecutive occasions, dialogue-based teachings or reflective dialogues were facilitated  
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50 344 by experts in the related fields to address different challenges that emerged in the first  
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52 345 meeting. Behavioral change in children through educating parents was also driven by the  
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54 346 reflective dialogues. Previous studies [55] state that reflective dialogue-parental education is  
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56 347 an effective method to enhance parental awareness and improve parenting skills. This is  
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58 348 achieved through confidence building, which is promoted, by social support and peer  
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3 349 influence. The discussions in the group were predominantly held in Swedish and interpreted  
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5 350 in Arabic by the health promoter for the benefit of some parents who could not speak  
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8 351 Swedish. At the beginning of every meeting, families had the opportunity to provide feedback  
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10 352 from the previous session. They also discussed their ability to make changes inspired by what  
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12 353 was learnt from their participation and the challenges faced in doing so. All discussions were  
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14 354 audiotaped with the consent of the families. A member of the researcher team also acted as an  
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17 355 observer and was responsible for taking notes during each meeting.  
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### 23 357 **Data Analysis**

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26 358 One team member [RR] reviewed audio recordings repeatedly to develop a content log of the  
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28 359 discussions as well as summary. Listening to the recordings, several times facilitated rapid  
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30 360 identification of codes together with the help of the observational notes. Two other members  
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32 361 from the research team who were not involved in the data assimilation process listened to the  
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34 362 recordings to complement the preliminary analysis performed by the first researcher [EC,  
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36 363 MR]. Following this, the researchers discussed and reflected on their findings together and  
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38 364 came to consensus over a final list of codes which were finally confirmed by [SBR]. The  
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40 365 discussed codes were placed under categories and each category was further defined in detail  
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42 366 to identify overarching themes. While data extraction was done using rapid identification of  
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44 367 themes from audio recordings (RITA) method, qualitative content analysis with an inductive  
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46 368 approach [56], was used to identify themes relevant to the research goals. The RITA method  
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48 369 has previously been established as a method that yields prompt and detail results from  
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50 370 qualitative data while also being less time consuming and less labor intensive [57-59].  
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### 373 **Qualitative Rigor**

374 Results from qualitative studies are evaluated based on certain criteria such as following Guba  
375 and Lincoln's criteria [60] as factors that predict the authenticity of the results. According to  
376 these criteria, the quality of results depends on the methods of data collection and the  
377 technique of data interpretation. The current study is built on the CBPR principles of co-  
378 learning and sharing thereby holding the contact between the researcher and community  
379 member's closer; thus, enabling better understanding and interpretation of information  
380 provided. Furthermore, the involvement of the health promoter at the different stages of the  
381 research process ensured open communication. This provided an opportunity for the  
382 participants to share trustworthy accounts of experiences to other members in the group  
383 ensuring credibility. The research team made observational notes describing the context to  
384 support the audiotaped data, which contributed to transferability of the findings.  
385 Dependability was attained by involving a third researcher who was not involved in the initial  
386 data collection and analysis to review the coded data. To achieve confirmability, the third  
387 member from the research team rechecked audio recordings and the observational notes in  
388 iterations. Findings were shared with participants and reconfirmed when necessary.  
389 Issues related to reflexivity was addressed using constant communication with the participants  
390 after each meeting, through peer debriefing, as well as triangulation by including several  
391 members in the research team in the focus groups as well as analysis of audio recordings.  
392 Self-reflexivity or personal reflexivity of the members of research team was considered rather  
393 positive since it gave the possibility for the team to reflect on power and privilege issues in  
394 relation to the context. This is also in line with guidelines indicated by prior work in  
395 participatory research [61].

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3 398 **Ethical Considerations**  
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5 399 The Regional Ethical Review Board in Lund approved the study (DNR 2016/824). All  
6  
7 400 participation was voluntary, and the participants were informed that they could leave the  
8  
9 401 discussions at any time without any explanation or consequences. The parents received  
10  
11 402 detailed information regarding the purpose and nature of the study, and were requested to  
12  
13 403 provide written informed consent before enrollment. Parents were requested to consent their  
14  
15 404 own as well as their children's participation. All invited participants consented both their own  
16  
17 405 participation as well as that of their children. The children also gave a verbal consent.  
18  
19 406 Participants were ensured confidentiality at the time of data collection. In addition,  
20  
21 407 participants were also informed that all results were to be presented abstracted and presented  
22  
23 408 at a group level and no individual shall be identifiable through their expressions in neither  
24  
25 409 reports nor scientific articles that emerge from this study. This information was explained  
26  
27 410 verbally, as well as, included in the information letter that they received when they signed the  
28  
29 411 informed consent. Considering the nature and design of the multistage focus group, it may be  
30  
31 412 difficult to ascertain confidentiality however, the research team explained to the mothers  
32  
33 413 concerning this and requested them to refrain from discussing sensitive or personal opinions  
34  
35 414 shared in the group elsewhere.  
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## 421 **Findings**

422 Three main themes including meaningful social interactions, family dynamics, and health  
423 trajectories were identified on exploring reflective thoughts and discussions in the focus  
424 groups with an aim to understand the process of changed behavior within the group.

### 425 *Meaningful social interactions*

426 The mothers reported in the beginning that they agreed to participate in this study since they  
427 trusted the health promoter. However, after a few meetings they began to enjoy the social  
428 aspects of being with new people especially since they would otherwise sit idly at home.

429 *“In the beginning I came here because we knew the “health promoter”. After coming here a  
430 few times, we started to interact with the others in the group. Now we do activities outside of  
431 this group, for example we go out on picnics or barbeque together. Coming here and meeting  
432 people is definitely better than sitting idle.” (Mother, Meeting 8)*

433 Although the mothers enjoyed the social aspects during the initial meetings, they began to  
434 look forward to interactions that were more purposeful and considered gaining knowledge as  
435 primary focus.

436 *“It is not just for meeting others. It is good that I get information about healthy food and what  
437 a good breakfast is for both my children and me. I just do not go there every time to meet  
438 someone else. We can do that in a different way.” (Mother, Meeting 8)*

439 The mothers in the group believed that the discussions and information they received were  
440 better than what they had received from the nurses at the primary care. They highlighted the  
441 importance of being in a group in the learning process since the discussions were interactive  
442 and not controlled or determined by the facilitators or field experts.

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2  
3 443 *“When we meet a nurse at a primary care center, they sound tired and disinterested and*  
4  
5 444 *hence do not provide the same information we get here. It was not of good quality neither*  
6  
7 445 *educational nor motivating as we do here within the group.” (Mother, Meeting 6)*  
8  
9

10 446 The mothers felt that they were given not only the opportunity to gain new knowledge and  
11  
12 447 learn, but also the possibility to discuss and share their own knowledge and experiences. They  
13  
14 448 also gave and received tips from each other within the group.  
15  
16

17  
18 449 *“It was not just a lecture, we got to ask, discuss and learn from the experts and from each*  
19  
20 450 *other. It was fun to give tips and suggestions to each other based on our experiences.”*  
21  
22 451 *(Mother, Meeting 7)*  
23  
24

25 452 Some of the mothers were unsure from the beginning if they could make changes to their diet.  
26  
27 453 After participation for a few weeks, they felt motivated and gradually started to make  
28  
29 454 changes.  
30  
31

32  
33 455 *“In the beginning I was drinking 5-6 liters of juice a day, after being here I have reduced it to*  
34  
35 456 *1 liter per week. I initially thought that I can't but when I was told about the sugar content of*  
36  
37 457 *the juice and learnt about others changing their dietary patterns, I too decided to change.”*  
38  
39 458 *(Mother, Meeting 7)*  
40  
41

42  
43 459 Towards the end of the sessions, several mothers expressed their interest in communicating  
44  
45 460 the knowledge they gained to the rest of the community, as they believed that the information  
46  
47 461 was important. They even went a step further and mentioned that they would like to join the  
48  
49 462 research team in the future to support the mission to improve oral health among the  
50  
51 463 population in the neighborhood.  
52  
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54  
55 464 *"I want to be one among your team, you are few and there are many people who need help so*  
56  
57 465 *I want to help others as you do." (Mother, Meeting 8)*  
58  
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3 466 Children in the group were also interested in spreading their knowledge to their friends and  
4  
5 467 classmates. One of the children in the group had already begun speaking about sugar intake  
6  
7 468 and oral health to his class.  
8  
9

10 469 *"I told my classmates about why eating sugary things is harmful and how sugar affects the*  
11  
12 *teeth. My teacher was impressed with me and wanted me to share more information in the*  
13 470 *class after each meeting."* (Child, Meeting 6)  
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15 471  
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18 472

### 21 473 **Family dynamics**

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23  
24 474 The role of individual members in the family, bonding and interactions between family  
25  
26 475 members together with socio-cultural or traditional values carried within the family, influence  
27  
28 476 lifestyle and behavior of the children. Acculturation and migration also have an influence on  
29  
30 477 the relationship between children and parents, specifically mothers. Thus, a sustainable  
31  
32 478 change in diet of children is influenced by family dynamics.  
33  
34  
35

36 479 Mothers in this study perceived that they had important responsibilities but were merely  
37  
38 480 limited to executing actions with little influence on decision-making. This was considered as a  
39  
40 481 direct challenge in promoting dietary changes in the family.  
41  
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43

44 482 *"I am a woman I can decide only for myself, I cannot tell my husband what he has to eat. My*  
45  
46 483 *children eat what their father eats. I drink a lot of tea and my children drink tea too. It is our*  
47  
48 484 *tradition."* (Mother, Meeting 2)  
49  
50

51 485 Children in the families acknowledged their traditional practices and consumed high amount  
52  
53 486 of sugar as part of it. They believed that following the parent's action was also associated  
54  
55 487 with culture.  
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3 488 *“We drink tea as a family in the evenings and during weekend. I cannot drink tea without*  
4  
5 489 *sugar in it. I usually put four teaspoons of sugar in my tea. That is how my parents drink too.*  
6  
7 490 *It is a cultural thing.” (Child, Meeting 1)*  
8  
9

10  
11 491 From the discussions with the children, it emerged that they were often alone when they ate  
12  
13 492 breakfast so they ate whatever they found in their refrigerators.

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15  
16 493 *“I eat breakfast alone and I eat whatever is available in the refrigerator. I mostly eat bread*  
17  
18 494 *with Nutella, as it is easy to make. My mother goes to work and my father is still sleeping*  
19  
20 495 *then. My brother never helps me even if I ask.” (Child, Meeting 3)*  
21  
22

23 496 Some mothers believed they could not provide enough attention to their children’s diet due to  
24  
25 497 lack of time and a stressful life in Sweden. Mothers also believed that fathers could not help  
26  
27 498 children, as well as, the mothers as men have low involvement in the upbringing of children.  
28  
29 499 After participation in the activities, the mothers found a solution to this through the tips they  
30  
31 500 got from fellow participants.  
32  
33  
34

35 501 *“I leave early to work and my children eat breakfast by themselves. My husband cannot*  
36  
37 502 *prepare food and take care of the children, sometimes he forgets everything, he miss to put on*  
38  
39 503 *their wooly caps in winter. It is cultural” (Mother, Meeting 2)*  
40  
41  
42

43 504 Mothers valued the involvement of children in the activities since they recognized changes in  
44  
45 505 children’s behavior at home after participation. Children were more cautious about their diet  
46  
47 506 and sought their parents’ help while brushing their teeth, which they refused to do previously.  
48  
49

50  
51 507 *“The good thing is that we got to be here with our children, and that they also got to listen*  
52  
53 508 *and learn. They have become more responsible at home; my son does not want to eat as many*  
54  
55 509 *bananas as he did earlier because he has learned that it has more sugar. He wants me to help*  
56  
57 510 *him brush his teeth; he would never allow me to do it before even if I insisted.” (Mother,*  
58  
59 511 *Meeting 5)*  
60

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3 512 Mothers were initially unsure about influencing the diet and lifestyle of their spouses, but  
4  
5 513 when they made changes for themselves their husbands chose to do so too. In some  
6  
7 514 households, women brought home information material from the meetings to convince their  
8  
9 515 husbands.

10  
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12  
13 516 *"At first I thought it might be hard for me to influence my husband, but when I changed my*  
14  
15 517 *own diet he chose to change his too," (Mother, Meeting 8)*

16  
17  
18 518 *"When I told him about sugar content in each food and showed the sugar brochure my*  
19  
20 519 *husband was shocked and immediately decided to change."*(Mother, Meeting 8)

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23 520

## 24 25 26 521 **Health trajectories**

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29 522 When the mothers initially volunteered to participate in the activity and attended the  
30  
31 523 meetings, they were concerned about their children's oral health behavior and diet. From the  
32  
33 524 initial discussions with parents and children it emerged that children frequently consumed  
34  
35 525 sugar in form of candies, juices and tea with sugar, which was a part of their tradition. Parents  
36  
37 526 were also worried since children frequently complained of toothache and some of them had  
38  
39 527 several fillings or a lost tooth.

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41  
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43  
44 528 Some parents even believed that they needed some amount of added sugar for normal body  
45  
46 529 function. Parents were unable to monitor and control their children's sugar intake.

47  
48  
49 530 *"I must have juice in the refrigerator all the time because my children want to drink juice*  
50  
51 531 *once every hour. I cannot say no to them because they will not eat anything else. I can't help*  
52  
53 532 *but buy juice as I also like it."* (Mother, Meeting 1)

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2  
3 533 After participation in the activities, mothers reported a sense of satisfaction and relief since  
4  
5 534 they were able to take control over their situation and bring about change, promoting a  
6  
7 535 healthier lifestyle for their children. This in turn made them happier and they slept better.  
8  
9

10 536 *"I felt bad when I realized that it was me who bought juice and sweets. I understood that if I*  
11  
12 537 *stop buying things it would help my family. Since I did that, I sleep better because I know I*  
13  
14 538 *have provided healthy food to my children."* (Mother, Meeting 8)  
15  
16  
17

18 539 Children in the group were particularly excited about learning to brush their teeth from  
19  
20 540 experts and the use of different kind of toothbrushes. They also spoke about the relationship  
21  
22 541 between healthy teeth and healthy living after participation in the discussions.  
23  
24  
25

26 542 *"It was fun to see all the different brushes. I never knew there existed so many. I learnt to*  
27  
28 543 *brush my teeth. I think that we must brush our teeth well since it makes us feel healthy."*  
29  
30 544 *(Child, Meeting 7)*  
31  
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33

34 545 Mothers began to understand the influence of diet on their health more distinctly after  
35  
36 546 participation in the activities. Mothers reported a change in self-perceived health owing to  
37  
38 547 behavioral change after participation in the activities.  
39  
40

41 548 *"Since I made changes to my diet, I started feeling fresher and healthier. I was at the doctor*  
42  
43 549 *last week and he was surprised because I have lost weight."* (Mother, Meeting 8)  
44  
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46

47 550 Participants began to understand the connection between oral health and general health and  
48  
49 551 well-being after having participated in the activities.  
50  
51

52 552 *"Through participation in this activity I have learned about the connection between oral*  
53  
54 553 *health with general health. I have actually seen a change in my physical health."* (Mother,  
55  
56 554 *Meeting 8)*  
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## 556 **Discussion**

557 Participation in the health promotional activities led to changed oral health related behaviour,  
558 and appeared to empower mothers and children, to gain control over their health, which in  
559 turn extended into the entire family as illustrated in the main findings social interactions,  
560 family dynamics and health trajectories. The analysis also draws on Zimmerman's (1995)  
561 definition of psychological empowerment, which includes the dimensions of people's  
562 perceived control of their lives related to their level of participation in community change  
563 [62].

564 The current study shows that a participatory dialogue and reflection, targeting behavioral  
565 change considering the actual needs of the community may initiate lifestyle changes among  
566 socially disadvantaged immigrant families compared to mere personal dietary counselling in  
567 primary care centers or at the dental clinics. This is in line with a previous study [63] which  
568 shows that dietary counselling offered by health care workers is frequently inconsistent,  
569 unclear - and beyond all - not culturally tailored and hence not effective in promoting dietary  
570 changes. On the other hand, in participatory research, participants are engaged in a  
571 collaborative process of social transformation, which enhances the possible uptake of  
572 knowledge through reflection within a social circle [64]. The role of mothers as important  
573 channels for behavioral change in the families is in line with a previous study based on oral  
574 health educational interventions involving immigrant families with children living in  
575 Australia [65]. However, the intervention offered in the Australian study was a predetermined  
576 intervention, unlike in the case of this study where the participants determined the health  
577 promotional activities. In addition, the health promotional activities in the current study were  
578 implemented over a longer period with frequent visits and involved children aged 7-14 years  
579 in contrary to the Australian study where the intervention was provided for 3-4 weeks and  
580 children of younger age (1-3 years) were included. Involving older children in the discussions

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3 581 offered an additional benefit, as they were also active during the sessions, had the opportunity  
4  
5 582 to ask questions, learn from experts, and thereby made changes in their lifestyle.  
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8 583 The interaction between individuals in a group appeared to exert a strong influence on the  
9  
10 584 behaviors, which was beyond the mere social aspect of meeting people to break isolation. The  
11  
12  
13 585 process involved utilization of collective knowledge to bring about changes in daily life  
14  
15 586 through mutual sharing and motivating each other. These results are in line with discussions  
16  
17 587 in a review study [66] that shows that participation in interactive lifestyle interventions in  
18  
19 588 small groups better promotes behavioral and lifestyle changes. This is because individuals in a  
20  
21 589 group are often in similar situations and through being role models to each other even the  
22  
23  
24 590 harder to convince participants in the group tend to change [66]. Similarly, according to an  
25  
26 591 earlier study , social interaction between children is known to help in shaping their cognition,  
27  
28 592 altering their attitudes, beliefs as well as understanding of reality that in turn promotes  
29  
30 593 behavioral changes [67].  
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34 594 The findings from the current study are in line with a previous study which describes the  
35  
36 595 process of change in parental conception following reflective dialogues which facilitated  
37  
38 596 behavioral changes in four stages including awareness of one's current conception,  
39  
40 597 dissatisfaction with one's current conceptions, support and understanding from others,  
41  
42 598 exposure to alternate ways, opportunities for encouragement and reflection [55]. According to  
43  
44 599 Freirean principles which states that the consequence of offering knowledge via dialogue as a  
45  
46 600 tool enhances the individuals control over self and their beliefs thereby leading to self-  
47  
48 601 empowerment [68] and such an empowerment may result in behavioral change [69]. These  
49  
50 602 principles were exemplified in the current study where the mothers in the group became  
51  
52 603 conscious and aware of what constituted the meals they served their families through  
53  
54 604 reflecting on the images of their own breakfast during the initial meeting. Further, through  
55  
56 605 participation in the group meetings they realized that they had a significant role in promoting  
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3 606 a healthier diet to the rest of their family. Despite being frustrated in the beginning, they  
4  
5 607 eventually found support from other participants in the group who were in similar situations.  
6  
7 608 The support, understanding, mutual respect and caring shared among each other in the group  
8  
9  
10 609 tended to have made the mothers psychologically stronger to accept the fact that their families  
11  
12 610 did not consume healthy diets. They began welcoming alternative conceptions that they were  
13  
14 611 exposed to both from the different actors providing knowledge as well as through interaction  
15  
16 612 with other members in the group with varying perceptions. Over time, the participants  
17  
18 613 progressed from a stage of seeking knowledge to sharing knowledge through providing tips to  
19  
20 614 one another as well as to their friends and relatives in the community. The mothers expressed  
21  
22 615 a feeling of confidence in self and appeared to be empowered after participation, which they  
23  
24 616 were lacking in the beginning of the study when they really felt powerless due to their  
25  
26 617 inability to take control over their children's oral health related lifestyle.  
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## 34 619 **Practical Implications**

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38 620 It became known through this study that brochures and health education material used in the  
39  
40 621 Swedish health care were adapted to the Swedish context and were considered less useful for  
41  
42 622 needy communities. The participants believed that educational material showing sugar  
43  
44 623 content in various food products would help understand sugar intake among families in  
45  
46 624 socially disadvantaged neighborhoods. As a part of the activities, participants learnt to read  
47  
48 625 and understand the ingredients list printed on the package of different food products. They  
49  
50 626 also learnt to convert the quantity of sugar in grams to sugar cubes, which helped them  
51  
52 627 communicate and spread the knowledge they gained. Participants gathered photographs of  
53  
54 628 food products and some culturally specific dishes which they wanted to include in a new  
55  
56 629 brochure. Together with the actors in the research team and a dietician, the participants  
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3 630 developed a sugar brochure. The sugar brochures were printed in multiple copies by TePe and  
4  
5 631 distributed to the participants. The brochure was also shared with the primary care, dental care  
6  
7 632 and pharmacy for further dispersal of the material. The participants, both mothers and  
8  
9 633 children found the brochure as a concrete tool for informing their family and friends in the  
10  
11 634 community about the harmful effects of sugar consumption. The mothers in the group became  
12  
13 635 oral health ambassadors in the community and started an initiative “Fight against sugar  
14  
15 636 intake”. They organized small gatherings with other women in the community to talk about  
16  
17 637 the knowledge they gained from their participation in this study, together with the help of the  
18  
19 638 brochure. Some of the children in the group who expressed interest to learn more about oral  
20  
21 639 health, diet and healthy lifestyle were specially educated by experts from TePe over a period  
22  
23 640 of one month with one lecture a week. After participation in the educational sessions, the  
24  
25 641 children were certified as child oral health ambassadors. These child oral health ambassadors  
26  
27 642 began spreading their knowledge in their respective schools.  
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## 644 **Limitations**

645 The current study could have been complemented with a quantitative assessment to explore  
646 changes in oral health related behaviours after participation in the activities. Such an  
647 evaluation is planned with this group using a participatory approach where health promoters  
648 will have an active role in distributing health surveys and analyzing them together with  
649 researchers.

650 Another potential limitation in this study is the non-participation of fathers, which may have  
651 introduced a selection bias. This however does not undermine the value of the findings from  
652 this study. Fathers in this study decided not to participate in the activities since mothers had  
653 the primary role of raising children and steering their behavior in these communities. This is



1  
2  
3 654 also in line with prior research on family traditions and the significant role of mothers in  
4  
5 655 raising children [70, 71]. A notable feature in multistage focus groups used in the current  
6  
7 656 study is that participant dynamics may change during subsequent meetings in that new  
8  
9 657 families take part or some of the original families do not take part in some of the meeting  
10  
11 658 series. According to previous studies, the introduction of new members have a positive effect  
12  
13 659 in that new discussions that emerge and more knowledge is generated [51]. However, in the  
14  
15 660 current study it must be noted that eight to twelve families attended almost all meetings while  
16  
17 661 there were also a few new families in every occasion, which steered new discussions and new  
18  
19 662 perspectives that benefitted even those families who came regularly.  
20  
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24 663 The rapid identification of themes from audio recordings may be considered a methodological  
25  
26 664 limitation. However, in contrast to the original method of listening to the audio for three  
27  
28 665 minutes [57], the themes were identified after listening to the entire audio recording several  
29  
30 666 times. In addition, extensive field notes were collected during each of the nine sessions,  
31  
32 667 which was used as complementary information to the audio recordings during analysis. Aside  
33  
34 668 of this the research team also had a deeper understanding of the participants' views from a  
35  
36 669 contextual perspective owing to their prior engagement with participants in the trust-building  
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38 670 phase, which was also enhanced by the involvement of health promoter.  
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## 47 672 **Conclusion**

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51 673 The current study highlights the importance of working with the family, to ensure sustainable  
52  
53 674 lifestyle changes. Placing the focus on both the process of change as well as the action paved  
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55 675 ways to explore how families experienced their participation in the activities offered as well  
56  
57 676 the determinants of behavioral change. Providing mothers and children with the knowledge  
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3 677 and skills to promote oral health behaviors influences not only their immediate family but also  
4  
5 678 their communities or social groups. However, the success of knowledge transfer is mediated  
6  
7 679 by the principles of participatory research that strengthens and appeared to empower  
8  
9 680 individuals, and may contribute to a healthier society and reduced health disparities.  
10  
11  
12  
13 681 Reflective dialogue and interactions within the social context influences the health promotion  
14  
15 682 process, and through the participatory approach, individuals seem to gain empowerment that  
16  
17 683 in turn can lead to behavioral change. Such a strategy can be considered in future work  
18  
19 684 targeting to promote health in disadvantaged populations.  
20  
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## 27 686 **Competing interests**

28  
29  
30 687 The presence of a private company TePe Oral Hygiene Products, here represented by the fourth  
31  
32 688 author (ANO) who is the head of the odontology and scientific affairs section may raise  
33  
34 689 questions related to competing interests. However, ANO aimed at understanding user needs in  
35  
36 690 order to develop products and solutions for improved oral health in socioeconomically  
37  
38 691 distressed communities. TePe Oral Hygiene Products represented by ANO had no financial  
39  
40 692 gains through the participation in the research project. The representative from Apotek Hjärtat,  
41  
42 693 private pharmacy was a trained pharmacist who participated in some of the sessions to inform  
43  
44 694 the participants about the oral health related side effects of different medications such as dry  
45  
46 695 mouth and how these can be prevented or treated. They did not have any financial gains from  
47  
48 696 their participation in this study. A representative from the non- profit organization, Save the  
49  
50 697 children participated in all the session with an intention to offer children and mothers in the  
51  
52 698 group social support and counselling if sensitive issues were discussed. They also informed the  
53  
54 699 participants concerning child rights. The representative from the primary care (Region Skåne)  
55  
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2  
3 700 was a dietist who was active in the sessions where diet was the subject of discussion, as well  
4  
5 701 as, in the development of the brochures.  
6  
7  
8  
9 702

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12  
13  
14  
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16  
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18  
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20  
21 707 municipality for providing their premises to conduct the various activities.  
22  
23  
24  
25 708

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29  
30  
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32  
33 711 2017–01272).  
34  
35  
36  
37 712

## 38 39 40 41 713 **Authors' Contributions**

42  
43  
44 714 RR, EC, SBR, ANO, AK and MR conceptualised and designed the study. RR, SBR, ANO and  
45  
46 715 MR collected data. RR, EC, MR and SBR analysed the audio recordings. RR wrote the initial  
47  
48 716 version of the manuscript under the guidance of AK, EC and MR. All authors gave detailed  
49  
50 717 feedback on early iterations of the manuscript. All authors have read and approved the final  
51  
52 718 version of the manuscript.  
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3 721 **Data Sharing Statement**  
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6  
7 722 The audio recordings from the focus groups generated and analyzed during the current study  
8  
9 723 are not publicly available due institutional policy and GDPR regulations but are available  
10  
11 724 from the corresponding author on reasonable request.  
12  
13

14  
15 725 **Legend of Figure 1**  
16

17  
18 726 Chronological timeline of the multistage focus group interviews.  
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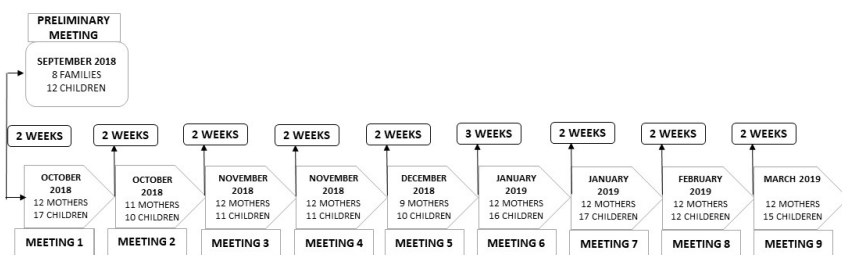


Figure 1:Chronological timeline of the multistage focus group interviews

338x190mm (96 x 96 DPI)

# Reporting checklist for qualitative study.

Based on the SRQR guidelines.

## Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the SRQR reporting guidelines, and cite them as:

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. *Acad Med.* 2014;89(9):1245-1251.

	Reporting Item	Page Number
<b>Title</b>		
	<a href="#">#1</a> Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g. ethnography, grounded theory) or data collection methods (e.g. interview, focus group) is recommended	1
<b>Abstract</b>		
	<a href="#">#2</a> Summary of the key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results and conclusions	2
<b>Introduction</b>		
Problem formulation	<a href="#">#3</a> Description and significance of the problem / phenomenon studied: review of relevant theory and empirical work; problem statement	3-7

1	Purpose or research	<a href="#">#4</a>	Purpose of the study and specific objectives or	8
2	question		questions	
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4	<b>Methods</b>			
5				
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7	Qualitative approach and	<a href="#">#5</a>	Qualitative approach (e.g. ethnography, grounded	11
8	research paradigm		theory, case study, phenomenology, narrative research)	
9			and guiding theory if appropriate; identifying the	
10			research paradigm (e.g. postpositivist, constructivist /	
11			interpretivist) is also recommended; rationale. The	
12			rationale should briefly discuss the justification for	
13			choosing that theory, approach, method or technique	
14			rather than other options available; the assumptions	
15			and limitations implicit in those choices and how those	
16			choices influence study conclusions and transferability.	
17			As appropriate the rationale for several items might be	
18			discussed together.	
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26	Researcher characteristics	<a href="#">#6</a>	Researchers' characteristics that may influence the	15
27	and reflexivity		research, including personal attributes, qualifications /	
28			experience, relationship with participants, assumptions	
29			and / or presuppositions; potential or actual interaction	
30			between researchers' characteristics and the research	
31			questions, approach, methods, results and / or	
32			transferability	
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37	Context	<a href="#">#7</a>	Setting / site and salient contextual factors; rationale	9
38				
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40	Sampling strategy	<a href="#">#8</a>	How and why research participants, documents, or	9-10
41			events were selected; criteria for deciding when no	
42			further sampling was necessary (e.g. sampling	
43			saturation); rationale	
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46	Ethical issues pertaining to	<a href="#">#9</a>	Documentation of approval by an appropriate ethics	15-16
47	human subjects		review board and participant consent, or explanation for	
48			lack thereof; other confidentiality and data security	
49			issues	
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53	Data collection methods	<a href="#">#10</a>	Types of data collected; details of data collection	12
54			procedures including (as appropriate) start and stop	
55			dates of data collection and analysis, iterative process,	
56			triangulation of sources / methods, and modification of	
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1		procedures in response to evolving study findings;	
2		rationale	
3			
4	Data collection	<a href="#">#11</a> Description of instruments (e.g. interview guides,	12
5	instruments and	questionnaires) and devices (e.g. audio recorders) used	
6	technologies	for data collection; if / how the instruments(s) changed	
7		over the course of the study	
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11	Units of study	<a href="#">#12</a> Number and relevant characteristics of participants,	10-11
12		documents, or events included in the study; level of	
13		participation (could be reported in results)	
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16	Data processing	<a href="#">#13</a> Methods for processing data prior to and during	14
17		analysis, including transcription, data entry, data	
18		management and security, verification of data integrity,	
19		data coding, and anonymisation / deidentification of	
20		excerpts	
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24	Data analysis	<a href="#">#14</a> Process by which inferences, themes, etc. were	14
25		identified and developed, including the researchers	
26		involved in data analysis; usually references a specific	
27		paradigm or approach; rationale	
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31	Techniques to enhance	<a href="#">#15</a> Techniques to enhance trustworthiness and credibility	15
32	trustworthiness	of data analysis (e.g. member checking, audit trail,	
33		triangulation); rationale	
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36	<b>Results/findings</b>		
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39	Syntheses and	<a href="#">#16</a> Main findings (e.g. interpretations, inferences, and	17-22
40	interpretation	themes); might include development of a theory or	
41		model, or integration with prior research or theory	
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44	Links to empirical data	<a href="#">#17</a> Evidence (e.g. quotes, field notes, text excerpts,	17-22
45		photographs) to substantiate analytic findings	
46			
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48	<b>Discussion</b>		
49			
50	Intergration with prior	<a href="#">#18</a> Short summary of main findings; explanation of how	23-25
51	work, implications,	findings and conclusions connect to, support, elaborate	
52	transferability and	on, or challenge conclusions of earlier scholarship;	
53	contribution(s) to the field	discussion of scope of application / generalizability;	
54		identification of unique contributions(s) to scholarship in	
55		a discipline or field	
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1	Limitations	<a href="#">#19</a>	Trustworthiness and limitations of findings	26-27
2				
3	<b>Other</b>			
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5	Conflicts of interest	<a href="#">#20</a>	Potential sources of influence of perceived influence on	28
6			study conduct and conclusions; how these were	
7			managed	
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11	Funding	<a href="#">#21</a>	Sources of funding and other support; role of funders in	29
12			data collection, interpretation and reporting	
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16 American Medical Colleges. This checklist was completed on 23. October 2019 using  
17 <https://www.goodreports.org/>, a tool made by the [EQUATOR Network](#) in collaboration with  
18 [Penelope.ai](#)  
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