

Application of the Life Grid in Oral Health Research: A Scoping Review

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Aim: The life grid is a retrospective interview-based tool used to enhance recall of past events. This scoping review examines the use of the life grid in oral health research and its applications. **Methods:** Using the Joanna Briggs Institute framework, Medline (Ovid), CINAHL, PsycInfo, ERIC, MedEdPortal, Web of Science Core Collection, ProQuest, and Google Scholar were searched with “life grid” and “oral” as initial keywords. Then, two reviewers screened the records independently. Studies published until April 21, 2022, were added, regardless of language. Data were summarised narratively and in a comprehensive table focused on seven main areas. **Results:** A total of 22 studies were included from 724 initially identified records. The life grid was used in different forms, in various qualitative, longitudinal, and cross-sectional studies with participants of different ages. Eight studies used the life grid at the beginning of the interview, four during the process, and one at the end. The ability to reduce recall bias, increase data reliability, establish rapport with participants, and ensure information accuracy were among the most commonly cited benefits of using the life grid in oral health research, particularly in oral cancer research. **Conclusions:** The life grid is a flexible tool used in a variety of structures and applications in oral health research. Positive impacts have been reported by both researchers and participants. This review highlights the potential of the life grid as a data collection and interview tool in oral health research and dental education.

Keywords: Research Design, Retrospective, Interview, Communication, Review, Data Collection

Introduction

The influence of lifetime exposures to environmental and behavioural factors on the development of chronic health conditions such as diabetes and cancers is well documented (Uauy and Solomons, 2005). Chronic oral health conditions including dental caries and periodontal diseases are not an exception to this influence, due to their largely irreversible and cumulative nature (Locker, 1988). The onset and development of these conditions are strongly influenced by structural factors like social capital, behavioural factors like diet and self-care, and the social determinants of oral health including socio-economic status and living environment (Watt, 2002; Rouxel *et al.*, 2015).

One approach to studying the interplay of these life-long exposures on oral health is through retrospective studies, where medical and lifestyle histories of participants are examined to identify factors associated with the onset and progression of a condition. Interviews can be used to gather information about life events as they offer rapid responses, are cost-effective, and tend to be less methodologically difficult (Blane, 1996). Interviews, however, have been criticised for their risk of recall bias and the consequent data inaccuracy.

The risk of recall inaccuracy is greater when a long period of time is studied. This might be due to the participant's current life situations affecting their memory, which may lead them to forget events or remember them differently, especially if they are experiencing cognitive decline (Sudman and Bradburn, 1973).

In response, Blane (1996) designed an interview tool called “life grid” to improve the accuracy of retrospective interviews by aiding the participants' recall. The life

grid is a visual aid in the form of a table, with rows representing different years in the interviewee's life and columns representing life aspects of it, depending on the focus of the interview (Parry *et al.*, 1999) (Figure 1). This method has been shown to enhance the recall and accuracy of personal, social, and historical incidents ranging from marriage, immigration, and work experiences, to political events and global catastrophes (Blane, 1996), it has reached a wide range of research disciplines involving diverse populations and age groups (Ballal *et al.*, 2020), and applications beyond recall accuracy (Abbas *et al.*, 2013). It has been used with different structural forms and application methods (Parry *et al.*, 1999), though the most effective form and method have yet to be determined. Additionally, the extent to which the life grid impacts the research process in general and in oral health-related research in particular, has yet to be fully explored.

A scoping review was suggested to gather information about the life grid as it summarises the existing literature as a guide for future oral health researchers who might benefit from such tool. As of March 2022, there was no scoping or systematic review on this topic. Therefore, in this scoping review, we aim to map the structure, application methods, and user perspectives of the life grid in oral health research.

Method

We conducted a scoping review following the Joanna Briggs Institute's (JBI) framework (Peters *et al.*, 2020). We followed the stages of identifying the research question; identifying relevant studies; selecting the studies; charting the data; and collating, summarising, and reporting

Year	Age	Life Events	Marriage & Family	Holidays	Relationship Issues

Figure 1. Example of a life grid (Bell, 2005).

the results. We did not include a quality appraisal of the data, as we aimed to overview the use of the life grid in oral health research with a more descriptive report of the findings.

A search strategy with three steps first made an initial search of MEDLINE (via OVID) and CINAHL databases to identify the keywords used to index the articles reporting the life grid in oral health research. The second step searched Medline (Ovid), CINAHL, PsycInfo, ERIC, MedEdPortal, and Web of Science Core Collection. ProQuest Dissertations and Theses Global and Google Scholar were also searched for relevant grey literature. Our search concluded on April 21, 2022 (Table 1). Next, we hand-searched the reference lists of all included studies for potentially unidentified eligible documents.

Following the search, all identified citations were uploaded to Covidence (Veritas Health Innovation, Melbourne, Australia). Title and (if available) abstracts were screened by two authors (MMS and TM), and uncertainties and disagreements were resolved through discussions. Studies where the reviewers could not reach an agreement about their eligibility, were included. A successive full-text screening was carried out for studies that were deemed eligible for inclusion in the title and abstract screening.

Reports of using a life grid to aid interviews (core concept) in oral health research (context) with participants of any age (participants), without any limitation in language or time frame were considered for inclusion;

Table 1. Search Strategy.

Date	Databases	Search #	Searched keywords
January 20, 2022	Medline (Ovid)	S1	Life grid
	& CINAHL(EBSCO)	S2	S1 AND oral health
April 21, 2022	Medline (Ovid), CINAHL, PsycInfo, ERIC, MedEdPortal, Web of Science Core Collection, ProQuest Dissertations and Theses Global, and Google Scholar	S3	("life grid" OR lifegrid OR Life-grid) AND (oral OR dent*)

whether they had used qualitative, quantitative or mixed methods or were review articles. Reports that did not use the life grid in original research or lacked full text were excluded (Figure 2).

A data extraction tool was developed according to JBI guidelines (Peters *et al.*, 2020) and was piloted in two of the included studies. The third author (MB) revised the extraction tool, and modifications such as adding columns based on the review’s objectives (e.g., perspectives toward the life grid and data sources in the study) were made (Table 2). Data regarding the life grid structure (number and heading of columns, arrangement, etc.), methods of application (timing of use, visibility to the participant, etc.), and its impacts on the research process (including the authors, researchers, or the participants’ opinions) were analysed.

Following data analysis, a narrative and descriptive summary and a comprehensive table (Table 2) were used to present the results.

Results

In total, 724 records were identified in the database search (Figure 2). After removing duplicates, the remaining 624 documents underwent title and abstract screening leaving 46 for full-text screening. Twenty-seven publications were excluded as they did not fit our inclusion criteria or repeated data (E.g. when a thesis originated one or more journal publications). Other reasons for exclusion were irrelevance to oral health research, having no full text available, or mentioning the life grid only in the literature review or only as a recommendation for future research. Three publications were also added through hand searching of the reference lists, resulting in 22 records included for data extraction.

Table 2 summarises the published studies applying the life grid in oral health research. The oldest record was published in 2011 and the most recent in 2020. The twenty-two (22) publications included eight manuscripts and fourteen full theses. Most studies (73%) were case-control, followed by cross-sectional (Sabokseir *et al.*, 2016), case-control and cross-sectional (Ullah, 2020), longitudinal (Letelier, 2018; Li, 2018), and qualitative phenomenological (Crawford and Wilkinson, 2019). One report did not specify the design (Golkari *et al.*, 2017).

The publications originated in Canada (N=15), the United Kingdom (N=3), Australia (N=2), and Iran (N=2). All were published in English except for one in French (Janati, 2014).

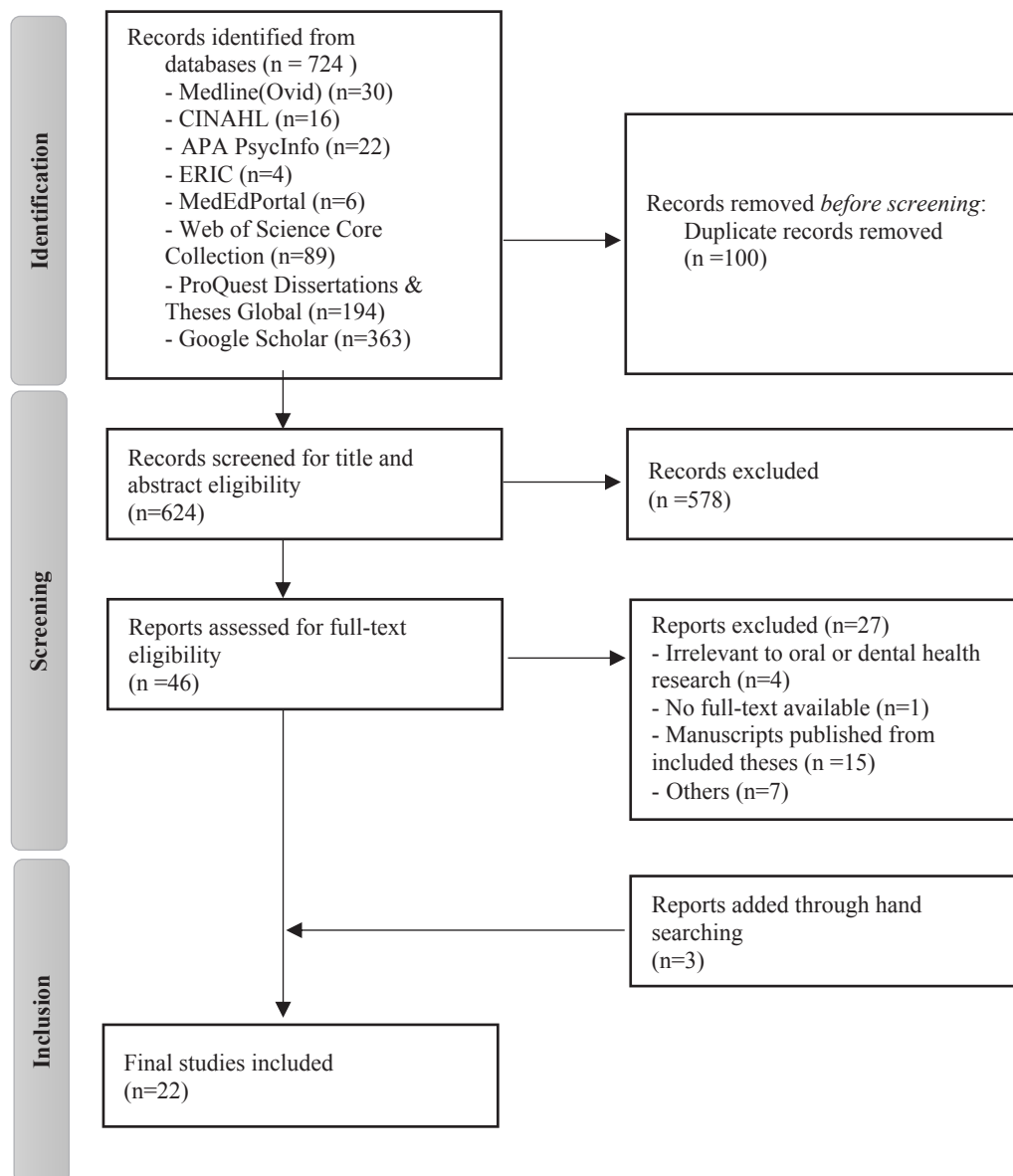


Figure 2. (PRISMA-ScR) flow chart (Tricco *et al.*, 2018) for reports using the life grid in oral health research.

The most investigated topic was risk factors and aetiologies of head and neck cancer (16 studies). The other six studies focused on the experience of mothers of adult children with dysphagia (n=1); oral health-related risk factors for colorectal cancer (n=1); early childhood life events (n=1); the association of social mobility and health (n=1); distinguishing between enamel fluorosis and other enamel defects (n=1); and the use of smokeless tobacco use among adolescents and their risk for oral cancer (n=1).

In all 22 studies, the life grid was administered to collect lifetime information on sociodemographic status (Krishna Rao, 2014; Sabokseir *et al.*, 2016; Golkari *et al.*, 2017; Letelier, 2018; Ullah, 2020, and general health conditions (Sabokseir *et al.*, 2016; Golkari *et al.*, 2017; Letelier, 2018).

Only two reports mentioned specific goals for using the life grid. The description and inclusion of the life grid varied, with three studies solely describing the structure of their life grid, four solely attaching their life grid in the documents, six doing both, and nine neither describing nor attaching the life grid utilised in their research.

The life grid was described in various ways, ranging from a large flip chart with a timeline (Crawford and Wilkinson, 2019) to a detailed table with 22 rows and

11 columns (Golkari *et al.*, 2017). Additionally, some researchers modified the life grid's structure, such as placing the age/year column in the middle (Farsi, 2011) or on the left (Golkari *et al.*, 2017). Despite these differences, all studies shared the same basic principle, with columns serving as categories of events to be recorded and rows representing ages or time periods.

Nine publications did not specify the method for using the life grid, but among the others, eight introduced it at the beginning of the interview and used the recorded events for cross-matching throughout the interview (Krishna Rao, 2014; Gupta, 2017; Ullah, 2020), while four built the life grid during the interview (Janati, 2014; Golkari *et al.*, 2017; Soman, 2017). In contrast, one study utilised the life grid at the end of the interview (Crawford and Wilkinson, 2019).

While one study (Laprise *et al.*, 2016) did not discuss the impact of employing the life grid on the research process, the benefits of using the tool were cited in twenty other reports. The life grid was found to minimise recall bias and enhance data reliability and accuracy. Other impacts from the researchers' perspectives included helping establish rapport with participants (Thekke Purakkal, 2012;

Table 2. Studies applying the life grid technique in oral health research.

<i>Author (year; country)</i>	<i>Objectives</i>	<i>Study design</i>	<i>Sample (N)</i>	<i>Grid structure</i>	<i>Method of use</i>	<i>Observations</i>
Crawford and Wilkinson (2019; UK)	Describe use of life grid & highlight effectiveness sharing & summarising complex data of people with Profound Intellectual and Multiple Disabilities and dysphagia	Qualitative phenomenology	Mothers of adult children with PIMD and dysphagia (N=3)	Large flip chart Timeline on left	At end of interviews Key events mapped along timeline Events discussed again to accuracy check and clarify	Useful in clarifying, organising and member-checking Visual data representation Tool to close interview Gained focused information Helped discuss difficult events Visible to participant & gave control Reduced recall bias
Durán et al (2020; Canada)	Estimate HPV infection in association between oral sex & oropharyngeal cancer	Case-control	Head and Neck Cancer (HeNCe) Life study (Cases N=188; Controls N=429)	Not informed	Not informed	Reduced recall bias
Farsi (2011; Canada)	Identify risk factors for head and neck cancer (HNC) and whether factors differ according to HPV infection	Case-control	HeNCe Life Study (Cases N=150; Controls N=161)	One central line with age from birth to present Four columns: Habits, Education/Job, Housing, and Other	At beginning of interview Important events marked Used during interview to help recall	Optimised accuracy Improved recall Reduced information bias
Farsi (2014; Canada)	Investigate the role of HPV in the aetiology of HNC	Case-control	HeNCe Life Study (Cases N=396; Controls N=438)	Same as Farsi (2011; Canada)	At beginning of interviews Important events marked down Events presented in interview	Reduced recall bias Optimised data accuracy Helped recall by linking events
Golkari et al (2017; Iran)	Develop life-grid method to collect data on events in early childhood	Not informed	Primary school children (N=110)	21 predefined age periods in rows 11 columns: External & Personal lifelines, Family residence, Occupation of parents/caregivers, Child's activities, Height, Weight, Illnesses, Medicine, Hospitalisation & Accidents	During interview Visible to participant	Helped recall events Helped correct events' times External line had least impact. Showed life histories well Helped friendly interaction Easier for interviewers than expected.
Gupta (2017; Australia)	Determine whether upper aerodigestive tract (UADT) cancers are influenced by behaviours & social circumstances	Case-control	UADT cancer (Cases N=240; Controls N=240)	Eight columns: Year, External events, Age, Life events, Years of education, Behaviours, Housing, and Occupation.	At beginning of interviews Cross-referenced events	Improved reliability of retrospective data Reduced recall bias
Janati (2014, Canada)	Assess feasibility of research on oral health in colorectal cancer risk	Case-control	Colorectal cancer (Cases=30; Controls=39)	Not informed	During interview Cross-referenced events	Improved data accuracy Reduced recall bias

Table 2 continued overleaf

Table 2. Continued...

Krishna Rao (2014; Australia)	Explore life course models in oral cancer. Estimate effect of childhood socioeconomic conditions on oral cancer. Develop screening model	Case-control	Oral cancer (Cases N=180; Controls N=272)	Twelve columns: Year, External events, Age, Life events, Residence, Occupation, Income, Diet, Tobacco, Quid & Alcohol use.	At beginning of interviews Used as guide throughout	Useful in collecting life-course data by cross-referencing events Improved recall accuracy				
Kumamangalam Puthiyannal (2013; Canada)	Assess association between periodontal health and the risk of oral cancer	Case-control	HeNcE Life study (Cases N=350; Controls N=371)	Not informed	During interview Major events recorded Other events cross-referenced	Reduced measurement error Stimulated & organised memory Developed rapport Not informed				
Laprise et al (2016; Canada)	Study association between oral HPV infection & oral cancers	Case-control	HeNcE Life study (Cases N=350; Controls N=371)	Not informed	Not informed	Not informed				
Laprise et al (2019; Canada)	Estimate roll of life course oral sex in OPC, and if mediated by oral HPV	Case-control	HeNcE Life Study (Cases N=460; Controls N=458)	Not informed	Not informed	Reduced measurement error				
Laprise et al (2017; Canada)	Describe the HPV genotype distribution and whether associated with HNC	Case-control	HeNcE Life Study (Cases N=460; Controls N=458)	Not informed	Not informed	Improved recall Reduced measurement error				
Laprise et al (2016; Canada)	Estimate association of periodontal diseases with oral cancer	Case-control	HeNcE Life Study (Cases N=306; Controls N=328)	Not informed	Not informed	Improved recall Reduced measurement error				
Letelier (2018; UK)	Assess whether social mobility predicts adult general & oral health, & physical function	Longitudinal	English Longitudinal Study of Ageing (ELSA), Wave 3 (N=9,771) and Wave 4 (N=11,050)	Not informed	Not informed	Helped recall, as a visual method				
Li (2018; Canada)	Investigate relationship between beta-blockers & HNC survival	Cohort	HeNcE Life Study (N=303)	Same as Farsi (2011; Canada)	Not informed	-Encouraged more accurate recall				
Madathil (2013; Canada)	Determine association between parental & participants' paan chewing Assess exposure to paan in risk of oral cancer	Case-control	HeNcE Life study (Cases N=350; Controls N=371)	Same as Farsi (2011; Canada)	At beginning of interview Major life events noted referring to age Other events cross-referenced	Improved recall accuracy & reduced bias Establish rapport				
Madathil (2018; Canada)	Investigate life course behaviours in aetiology of HNC Understand role of tobacco use in HNC	Case-control	HeNcE Life study (Cases N=810; Controls N=829)	Same as Farsi (2011; Canada)	Beginning of interview Major events noted. Other events cross-referenced	Improved recall and reduced bias Established rapport Should be assessed for collecting data on behavioural risk factors				

Table 2 continued overleaf

Table 2 continued

Sabokseir et al (2016; Iran)	Distinguish fluorosis from other defects	Cross-sectional	9-year-old children (N=400)	Early Childhood Events grid (ECEL) of developmental milestones and shorter periods	Not informed	More accurate recall Seemed promising to record health-related events
Soman (2017; Canada)	Study causal pathways between socioeconomic position, polymorphisms, behaviours and HNC	Case-control	HeNcE Life study (Cases N=810; Controls N=829)	Same as Farsi (2011; Canada)	During interview Responses cross-checked after interview	Improved retrospective data quality – Improved recall
Thekke Purakkal (2012; Canada)	Estimate extent of life course socioeconomic position on oral cancer	Case-control	HeNcE Life study (Cases N=200; Controls N=150)	Same as Farsi (2011; Canada)	At beginning of interview Information cross-referenced Used as guide in interview	Helped establish rapport Improved recall & quality of data
Ullah (2020; UK)	Investigate smokeless tobacco use, knowledge of adverse effects, predictors of use & assess risk in oral cancer	Cross-sectional and Case-control	Secondary school students (N=790) and oral cancer (Cases N=169; Controls N=338)	Same as Farsi (2011; Canada)	Beginning of interview Important events recorded before-hand Events cross-referenced during interview	Helped accurate recall by minimising recall bias
Ying (2019; Canada)	Estimate role of lower 2nd & 4th digit ratio in Oral Carcinoma	Case-control	HeNcE Life study (Cases N=348; Controls N=371)	Same as Farsi (2011; Canada)	Not informed	Stimulated and organised participants' memory Developed rapport

Madathil, 2013, 2018; Golkari *et al.*, 2017; Ying, 2019), visually representing life events during the interview (Golkari *et al.*, 2017; Letelier, 2018), facilitating data collection and verifying collected information (Crawford and Wilkinson, 2019).

Discussion

To our best knowledge, this is the first scoping review to overview the application of the life grid in oral health research and describes the perspectives surrounding its use. The review follows the JBI framework (Peters *et al.*, 2020), and searched multiple databases with no language or time-frame limitations to include all available literature on the topic. Additionally, two reviewers collaborated to ensure a thorough analysis. The life grid tool has been employed in oral health research for only the last twelve years, following its introduction in 1996 (Blane, 1996). The Head and Neck Cancer Life course (HeNcE Life) study seems to be the first to do so (Thekke Purakkal, 2012).

Our results showed various implications of the life grid. For instance, the most researched topic was oral cancer risk factors and aetiologies. Given cancers' life-long chronic development process, the life grid was found effective in accurate data collection on its risk factors and aetiologies accumulating since early life (Ying, 2019).

The life grid also had other implications in these studies, such as accuracy checking. For instance, Farsi (2014) checked consistency in participants' answers. The author compared the years of education received with the attained degree to resolve the inconsistencies before the analysis. This may be even more advantageous if done before finishing the interview to check these inconsistencies with the participants, as suggested by Crawford and Wilkinson (2019).

Most included topics were researched quantitatively. Bell (2005) criticised the life grid technique for encouraging more "event-centred" data rather than focusing on the emotional aspects of the events, implying more suitability for quantitative research. However, Abbas (2013) states that the grid would be as useful in qualitative research by explaining to participants that information beyond the events *per se*, including experiences, thoughts, and emotions are sought as data. To date, this technique has been successfully used in various qualitative studies in disciplines including health (Ballal *et al.*, 2020), education (Abbas *et al.*, 2013), and sociology (Parry *et al.*, 1999).

The study participants' wide age range was also noted. Despite older adults being the main target population of life grid research (Parry *et al.*, 1999), the life grid was useful when interviewing much younger people, including elementary school children (Sabokseir *et al.*, 2016; Golkari *et al.*, 2017) and adolescents (Ullah, 2020). Further, its use can go beyond the study of risk factors in later-life chronic conditions to phenomenological meaning-making (Crawford and Wilkinson, 2019) and differential diagnosis of developmental pathology (Sabokseir *et al.*, 2016).

Additionally, the life grid was effective in both structured (Gupta, 2017; Ullah, 2020) and semi-structured (Crawford and Wilkinson, 2019) interviews. It also has different methods of application. Most studies filled in the life grid with the major life events at the beginning and used it as a guide during interviews (Farsi, 2011). Crawford and Wilkinson (2019), on the other hand, used it at the end of

the interview to check or clarify the data, filling potential gaps rather than for its original purpose of aiding recall.

Such variations also extended to the forms in which the life grid has been used, attesting for its flexibility. For example, the HeNCe Life study planned the column headings as ‘Habits’, ‘Education/Jobs’, ‘Housing’, and ‘Other’ with the age timeline at the centre (Farsi, 2011). Golkari et al. (2017), instead, used ten columns as categories of data and predetermined time periods in rows. They assigned shorter periods to the children’s earlier life stages for a more detailed investigation of events more important to physical and mental development.

Various impacts of the life grid on the research processes were pointed out in the reports. In all of them, facilitation of recall and minimising the participants’ recall bias to enhance the data’s reliability and accuracy was the researchers’ goal for employing the life grid (Berney and Blane, 1997; Bell, 2005). This follows the principle that respondents are more likely to recall their life events regarding individual or family, like marriage or the birth of a first child (Rodgers, 1973).

However, Crawford and Wilkinson (2019) mentioned that facilitation of recall was not so relevant when they used the life grid at the end of the interview and did not need accurate recall of events but rather, the feelings, beliefs, and meaning-making associated with the participants’ experiences. Still, they found the life grid helpful regarding their objectives.

Participants’ higher control over the interview was another benefit because the life grid gave them a visual representation of the data (Crawford and Wilkinson, 2019). Interestingly, only one other study (Golkari et al., 2017) described the life grid being visible to the participant during the interview and mentioned receiving positive feedback from the participants on its application. Some authors felt the life grid’s visual presence empowers participants to guide the conversation or question, contradict, or redirect it. (Parry et al., 1999; Crawford and Wilkinson, 2019), giving them the flexibility to decide what topics they want to talk about, including sensitive matters (Ballal et al., 2020). Lalanda Nico (2016), felt this facilitated and enhanced the depth of the interview.

In two reports, participant satisfaction was reported as an impact of the life grid (Golkari et al., 2017; Crawford and Wilkinson, 2019). Many others reported that their participants “liked the activity” (Ballal et al., 2020), “appeared to enjoy the interview” (Blane, 1996), found the activity enjoyable and rewarding” (Abbas et al., 2013), which might have increased participation (Berney and Blane, 1997; Parry et al., 1999).

The life grid helped establish a rapport and a more comfortable relationship during the interview (Thekkepurakkal, 2012; Madathil, 2013; Golkari et al., 2017), which in turn increased participants’ comfort and willingness to share their narratives (Berney and Blane, 1997; Parry et al., 1999; Ballal et al., 2020). Parry et al. (1999) explained that this rapport resulted from a sense of joint endeavour between the interviewer and interviewee in completing the life grid. However, Crawford and Wilkinson (2019) did not expect this rapport development if the life grid was used at the end of the interview. Still, this task is positive and mutually collaborative, as evident with their participants engaging enthusiastically.

Interviewer satisfaction with the use of the life grid was described by Golkari et al. (2017) and Abbas et al. (2013).

This study has limitations. Despite a thorough search of various databases, there may be reports of using the life grid in oral health research that were missed. For example, although there was no language limitation in the search, any non-English literature that did not include the English term “life grid” was not accessed in the review. Additionally, we only included literature published before April 21, 2022, and there may be more recent studies. Moreover, there are other data collection tools, such as the Event History Calendar (Freedman et al., 1988), Collage Life Story Elicitation Technique (van Schalkwyk, 2010), Occupational History Calendars (Porcellato et al., 2016), and the Household Grid (Vikat et al., 2018), which are similar to the life grid but were not reviewed. Also, studies that used the life grid but did not explicitly refer to it by this name were not accessible. During the initial screening, the included documents were comprised of theses and manuscripts. Each of these was carefully reviewed during the full-text screening. Some manuscripts had been published included theses. This was determined through similarities found in authors, titles, study samples, objectives, outcomes, or explicit citations within the theses. Considering that the theses and dissertations may provide more extensive content, a decision was made to include only these documents. This choice ensured the maximum inclusion of pertinent information without unnecessary repetition. Finally, due to the scope of this review providing a descriptive (rather than analytic) overview of all the literature on the topic, evidence synthesis and a formal process of methodological appraisal to determine the quality of the publications were not performed. Such appraisal is beyond the focus of a scoping review and is more appropriate for systematic reviews (Ramachandran et al., 2023). This, in turn, may lead to a potential variation in the quality of publications.

In conclusion, this review identified a variety of applications of the life grid in oral health research, the flexibility of this tool in structure and method of use, and the researchers’ and participants’ perspectives on its impacts. This information may help design future oral health research considering the life grid as a data collection tool. However, the extent to which it can be used to train undergraduate health students in developing communication skills to gather information from their patients, for example remains unknown. The authors of this review also suggest a systematic review on this topic to access studies published after April 21, 2022, and evaluate the evidence quality and synthesis based on the review findings.

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Declaration of Conflicting Interests

The Authors declare that there is no conflict of interest.

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