



## Review Article

# Evaluation of the Current Understanding of Oral Health, Periodontal Status and the Treatment Needs of Schoolchildren

Dr Bashar Helail  
Post Graduate, Dip Bristol England

### \*Corresponding Author

Dr Bashar Helail  
Email:

### Article History

Received: 27.09.2019

Accepted: 11.10.2019

Published: 28.10.2019

**Abstract: Objective:** This paper provides an assessment of the current understanding of the periodontal statuses and treatment needs of School **Methods:** comparing three different papers and the methods used and results obtained by each **Conclusion:** The study outcome on the oral health status acknowledges the necessity of preventive measures to improve the methods used in surveying and studying same issues.

**Keywords:** schoolchildren, Oral health, periodontal status , treatment needs, search strategy!

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## INTRODUCTION

The aim of this assignment is to critically review the current understanding of periodontal status and the treatment needs of schoolchildren, with the goal of identifying current concerns and policy and eventually suggesting a research question or hypothesis, demonstrating positivism and interpretivism relative to the assignment, examining both their uses and restriction, before critically assessing a research design from each of the two paradigms.

Periodontal disease is an inflammatory disease that has a harmful effect on both the soft and hard tissue structures which are involved in tooth support . In its early stage, called gingivitis ( or generally gum diseases) , the gums become swollen and red because of irritation, which is the body's normal reaction to the nearness of destructive microbes. In the more serious form of periodontal disease called periodontitis, the gums pull far from the teeth and supporting gum tissues are annihilated (American Academy of Periodontology 2018). During the late 19<sup>th</sup> century Dr. John Riggs was one of the first to describe periodontal disease and called it Riggs disease or pyorrhoea (Armitage 2000).

According to WHO (World Health Organisation)(2018) the High prevalence of periodontal disease in adolescents, adults, and older individuals makes it a public health concern as approximately 20-50% of the global population are affected by the disease. As WHO mentioned in their annual report that extreme periodontal (gum) infection, which may result in tooth loss, was evaluated to be the 11th most prevalent disease globally.

### Search strategy

The paper presented below will be focusing on the periodontal health and the treatment needs of school-children or those associated with a certain ethnic group. All of the research carried out was in English.

Initial research was carried out utilising four electronic databases to gain the relevant data: - CINAHL, SAGE journals, Science Direct and the BDA (British Dental Association) online library.

The studies were a mixture of quantitative and qualitative methods and were international. In my primary research I focused on articles discussing periodontal diseases in children that were systemically fit and excluded any medically compromised cases or special needs. Systemic reviewer protocol requires researchers to make a judgment about the quality of each paper where only high quality evidence papers are included. On the other hand, other papers which were not included in the review might contain valid points to answer the research question (Aveyard, 2014). Rees (2011) stated that a review must be planned very carefully to provide the best quality evidence. Based on this, I selected four articles to include in this review. Finally, I used the CASP(2018) checklist to assess the overall results of the review (CESSDA 2018).

**Full details of the search criteria are provided in Appendix 1**

## Literature Review

According to the publication date, the first paper I am going to review is by Kolawole (2011) 'Oral hygiene measures and the periodontal status of school children' who conducted his study with school children in Osun State in Nigeria. Initially, he obtained ethical clearance from the local university and from the school authorities and selected his sample from a mixture of private and public school children aged between 11-14 years old. He gained consent from both the guardians and the children as well. His methods of data collection were mixed - qualitative (open-ended questionnaire and examination) and quantitative (closed-ended questions and statistics analysis) where he collected data from a total number of 242 children (123 girls and

119 boys). The author also used the scoring index of socio-economic classification where he divided the sample into three groups (high, medium and low). The total number of high socioeconomic children was 125 (more than half the whole sample) and 64 and 53 samples for the medium and low socioeconomic samples respectively. The samples were taken equally from both males and females. A questionnaire was first collected to indicate the brushing and the snacking habits and the author linked the questionnaire to the socioeconomic groups.

The results obtained by the author revealed that the overall prevalence of gingivitis was 21, 4% and that severe gingivitis were slightly higher in the middle socioeconomic class compared to that of the in high and low social economic groups. Also, the study revealed that gingival diseases are associated more with males than females, the researcher linked this to certain facts such as regular use of dental care facilities might have been the reason behind the relatively low gingivitis prevalence in high socioeconomic class might be due to the regular use of dental facilities, yet no clear explanation was given by the researcher in relation to the low socioeconomic class

Varas (2011) in his paper 'Periodontal status and treatment needs of children from 6 to 8 years old in the Santiago Metropolitan Region of Chile' performed a similar study in Santiago, Chile, but he concentrated mainly on 1,637 school children between the ages of 6 and 8. Also, she selected his sample randomly and used cross-sectional quantitative and qualitative methods to collect data. As in the previous paper the socioeconomically the sample as divided into three groups (high - 278 children, medium - 547 and low - 812) and from both genders (49% girls and 51%) and informed consent was obtained. The prevalence of gingivitis was 68.42%. Vargas (2011) also found that gingivitis did not show a significant statistical difference among the three socioeconomic levels. No significant statistical difference between sexes was recorded and the study did report the brushing habits of the participants.

In a later study 'Dental and periodontal status of 12-year-old Dai school children in Yunnan Province, China: A cross-sectional study', by Zhang (2013) studied the periodontal health of 12-year-old school children in the province of Yunnan in China, using similar methods (qualitative and quantitative) of data collection as the previous papers, using multistage and cluster sampling method. Consent was taken from a total of 823 (399 boys and 424 girls) and initially a self-completed questionnaire was sent to the children to determine both their brushing habits and snacking habits. A later stage examination was carried out by a dentist for each individual child. Also, a binary logistic regression analysis was conducted to assess the factors which might be involved in gingival diseases without taking any socioeconomic factors into considerations. The results revealed that overall 61% were brushing twice or more daily and a record of 91% had gingivitis, which was calculated after examination with no major difference recorded between the genders.

Aveyard (2012p.87) stated that "Critical appraisal is the structured assessment of the strengths and weaknesses of a paper." Several steps should be followed when performing a critique appraisal, initially it should be determining if all reviews have been taken systemically?

### **To Answer This Question We Should Highlight Each Paper.**

All three studies had many strengths in relation to data collection and methodology (all of the three studies used quantitative data collection as well as questionnaire and examination), as well as ethical provisions. On the other hand, trying to draw a general conclusion from people who are from a specific population will result in selection bias which affects the outcome of the gingival diseases as patients may differ in variable factors or characteristic features. Kolawole (2011) stated his study was focused on the periodontal health of school children in

general whereas his samples were collected from a specific area. Several researchers such as Jain (2016) and Jacob (2002), as a bias can lead to an incorrect treatment estimating an incorrect relationship between the actual events and its outcomes as it is based on wrong information and therefore affecting the validity of the conclusion. Therefore, other clinicians such as Youravong (2012) bypassed Kolawole (2011) by confining his research only to children inhabiting a shipyard industrial area.

### **Search Strategy**

It is critical that researchers are clear about their own beliefs and assumptions in this regard. In understanding paradigms and their effect upon the research procedure, medical attendants will be better positioned to understand the nature of research questions, why particular methodologies utilised to address those inquiries and how information gathered is analysed and translated. In order to better understand research methodology, health workers need an understanding of research paradigms.

In simple language, paradigms can be described as the lens or filter through which we can view our world clearly, or a belief system. A research paradigm is a methodology or an exploration model for conducting a study that has been confirmed by the research community and that has been in practice for years. It can be described as hypothetical ideas that support, investigate and decide the exploration plans and techniques picked (Stephen, 2015). The first use of paradigms was in the 15<sup>th</sup> century; they have three dimensions: the ontological question; the epistemological questions; and the methodological question. The ontological aspect deals with what reality is, which can be defined as the part of philosophy which is the science of what is, of the sort and structures of objects, properties, events procedures and relations in each zone of the real world. Therefore, to determine the ontological viewpoint of an individual, the way of life, condition, training, connections, society, religion and different angles assume an imperative job while the second aspect (epistemology) means the nature of knowledge which is the philosophy which deals with the method for acquiring substantial learning. It focuses on the nature and extent of learning, while methodology means which precise procedure can be used (Pandey, 2016).

The word 'research' alludes to the methodical, arranged and considered utilisation of 'scientific method' for the examination of some subject, point, issue or concerns, trying to either improve our comprehension of the issue or to find new thoughts or realities. Many research reporters allude to the way of finding new realities as experimental research. The majority of the research ideal models rise up out of one of the two of the ways to deal with research, either positivist or interpretivist methodologies. The positivistic paradigm typically uses a quantitative methodology, while a constructivist or interpretative paradigm typically assumes a qualitative methodology (Henry, 2007). There are several factors which influence the choice of a paradigm such as the aim of the study; whether it is to value the objectives or whether its aims for complex multiple understanding. Also the nature of the research, whether it is a survey, comparison, personal document or observation.

The quantitative paradigm is the one extensively connected with what we like to consider as 'scientific investigation'. The quantitative paradigm includes a system for seeing the world and the things in it in a way that fuses being able to check and 'show' things this respect, quantitative refers to a view of the world which is manageable to measurement, where the findings of research are measurable, countable or can be spoken to in manners which include numbers and insights. This frequently includes control of reality with varieties in just a solitary independent variable to distinguish regularities in, and to form connections between a portion of the constituent components of the social world. (Ellis, 2014, Antwi *et al.*, 2015)

One of the distinguishing characteristics of quantitative research is that it is concerned with proving something (Ellis, 2014). For the positivist paradigm, its epistemology is said to be objectivist, its ontology naive authenticity, its methodology that is experimental, and its axiology beneficence. Once more, unpacking each of these components should enable the specialist to better understand each paradigm. The objectivist epistemology holds that human comprehension is increased through the utilisation of reason (Fadhel, 2002). This implies that through research we can secure knowledge that progressively approximates the real nature of what it is that we examine. This means that, through research, we can gain knowledge which encourages us to turn increasingly objective in understanding our general surroundings (Putnam, 2012; Searle, 2015).

The positivist paradigm is usually validated by applying four criteria, namely, internal validity, external validity, reliability, and objectivity (Burns, 2000). Internal validity means how well the study is run, e.g. the design, operational definitions, how factors are estimated, and what is (not) estimated. Internal validity may be affected by several factors such as: history, if the data are collected over a long period of time; maturation, where the subject might become more or less motivated; testing which might affect the outcome of the study; changing measurement methods; the variation of extremely high or low scores, where different groups are selected from those to the beginning of the study; withdrawal and mortality rate among the samples; and finally if the selection method interferes with one of the above factors. External validity describes the capacity to sum up a study, which is especially compromised if individuals, places, or times are poorly selected. The sample selected should generalise the community at which the research is taking place. Reliability means "repeatability" or "consistency it can be obtained when a certain measure always provide the same result.

Interpretivism research philosophy involves scientists interpreting components of the research; consequently, interpretivism to deal with social reality and in its ability to describe life experience. Accordingly, this philosophy emphasises qualitative analysis over quantitative analysis. This paradigm assumes a subjectivist epistemology, relativist ontology, a naturalist methodology, and a balanced axiology (Kivunja 2017). Epistemology here means that the researcher makes meaning of their data through their own understanding and knowledge. As for the relativist ontology, it means that you believe that any condition studied has more than one fact and that those realities can be investigated and meaning can be made of them or reconstructed through human interactions between the researcher and the sample of the study, and among the research participants (Wasserman, 2005). With the naturalist methodology the researcher uses data and information collected through interviews, discourses, text messages and sessions.

The qualitative paradigm is regularly more related to the sociologies and 'individual focused' research techniques. Qualitative research looks at the world from the perspective or view of the people experiencing it; it is interested in how individuals experience the world, rather than in attempting to catch some quantifiable proportions of reality. The core topics within qualitative research are individual's attitudes, feelings, beliefs and understandings. The distinguishing characteristics of this philosophy are unlike that of quantitative research as it is concerned with describing and seeking to understand the experiences of people rather than proving a cause.

Like for positivist, the interpretivist approach also has four criteria to validate it; these are credibility, dependability, conformability and transferability. Credibility means how reliable and believable the findings are, which is equal to internal validity in positivism. Dependability means how reliable the results are over time and different conditions. Conformability indicates the degree of neutrality in the research study's findings and transferability means can the results be applied to another context?

The term, researcher-participant or (researched) relationships, means the relationship between investigators and the individuals who take part in the study or provide data. Trust is a central focus in research relationships and it is developed gradually over time which means it is not a static but rather a dynamic relationship. Trust is typically conceptualised as a relational relationship, where one individual depends upon someone else to act in certain ways (Baier, 1986; Hardin, 2002, Guillemin 2018 ).The trustier is vulnerable, as in the individual needs to depend on the generosity of the individual being trusted, yet trust is something beyond dependence in the medicinal services setting. Several researchers such as Jones (2012), Eide and Kahn (2008) characterised trust between the researcher and the participant as a deeply personal relationship where the participant depends on the trust of his researcher (Guillemin *et al.*, 2018). The researchers can increase the trust with the participant by being honest towards the participant, by mutual understanding of the participant needs; by being open to feedback and by being able to break bad news when necessary (Zaltman 1988)

The researcher's role is highly debated in qualitative research as qualitative research poses several unique ethical issues and challenges. Both the researcher and the participant have several concerns towards each other which might help in a later stage to build trust between the two parties (Sanjari 2014). The participant may address several concerns towards the researcher such as personal analytic concerns, explanation concerns, and objective concerns. As for the researcher they might hold in their mind other concerns such as expression, specific, subjective, descriptive and illustrations towards the participant. Hewitt (2007) listed several factors that have an impact on the researcher- participant relationship, such as age, socioeconomic level, general appearance, background and culture, different level of knowledge and sex., the impact that the relationship has on data collection, or if the research involves any investigation of illegal activities. Also, a main challenge might take place when a participant starts seeking feedback and solutions from the researcher.

Several data collection methods can be used in qualitative analysis, such as, one to one personal interviews which might be informal, unplanned and might include many barriers, such as language and culture, yet the strength of this method might come from the data gathered which might be highly personalised and allow for follow up questions (Anastasia 2017). It may be collected through questionnaires in the form of open ended questions which is another valid approach of data collection. The strength of this approach is it can be used in small as well as large samples. Also, they provide extra details which can be beneficial in data analysis but weakness might arise from being time consuming with a large amount of data collected. Another method used is focus groupDs which might have the advantage of gaining detailed and descriptive data but the disadvantage of this method comes from them requiring a very skilled researcher to handle them. Observation on the other hand is another method and it might come in the form of examination plus observation and because it's an observation method the information and data collected here are more reliable. Overall qualitative approaches are time-consuming and expensive (Adams *et al.*, 2008).

Quantitative data collection methods include closed-ended questionnaires which are ideal for large samples because its measurable nature allows that to be possible and easier where no in depth details are collected. , however, the responses are specified which can limit the findings because the participants might not agree with any of them. Another approach is face-to-face / telephone interviews which although cost effective the data validity is at risk (Dougherty, 2015). Telephone and web designed interviews is another method which is also ideal for a large sample but can be expensive and require specific skills to set up (Hodur, 2011).

Regardless of whether an investigation is quantitative or qualitative, rigour is an ideal objective that is met through the incorporation of various philosophical viewpoints inherent in a qualitative inquiry and the procedures that are explicit to each methodological methodology, including the confirmation strategies to be observed during the exploration procedure. It additionally includes the scientist's innovativeness, affectability, adaptability, and expertise in utilizing the confirmation techniques that decide the unwavering quality and legitimacy of the developing investigation (Cypress, 2017). Different methods have been developed to ensure rigour in qualitative studies, such as the use of a computerised system to facilitate the analysis of qualitative data, recording information unbiasedly and fathomably, including the utilisation of audiotapes, tapes and distinctive dimensions. Also, testing theories in data analysis and guaranteeing representativeness of cases, including the utilisation of consolidated subjective and quantitative strategies to support generalisation (Seale, 1997). In quantitative studies statistical testers are used to determine whether the findings can be considered to be valid and this is accomplished through estimation or validity (the degree to which an idea is precisely measured) and reliability (instruments accuracy) (Heale, 2015).

Also known as "mixed method or merging approach of both qualitative and quantitative" research, triangulation is the act of uniting a number of research methods to study a certain issue. The strength of triangulation is that it adds rigour, richness, validity, accuracy and depth to the design and to the data collected. It also overcomes the weaknesses of each individual's approach separately as one approach may support the strength of the other approach and therefore it reduces bias and provides more detailed information. Also, it supports the hypothesis testing. Yet, on the other hand, the limitation of this approach is it needs more time and effort as besides a solid research for quantitative and qualitative approach, it requires the ability to integrate both approaches in a proper way (Fetterman, 2009).

In order to have a good understanding of the relationship between the gingival disease in the primary and secondary dentition in school children and the socioeconomic background we should focus on both quantitative and qualitative analysis. Quantitative open-ended questionnaires can give us information about the frequency of tooth brushing whereas face to face interviews can provide us with detailed information about various factors including the socio economics facts. On the other hand, a proper qualitative analysis such as one to one and an open ended questionnaire can address the source of the main problem and how to overcome it.

Jain (2015) and Johnson (2012) suggested that sample size is a very important factor in dental research, as any increase in sample size will lead to a smaller standard of error. Jain(2015) even suggested a number of 600 for a proper dental sample, considering that Kolawole (2011) collected his study from 242 children where to obtain the sample, Initially Kolawole listed all the government-approved public and private secondary schools, then to guarantee an indeed, even financial conveyance, four of them were chosen where Kolawole selected children by a two stage sampling technique from every single school and the selection was made of children between 11 to 14, the validity of that sample may be in question. In addition to this, another factor should have been taken into consideration which is mixed dentition (the time when the child gets his first permanent teeth which is around 6 to the time where all permanent teeth are erupted at around 12 years old).

Several authors Fonseca *et al.*, (2017), Bimstein (1994) and others concluded that there are anatomical variations between gingival of the primary and permanent teeth in children which entitles permanent teeth to be more susceptible to gingival diseases. Yet the first and the second paper ignored the facts they performed their study with children of mixed dentition without mentioning if the gingivitis was around the permanent or primary teeth, a fact Zhang (2013) avoided by taking her sample

only from 14 year olds who had permanent dentition. Another fact which we should not ignore is the socioeconomic background which is largely related to gingival disease. Furthermore Zhang (2013) did not mention the socioeconomic groups, in the sample she collected. Simone (2018) and Ma(2013 ) suggested a strong implication of the socioeconomic level and health statutes which furthermore will affect the result in the samples, where Varas (2011) obtained his samples equally from different socioeconomic groups. Also, 51 % of Kolawole's(2011) samples were collected from high socioeconomic level which can have a good implication on the results, whereas other researchers such as Azodo (2015) and Gambhir *et al.*, (2012) found that children of high social classes use toothpaste more regularly than those of low social background and therefore showed a lesser degree of gingivitis. In Varas's (2011) paper the outcomes were not appropriately described in the title of the paper as no treatment options were discussed or addressed, whereas this point has been highlighted by others such as Clerehugh (2012) and Akinade (2018)

The valid research question here should be *the relationship between the gingival disease in the primary and secondary dentition in school children and the socioeconomic background.*

### Critical Evaluation of 2 Research Designs

There are two types of study design, either an experimental study design or observational study. an experimental study design (clinical trials) means that a solution is suggested by the researcher and the results are observed. These types of studies are good in expressing how beneficial a new treatment is. It includes: randomised controlled trial (RCT) (Bernard 2015); and non-randomised controlled trial. Observational studies are where an individual or patient is observed in normal status and the observer might monitor those individuals over time. There is no control group in this type of study. Observational research design includes: case-control studies; cohort studies; cross sectional studies; or ecological studies (Gelman 2017).

Cohort studies are opposite in the way that they focus on individuals who are already receiving a certain treatment and monitor them over a certain period of time and the results of how effective or successful (that treatment or procedure is compared with another group (the comparison group) that is not exposed to the treatment or factor.

Cohort studies identify a group of patients who are who are as of now taking a specific treatment or have an exposure and follow them forward over time, and afterward contrast their results with a similar group that has not been affected by the treatment or exposure being examined (Ellis 2014). Cohort studies are observational and not as reliable as randomised controlled studies, since the two groups may differ in ways other than in the variable under study. The disadvantages of this design are that it the time frame is long, there are several ethical issues and the sample size must be large. However, several advantages have been highlighted such as multiple outcomes can be monitored, it is a good method for the evaluation of rare conditions, and it is one of the best methods for calculating incidence and prevalence and diseases (Cypress 2017).

On the other hand, qualitative research looks to increase rich story data, as suggested by several authors such as Schultze (2011) and Ploeg (1999). Anastasia (2017) addressed interviews which might be informal, unplanned and might include a lot of barriers such as language and culture yet the strength of this method might come from the data gather here might be highly personalised and allow follow up questions, to overcome the weakness in this approach Coughlan (2009) suggested several points which must be followed such as:- the nature of each question, the technique and method used when asking these questions and how to shape or rephrase each question to fit the participants.

Grounded theory approach was first developed by two sociologists, Barney Glaser and Anselm Strauss, this theory is defined as: 'the discovery of hypothesis from information and data systematically obtained from social research', it can represent a perfect method for investigating social relationships and the behaviour of groups where there has been little investigation of the logical factors that affect individual's lives, it mainly involves accumulation and analysis, as well as the discovery of social process in those data and finally coming out with some analytic codes and classification produced from data and not by pre-existing conceptualisations in order to evolve or "ground" a theory (Calman 2004).

Unlike positivist research a study using grounded theory starts usually with a question or even just with some collection of certain qualitative information, then the researchers will start reviewing all those data collected previously, and repeated ideas gained, concepts or elements become apparent and then each one has its own code, one of the main strengths of grounded theory is the fact that researcher bias has less chance in affecting the outcome of a grounded theory study. ... Another strength of grounded hypothesis is that it can deliver a richer, more assorted arrangement of answers than traditional research, on the other hand it tends to produce large amounts of data which is usually not easy to manage (Allan 2003).

### Ethics

Research ethics are a set of moral principles informing and guiding research practice (Hardicre, 2014). The main aim of these principles are to: protect individuals participating in the research; planning and changing exploration with moral honesty and soundness; ensuring transparency and conducting a high standard of research (Antwi *et al.*, 2018).

There are six main ethical principles which should be applied in order to protect a patient and these are: beneficence, which means commitment with respect to maximising benefits for the individual member; non-maleficence (non-harming); fidelity; justice; veracity and confidentiality (Antwi *et al.*, 2018).

### Vulnerable Groups

All individual who take part in research may be vulnerable. There are three main types of vulnerability that should be considered: vulnerability to physical damage; social vulnerability; as well as vulnerability to emotional and psychological stress. These three types can occur separately or in combination. In a study conducted by Edwards (1993) it was found that the people who are more susceptible to three types of vulnerability are those for whom their informed consent can be in a doubt, such as children under 18, people with mental special needs, those who have certain psychological disorders, in addition to those who have lack of language knowledge.

Moreover, the other groups of people who may suffer from the three types of vulnerability are those who for any social reason are not able to practice an informed consent, such as young offenders. A third group categorised by the University of Sheffield have certain circumstances that prevent them from giving valid consent, such as disabled individuals, those suffering from poor health, the elderly and people in care. People who also fall within this category are relatives who are vulnerable and cannot give a valid consent for someone else (such as a child under 18) (Edwards 1993)

### Sensitive Research

Joan Sieber and Liz Stanley (1988:49) define socially sensitive research as studies in which there are potential results or suggestions, either specifically for the members in the study or for the class of people introduced by the research. However, Lee (1993) suggested that there are other sensitive topics which might not be involved in the previous definition. Also, he categorised several topics as sensitive in research, such as those

that involve deeply private experience, when the individual involved in the research are scared to discuss a topic, or if the research is concerned with deviance or social control. In these cases, there should be an assessment of the potential risks and the possible impacts when dealing with sensitive studies and factors such as a proper data protection policy, information security, ethical approval, and the possibility of any misuse for the study should always be considered when discussing such topics (Dickson-Swift 2008).

### Consent

Informed consent is the process by which a researcher discloses appropriate data about the study so the individual will make an intentional, informed decision to accept or decline to cooperate. Several things should be obtained by a researcher in order to gain informed consent, these include: addressing the purpose of the research in front of the participants; explaining in detail what will happen when they participate; ensuring that there are several steps that will be taken to ensure the confidence of the research; and explaining their right to withdraw at any moment. Consent can be gained from participants in written or oral form, as a one-off or consistently all through the study, retrospectively or not at all. The type will rely upon the nature of the project being conducted.

### CONCLUSION

The task has basically analysed the literature on the influence that socioeconomic factors have on gingival health status, suggesting a possible research question. Two research paradigms have been assessed with the demonstration of some ethical topics.

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