

Impact of lockdown on children's lifestyle and their collaboration during dental sessions



A.V. Brescia*, C. Bensi**, G. Di Gennaro***, M. Monda****, R. Docimo*****

*DDS, Paediatric Dentistry - University of Rome "Tor Vergata", Rome, Italy

**DDS, Paediatric Dentistry Post-Graduate School, University of Rome "Tor Vergata", Regina Apostolorum Hospital, Albano Laziale (Rome), Italy

***Ph.D, Medical Statistician, Department of Pathology and Diagnostics - Integrated University Hospital of Verona, Verona, Italy

****DDS, University of Rome "Tor Vergata", Regina Apostolorum Hospital, Albano Laziale (Rome), Italy

*****MD, DMD, Paediatric Dentistry, Department of Surgical Sciences - University of Rome "Tor Vergata", Rome, Italy

e-mail: raffaella.docimo@ptvonline.it

DOI 10.23804/ejpd.2021.22.01.11

Abstract

Aim To analyse lifestyle of Italian families during lockdown, evaluating its possible impact on the collaboration of children with the paediatric dentist and associated predictive factors.

Materials and methods Only patients aged between 3 and 16 years, who had started treatment before the lockdown and had spent this period with both parents were included in the study. The interviews were carried out using an anonymous questionnaire that assessed school and play activities, the type of diet, the time dedicated to home oral hygiene and the activities carried out with parents. Parents' work situation during lockdown was included to correlate it with time spent at home. The Frankl Behavior Rating Scale was used to determine the degree of cooperation during dental sessions pre- and post-lockdown. Chi-square test and Fisher's Exact tests were used to identify statistical associations of improvement with each categorical variable. Student's t-test was used to highlight the differences in mean values of continuous variables between subjects considered more cooperative and unimproved subjects. Hosmer-Lemeshow test was used to assess the goodness-of-fit of the model. Assumption of linearity of independent variables and log-odds were assessed by Box-Tidwell transformation. Final selection was carried out using the Akaike criterion and all statistical analyses were carried out using the STATA statistical software package.

Results The sample consisted of 212 patients (103F; 109M). The age ranged between 3 and 16 years with an average age of 9.03 years; 82.08% (95% CI 76.24–86.99) of the subjects showed an improvement in collaboration compared to pre-lockdown. Logistic analysis reveals a statistically significant increase of the odds of improvement in patients with a lower pre-lockdown collaboration (OR: 6.05, $p = 0.001$), in children with a parental presence at home (jobless, OR: 30.55, $p < 0.001$; in "smart working", OR: 23.06, $p < 0.001$) when compared to children whose parents work away from home. From a further exploratory analysis, time dedicated to home oral hygiene was increased if associated with an increased presence of the parents at home ($p = 0.015$).

Conclusion Changes in family routines and increased parental presence at home, during the COVID-19 pandemic lockdown, are associated with improved collaboration of children during dental sessions. A statistical association between the increase in time spent on oral hygiene and the increased presence of parents at home was found.

KEYWORDS COVID-19 lockdown; Compliance; Lifestyle; Children's behaviours.

Introduction

Italy is one of the European Countries most severely affected by the COVID-19 pandemic. The data as of August 14th, 2020 indicate that 250,973 Italian residents were positive for COVID-19, including 2,784 children aged 0 to 9 years (1.1%) and 4,964 adolescents aged 10 to 19 years (2.0%) [Italian National Institute of Health, 2020].

The Decree of the Italian Prime Minister dated March 9th 2020 provided for a series of measures for the containment and contrast of the spread of the SARS-CoV-2 virus throughout the national territory [DPCM of March 9th, 2020]. Families had to face sudden and significant changes, especially regarding daily habits and lifestyles. Italy imposed social distancing by limiting outings to strictly necessary activities, closing common places such as schools, parks, cinemas, bars, restaurants, libraries, pubs or discos, and limiting meetings between people, including non-cohabiting family members. The activity in dental clinics was limited to urgent treatment. School activity has been replaced by online learning activities [DPCM of March 9th, 2020]. Behavioural restrictions and general stay-at-home guidelines prompted families to seek solutions to preserve a healthy routine, organising the days between school activities, games, moments of sharing and rest, regular meals and sports activities [Hongyan et al., 2020]. This has resulted in a closer parent-child relationship, lived within the home with different modalities of affection and sharing, compared to the periods of closer family coexistence, experienced in the summer or winter holidays, and differently from what reported by Schwab and Dustin [2015], who observed that during the

summer school holidays, free time is spent in frenetic, fragmented ways and conditions that may not favour quality interactions. The family environment is recognised as one of the factors that can influence the level of cooperation of children [Zabriskie and McCormick, 2001; Wright, 1975]. In the case of the Covid-19 lockdown, although its long-term psycho-physical consequences are to be defined [Saurabh and Ranjan, 2020], it is to be considered whether close cohabitation within the family has positively affected the relationships between parents and children, strengthening emotional ties, encouraging opportunities for dialogue and intensifying educational potential [Perrin et al., 2016].

The hypothesis is therefore that this period of lockdown could have contributed to the emotional well-being of children, favourably affecting their behaviour even in the dental field. The purpose of this study is to analyse the daily lifestyle of Italian families during the lockdown, evaluating its possible impact on the collaboration of children with the paediatric dentist and their associated predictive factors.

Materials and methods

For the purposes of this study, the sample was composed of patients aged between 3 and 16 years who had already undergone a pre-lockdown treatment at Regina Apostolorum Hospital in Albano Laziale (Rome, Italy) and needed to be considered for a new post-lockdown dental treatment by the same operator for restorative, endodontic, surgery and prevention services. Furthermore, only patients whose parents or guardians signed the informed consent and those who had spent the lockdown with both parents were included. Patients with family experience of COVID-19, patients aged >16 years or <3 years, first visit patients, special need patients and patients with a high degree of pre-lockdown cooperation were excluded. There was no compensation for participation in the study.

An interview was carried out using a preformed anonymous questionnaire in order to evaluate the subject's individual behaviour in the relationship with the paediatric dentist and therefore his/her degree of collaboration. The questionnaire assessed school and play activities, the type of diet, the time dedicated to home oral hygiene and the activities carried out with parents. The work situation of parents during lockdown was also included to correlate it with time spent at home. The interview was carried out immediately after the authorisation to open the dental offices also for non-emergency therapies [DPCM 26 April 26th, 2020].

The Frankl Behavior Rating Scale was used to determine the degree of cooperation [Frankl et al., 1962] as follows.

- Degree 1: Refusal of treatment, violent crying, fear or any other obvious evidence of extreme negativity.
- Degree 2: Reluctance to accept treatment, uncooperative behaviour, evidence of a negative, but not overly pronounced, attitude.
- Degree 3: Acceptance of treatment, sometimes cautious, willingness to collaborate with the dentist, sometimes with reservations.
- Degree 4: Good relationship with the dentist, interested in clinical procedures, laughs and lives the session positively.

Statistical analysis

All collected variables were summarised by mean, median, standard deviation, interquartile range, minimum and maximum values. Categorical variables were expressed as percentages. The skewness of the variables was estimated by Shapiro-Wilk test. Improvement is defined as a post-collaboration value greater than the pre-collaboration value. Children age was categorised as age, type of dental service and degree of collaboration pre-lockdown.

Age of children was classified into three groups:

- a) 3–5 years;
- b) 6–12 years;
- c) 12–16 years.

The variable "type of dental service" was classified into: "preventive measures", "restorative", "endodontics", and "surgery".

The percentage of patients with improvement of compliance was estimated with a confidence interval of 95%. Chi-square test or Fisher's Exact tests were performed to identify statistical associations of improvement for each categorical variable. Student's t-test were used to test differences in mean values of continuous variables between subjects considered more cooperative and unimproved subjects. Statistical significance was set at 5%. With the aim of correcting the significance values of the single variables as the value of the other variables varies and thus highlight the predictive factors of the result, binomial logistic regression has been developed. The estimated accuracy of the candidate models was measured by C statistics. Hosmer-Lemeshow test was used to assess the model goodness-of-fit. Sensitivity analysis was run to confirm model estimates after removing highly influential patients identified by residuals examination. Assumption of linearity of independent variables and log-odds was assessed by Box-Tidwell transformation. Final selection was carried out by using the Akaike criterion. All statistical analysis was carried out by statistical package STATA (version 14).

Results

According to the inclusion criteria, a total of 212 patients (103 female, 109 male) were included (average = 9.03 years) in this study.

The sample consisted of 212 patients (103 F; 109 M), with age ranging between 3 years and 16 years with an average age of 9.03 years. Table 1 reports the descriptive statistics of all collected data. 82.08% (95% CI 76.24–86.99) of subjects showed an improvement in collaboration compared to that recorded pre-lockdown (Table 2). The description of the behavioural differences of the subjects are shown in Table 3. Logistic analysis reveals a statistically significant increase of the odds of improvement in patients with a lower pre-lockdown collaboration (OR: 6.05, $p = 0.001$), in children with a parental presence at home (jobless, OR: 30.55, $p < 0.001$; tele-working, OR: 23.06, $p < 0.001$) when compared with children whose parents worked away from home. Positive effects on collaboration are also shown for higher amounts of hours spent in playful activity (OR: 1.27, $p = 0.048$). The statistical model (Table 4) showed a satisfying goodness-of-fit ($p = 0.21$) and a 0.87 C-statistic.

Finally, as exploratory analysis, a statistical association

Variables	Patients	Percentage
	(N)	(%)
Sex		
F	103	48.58
M	109	51.42
Age		
3-5	28	13.21
6-12	169	79.72
12-16	15	7.08
Type of dental service		
Preventive	31	14.63
Restorative	97	45.75
Endodontics	54	25.47
Surgical	30	14.15
Pre-lockdown collaboration		
Degree 1	40	18.86
Degree 2	83	39.15
Degree 3	89	41.98
Parents' employment status		
No work	95	44.81
Remote working	89	41.98
Work outside the home	28	13.20

TABLE 1 Description of sample characteristics (N = 212).

Result	Degree of collaboration pre-lockdown			Total
	1	2	3	
No Improvement	2 (5.00)	11 (13.25)	25 (28.09)	38 (17.92)
Improvement	38 (95.00)	72 (86.75)	64 (71.91)	174 (82.08)
Total	40 (100.00)	83 (100.00)	89 (100.00)	212 (100.00)

TABLE 2 Description of post-lockdown compliance improvement compared to pre-lockdown N (%).

was assessed by chi-square test between presence of parents at home and increase in time dedicated to home oral hygiene, showing a statistically significant increase for the latter in association with a greater presence of parents (p=0.015) (Table 5).

Discussion

The collaboration of the paediatric patient depends on various factors which are not always easily identifiable [American Academy of Pediatric Dentistry, 2015]. Parents, as first models and educators [Baumrind, 1978; Law, 2007], exert a significant influence on the development of their children’s behaviour, personality, social and cognitive well-being [Law, 2007; Baumrind, 1971; Bailey et al., 1973; Cohen and Rice, 1997; Querido et al., 2002; Rytkonen et al., 2005]. Aminabadi and Farahani [2008] showed a correlation between the parenting style and the behaviour of children during dental sessions. The parenting style of education also influences how a child learns to cope with stresses and motivation, including those that occur in the dental environment. Another study shows that children from cohesive and peaceful families have high levels of safety and constructive coping, proving to be more predisposed to building a stable and positive relationship. Children from disadvantaged families or with separated parents show an increased risk of anxiety, poor ability to tolerate stress and adapt to new situations, as well as poor collaboration during dental services [Davies, 2004].

The lockdown period has certainly had a negative impact on the work, emotional, health and psychological aspects of the population, especially in seniors and young people [Saurabh and Ranjan, 2020]. However, positive aspects such as greater mutual attention, greater sense of responsibility of children and greater involvement of parents in their children’s activities are not negligible. According to Brooks et al. [2020], spending time with the family and may be a useful strategy for reducing anxiety and stress.

Another study promoted the importance of family playtime as a factor associated with the well-being of children [Lietz et al., 2018]. For this reason, during the lockdown, families have adopted solutions to preserve a healthy routine [Hongyan et al., 2020], and spend more time in activities with their children. In addition, a study on a group of children and adolescents aged 9-18 years, found that more than half of participants understood the importance of restrictive measures during the lockdown, demonstrating a high degree of compliance in respecting the rules imposed by the government [Saurabh and Ranjan, 2020]. This sense of responsibility and the greater degree of calmness of the child is also confirmed by the results of

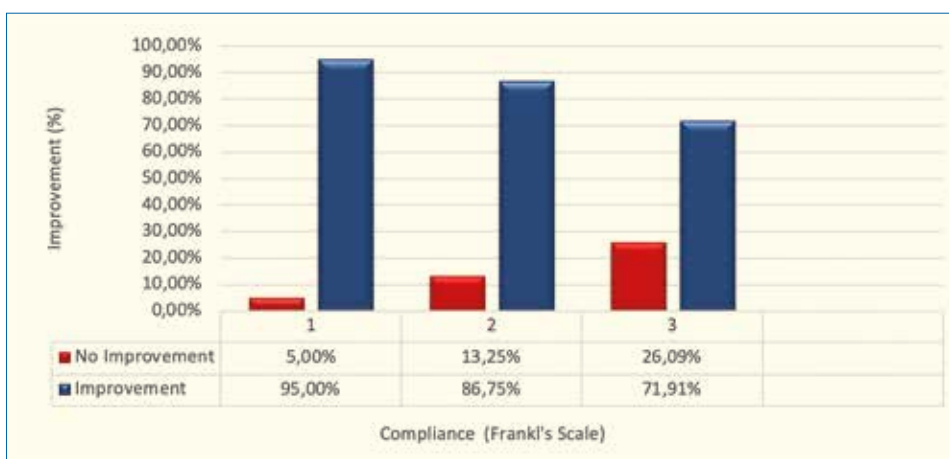


FIG. 1 An inversely proportional trend of improvement in post-lockdown collaboration compared to pre-lockdown can be seen.

Variables	Improvement N = 174	No improvement N = 38	Bivariate P (5%)
School activity M (DS)	2.50 (2.28)	2.26 (2.01)	0.54
Individual study M (DS)	2.44 (1.82)	2.34 (1.58)	0.739
Playful activity M (DS)	4.35 (2.14)	3.44 (1.81)	0.0163
Regular diet N (%)	159 (91.38)	24 (63.16)	<0.001
Sleeping time N (%)	99 (56.90)	14 (36.84)	0.025
Home oral hygiene N (%)	93 (53.45)	12 (31.58)	0.015
Time with parents N (%)	173 (99.43)	23 (60.53)	<0.001
Parents' employment status N (%)			
No work	86 (49.43)	9 (23.68)	
Tele-working	78 (44.83)	11 (28.95)	<0.001
Work outside the home	10 (5.75)	18 (47.37)	

TABLE 3 Lifestyle of patients during lockdown divided by improvement or no improvement of post-lockdown collaboration. Significant difference assessed by Chi-square or Fisher-Exact test (categorical variables) or two-sample T test.

Variables	Odds Ratio	Confidence interval	p value
Pre-lockdown collaboration	6.05	2.14 - 17.12	0.001
Type of dental service*			
Restorative	0.85	0.23 - 3.09	0.805
Endodontic	0.51	0.13 - 1.95	0.328
Surgical	1.19	0.21 - 6.63	0.838
Parents' employment status			
No work	30.55	8.33 - 112.03	<0.001
Tele-working	23.06	6.36 - 83.60	<0.001
Online school activity	1.28	1.01 - 1.62	0.042
Playful activity	1.27	1.00 - 1.60	0.048
Time dedicated to home oral hygiene	1.37	0.54 - 3.51	0.509

TABLE 4 Odds Ratio attributable to different family lifestyles. The estimates were performed by binomial logistic regression.

*Vs preventive
**Vs work outside the home

Parents' employment status	Home oral hygiene		Total
	Unchanged	Increased	
No Work	47 (34.93%)	48 (45.71%)	95 (44.81%)
Teleworking	39 (36.45%)	50 (47.62%)	89 (41.98%)
Work	21 (19.63%)	7 (6.67%)	28 (13.21%)
Total	107 (100%)	105 (100%)	212 (100%)

TABLE 5 Association between the presence of parents at home and time dedicated to home oral hygiene N (%). Evaluation performed by chi-square test (p=0.015).

the present study. As shown in Table 2, there is an improvement in collaboration in 82.08% of subjects. In particular, Figure 1 shows an improved collaboration in patients who had a low degree of compliance in the pre-lockdown period than in subjects who had a higher degree of compliance *ab initio*. Different family lifestyles implemented during the lockdown, when analysed individually (Table 3), show how the increased attention and presence of parents, the hours of playful activity and a regular diet are statistically significant predictive variables of the improvement of children's collaboration during dental session. The positive effect of the cohabitation with parents (24/7), the time dedicated to playful activities and to online school, is confirmed by the multivariate logistic analysis (Table 4) in which all lifestyles are analysed. The explanation probably is found in the satisfaction of the natural emotional needs of children by parents who, not working or working from home, had more time to dedicate to their children than parents who continued to work

outside the home (Table 3). Moreover, this also seems to have had a positive effect on the time dedicated to home oral hygiene which, from a further exploratory analysis, was increased if associated with the major presence of parents at home (p = 0.015) (Table 5).

However, paediatric dentistry will never be the same after the COVID-19 pandemic. Until a cure is found, the best approach is prevention and containment [Stevens, 2020]. Therefore, it will be recommended to limit, if possible, treatments that produce aerosols or to perform them with adequate ventilation and without air conditioning [Acharya et al., 2020], or to use minimally invasive procedures, ART (Atraumatic Restorative Treatment) or ozone therapy. Moreover, paediatric dentists will have to review the schedule and timing of procedures, dividing "no aerosol" and "aerosol" procedures [Paglia, 2020] and setting, where possible, "virtual appointments" as in the case of tele-orthodontics already tested during the lockdown [Saccomanno et al., 2020].

Conclusions

This study provides insights on the effects associated with lockdown due to COVID-19, demonstrating a positive impact of family on children's collaboration during dental sessions, probably attributable to a greater presence of parents at home, a greater sense of acquired responsibility and a regular and organised life. Furthermore, the statistical association found between the increased time devoted to oral hygiene and the greater presence of parents at home (Table 5), calls for future post-lockdown studies on the status of oral health in children.

References

- › Acharya S, Singh B, Godhi B, Pandey S. How to deal and learn from the threat of COVID-19 in paediatric dentistry. *Eur J Paediatr Dent* 2020; 21(3):173-5.
- › American Academy of Pediatric Dentistry. Behavior Guidance for the Pediatric Dental Patient. 2015 The Reference Manual of Pediatric Dentistry 2019-2020. pp. 266-279
- › Aminabadi NA, Farahani RM. Correlation of parenting style and pediatric behavior guidance strategies in the dental setting: preliminary findings. *Acta Odontol Scand* 2008; 66: 99-104.
- › Bailey PM, Talbot A, Taylor PP. A comparison of maternal anxiety levels with anxiety levels manifested in the child dental patient. *J Dent Child* 1973; 40: 277-84.
- › Baumrind D. Current patterns of parental authority. *Dev Psychol Monogr* 1971; 4: 1-103.
- › Baumrind D. Parental disciplinary patterns and social competence in children. *Youth Soc* 1978; 9: 239-251.
- › Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, Rubin GJ. The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *Lancet* 2020; 395 (10227): 912–920.
- › Cohen DA, Rice J. Parenting styles, adolescent substance abuse, and academic achievement. *J Drug Educ* 1997; 27: 199-211.
- › Davies PT, Cummings EM, Winter MA. Pathways between profiles of family functioning, child security in the interparental subsystem, and child psychological problems. *Development Psychopathology* 2004;16, 525-550.
- › DPCM 9 March 2020. https://www.gazzettaufficiale.it/eli/gu/2020/03/09/62/sg/pdf/DPCM_26_April_2020. https://www.governo.it/sites/new.governo.it/files/Dpcm_20200426.pdf
- › Frankl SN, Shiere FR, Fogels, HR. Should the parent remain with the child in the dental operator? *J Dent Child* 1962;29: 150–163.
- › Istituto Superiore di Sanità (Italian National Institute of Health) Rome. COVID-19 epidemic. https://www.epicentro.iss.it/coronavirus/bollettino/Bulletin-integrated-surveillance-COVID-19_11-August-2020.pdf (accessed 14 August 2020).
- › Hongyan G, Okely AD, Aguilar-Farias N et al. Promoting healthy movement behaviors among children during the COVID-19 pandemic. *Lancet Child Adolesc Health* 2020.
- › Law CS. The impact of changing parenting styles on the advancement of pediatric oral health. *J Calif Dent Assoc* 2007; 35: 192-7.
- › Lietz P, Dix KL, Tarabashkina L, O'Grady E, Ahmed SK. Family fun: a vital ingredient of early adolescents having a good life. *J Family Studies* 2018.
- › Paglia L. COVID-19 and Paediatric Dentistry after the lockdown. *Eur J Paediatr Dent* 2020; 21(2): 89.
- › Perrin EC, Leslie LK, Boat T. Parenting as primary prevention. *JAMA Pediatr* 2016; 170 (7): 637-638.
- › Querido JG, Warner TD, Eyberg SM. Parenting styles and child behavior in African American families of preschool children. *J Clin Child Adolesc Psychol* 2002; 31: 272-7.
- › Rytönen K, Aunola K, Nurmi J. Parents' causal attributions concerning their children's school achievement: a longitudinal study. *Merrill-Palmer Q.* 2005; 51:20.
- › Saccomanno S, Quinzi V, Sarhan S, Laganà D, Marzo G. Perspectives of tele-orthodontics in the COVID-19 emergency and as a future tool in daily practice. *Eur J Paediatr Dent* 2020; 21(2): 157-62.
- › Saurabh K, Ranjan S. Compliance and psychological impact of quarantine in children and adolescents due to Covid-19 pandemic. *Indian J Pediatr* 2020; 87 (7): 532-536.
- › Schwab K, Dustin D. Towards a model of optimal family leisure. *Annals Leisure Research* 2015;18 (2), 180–204.
- › Stevens H. Why outbreaks like coronavirus spread exponentially, and how to 'Flatten the Curve'. *Washington Post*; 2020 (accessed 11th April 2020).
- › Wright GZ: *Behavior Management in Dentistry for Children*. Philadelphia; WB Saunders Co, 1975
- › Zabriskie RB, McCormick BP. The influences of family leisure patterns on perceptions of family functioning. *Family Relations: An Interdisciplinary J Applied Family Studies* 2001;50 (3), 281–289.