









# Using social media application associated with active learning methodologies for adherence to dental treatment

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**Aim:** To investigate the effects of using social media application associated with active learning methodologies on adherence to dental treatment among young adults.

**Methods:** This study controlled intervention was conducted in the city of Piracicaba, São Paulo, Brazil, in 2017, with 40 participants (age range from 19 to 24 years) randomized into Control (n=20) and Intervention Groups (n=20). For ten months the intervention group was invited to participate in a WhatsApp® group. This group used the pedagogical method of problematization with a discussion of oral health-related topics, while the Control Group was only instructed to seek dental treatment. The outcome was treatment adherence, evaluated by the mean period of time elapsed from beginning with follow-up of the study through to the time of the first consultation (Initial Time), and the time counted in days from the first consultation to conclusion of the treatment (Final Time) in both groups. Fisher's exact test was used to compare adherence between the Groups and the Student's-t test was used for initial and final times. **Results:** The results revealed that 66.7% of the Intervention Group and 23.5% of the Control Group adhered to treatment (p<0.05). The number of decayed teeth was higher in the Control Group (p<0.05). Self-efficacy was higher in the Intervention Group (p<0.05). **Conclusions:** WhatsApp® associated with active learning methodologies increased adherence to dental treatment.

**Keywords:** Adolescent. Oral health. Self-efficacy. Dental care.



## Introduction

Treatment adherence can be defined as the collaboration between patients and professionals to achieve therapeutic success<sup>1</sup>. Considered a multidimensional phenomenon, treatment adherence in Dentistry means solving an oral health problem by completing the treatment and applying recommendations provided by dentists in daily practice. The intention of adhering to professional guidelines is to build behavior that leads to the self-care necessary for maintaining one's health<sup>2</sup>.

Thus, not undergoing health treatment, especially for chronic conditions, can lead to morbidity and medical complications, which in turn may result in hospitalisation, contributing to a poorer quality of life. Moreover, it is essential to consider the economic impact of low adherence, as all the mentioned complications also lead to subsequent excessive use of the Health System (unnecessary medical consultations and investigations)<sup>3</sup>.

Among Brazilian adolescents, dental treatment is a challenge<sup>4</sup>. A study conducted in Brazil found that out of 325 adolescents with dental treatment needs, 49% did not adhere to the guidelines indicated<sup>5</sup>. Besides low treatment adherence, adolescents usually have inadequate oral hygiene and deleterious habits that compromise their well-being<sup>6</sup>.

According to the United Nations, youth begin at the age of 15 and extends to 24 years of age<sup>7</sup>. This period, during which health behaviors become lifestyles that perpetuate in adulthood, is considered socially critical. This is when educational interventions must be opportunistic to positively change undesirable behaviors<sup>8</sup>. Thus, educational interventions using mobile phone applications such as WhatsApp® have been a strategy implemented worldwide to promote better clinical, behavioral, and psychological parameters among adolescents and other audiences<sup>9,10</sup>.

In Dentistry, there is evidence that using mobile phones is effective for transmitting information and increasing adherence to orthodontic treatment<sup>11</sup>. Among the applications mentioned for communicating with patients, WhatsApp® was effective and contributed to the completion of dental treatment<sup>12</sup>.

However, the transmission of information is not always sufficient for inducing behavioral changes. It is believed that a process of teaching-learning the new knowledge required for reconstructing beliefs, values, and expectations should be implemented based on using the problematization method<sup>13</sup>. The methodology of problematization can be developed with the Maguerez arch. Starting with a few preset steps, this technique aids the observation of reality, delimits problems, and helps [those who participate in learning to use] the technique to seek and apply practical solutions<sup>14</sup>.

This active teaching-learning methodology has been incorporated in educational health actions to empower critical subjects, politicians, citizens, and agents of transformation<sup>15</sup>. The power of using active methodologies has also been per-

ceived in the increasing self-efficacy among subjects; that is, when successfully applied, it helps people to feel capable and/or more competent to achieve certain desired results<sup>16</sup>.

Thus, this has raised the hypothesis that self-efficacy and the use of active learning methodologies mediated by a mobile application would contribute to adherence to dental treatment among adolescents.

Considering the above and with the aim of collaborating with the incorporation of educational practices, including the context of oral health, the present intervention study aimed to investigate the influence of a popular communication application - WhatsApp® - associated with active teaching-learning methodologies and self-efficacy to increase adherence to dental treatment among adolescents.

## Materials and Methods

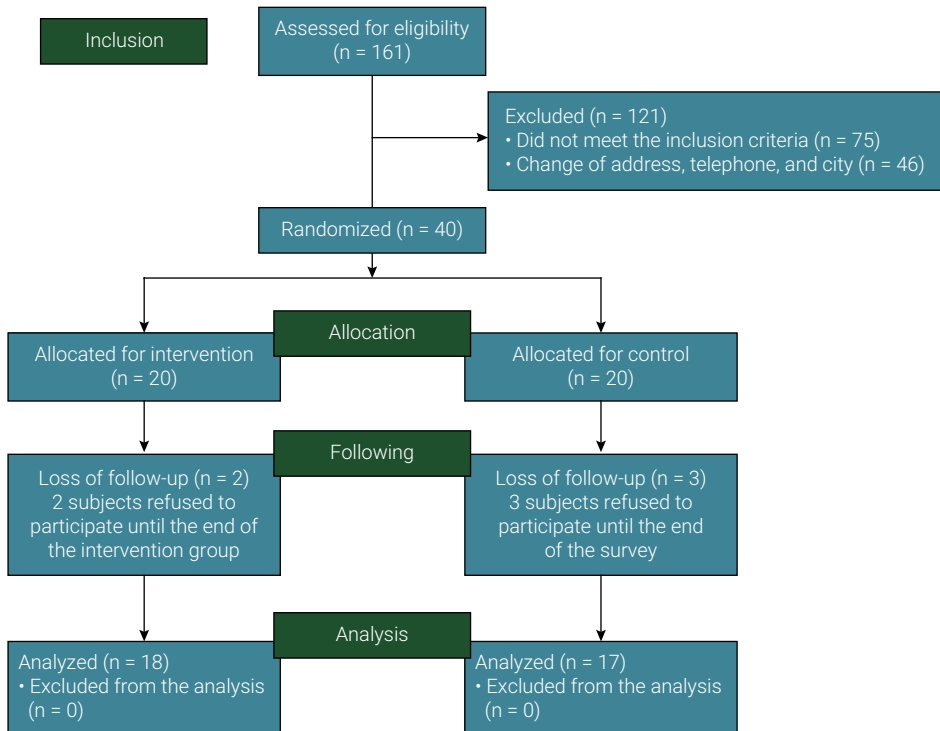
### Type of study

This was a study with controlled intervention and group randomization, conducted in the city of Piracicaba, São Paulo, Brazil, in 2017.

### Population and Sample

The sample was obtained from a cohort of adolescents who have been followed-up by researchers since 2012. The original cohort consisted of 1,179 adolescents (15 to 19 years of age) assisted by 34 family health strategy teams in the city of Piracicaba, São Paulo, Brazil. The sample consisted of adolescents, based on the description in the United Nations guidelines, in which adolescence is considered the age group between 15 and 24 years old (Organization of United Nations, 2010). After 18 months of follow-up, 325 adolescents were referred to the reference Basic Family Health Unit for dental treatment. Of these, only 164 individuals completed the dental treatment required<sup>5</sup>.

The 161 adolescents who did not adhere to dental treatment during the follow-up of the cohort constituted the sample of the present study. The inclusion criterion was the need for dental treatment, meaning the presence of at least one decayed tooth and/or the presence of gingival bleeding in one or more teeth. The exclusion criteria considered individuals with systemic diseases, communication challenges or neuromotor problems, and the presence of severe hypoplasia and orthodontic bands. Thus, of the 161 individuals, 75 did not meet the inclusion criteria and 46 had changed their address, telephone, and city (Figure 1).



**Figure 1.** Consort flowchart

The final sample consisted of 40 participants randomized into two groups: Control (n=20) and Intervention (n=20) (Figure 1). The individuals were allocated to the Groups by a draw, using a computer program to generate random sequences of numbers from 1 to 40. Therefore, each individual was selected to participate in a group based on chance; that is, with an identical chance of being allocated to one of the study (comparison) groups. During the course of the intervention, there were dropouts, two from the control group and three from the intervention group.

## Data collection

Before baseline (clinical data collection), the researchers and the dentists of the health units located close to the adolescent's home were agreed to guarantee a appointment for dental treatment, so controlling the barriers of geographic access.

After the clinical examination, the adolescent received the referral form and his appointment was guaranteed at the health unit. Therefore, we sought to control the barrier to access to the service. The researchers called the adolescents and dentists monthly to check the progress of dental treatment, which was helpful for controlling treatment dropouts, favoring the longitudinality of care.

The data was collected during pre-scheduled home visits. In the first home visit (baseline), sociodemographic data (age, sex, monthly family income, number of people living in the household, paternal and maternal level of education, housing, and occu-

pation of the head of the family) were collected with the instrument adapted from Meneghim et al.<sup>17</sup> (2007).

Simultaneously, the General Self-Efficacy Scale (GSES)<sup>18</sup>, validated in Brazil<sup>19</sup>, was applied. The GSE scale is a self-efficacy measurement instrument composed of a scale of 10 self-applicable items. The subject scores each item on a 4-point scale ranging from "not true for me" (1 point) to "totally true to me" (4 points). The scores range from 10 to 40, with higher scores indicating greater perceived self-efficacy. Examples of scale items are: "when I face a problem I can usually find several solutions" and "I can face any adversity." It is emphasized that the GSE scale was applied again in the second home visit, after the treatment.

Furthermore, at baseline, a clinical dental caries examination was performed using the decayed, missing, and filled teeth index (DMFT), and periodontal disease was measured with the Community Periodontal Index (CPI), in accordance with the criteria of the World Health Organization<sup>20</sup>.

All individuals selected for the study were referred to the reference Basic Family Health Unit for dental treatment, even those who reported that they attended other private services. The researchers and the dentists of the health units located close to the adolescent's home were agreed to guarantee a appointment for dental treatment, so controlling the barriers of geographic access. After the clinical examination, the adolescent received the referral form and his appointment was guaranteed at the health unit. Therefore, we sought to control the barrier to access to the service. The researchers called the adolescents and dentists monthly to check the progress of dental treatment, which was helpful for controlling treatment dropouts, favoring the longitudinally of care.

The participants were followed up with monthly telephone calls during a time interval of ten months (May 2017 to February 2018) to assess treatment adherence. Every month, the participants were asked: "Did you seek dental treatment?" (The answers were yes or no). If the answer was yes, they were asked: "When did you begin the treatment?" (Day and month were registered in the participant's file). They were also asked: "Did you finish the dental treatment?" (The answers were yes or no). If yes, "When did you finish it?" (Day and month were registered in the participant's file). When the adolescents answered "yes" to all the above questions, they were examined by the researchers to confirm the completion of the dental treatment. If confirmed, the adolescent was considered as a patient who adhered to the treatment.

These questions were used in both the control and intervention groups throughout the study to obtain the time in days of adherence to dental treatment. The procedures indicated and performed for dental treatment of the adolescents were with reference to the treatment of dental caries and periodontal diseases (conditioning of the oral medium, supra- and infra-gingival scaling, provisional and definitive restorative treatment, extractions, and coronal opening). The adolescents were followed up for ten months (303 days). Within this period, both the time (interval) it took for the adolescents to seek treatment, and the time (interval) it took for them to complete treatment were considered. The reference for adherence to dental treatment was assessed by search time (in days) and time of completion of dental treatment

(in days) both in the Control and Intervention groups. The longer the time interval - in days - it took the adolescent to seek and complete treatment was shorter than the time interval of adherence to treatment. Furthermore, the time that elapsed from the beginning of follow-up of the study (first month - May) through to the time of first consultation (Initial Time) and the time - in days - from the first consultation until completion of treatment (Final Time) was recorded.

To verify whether the individual had completed the treatment, a new clinical examination was performed during follow-up (after ten months) during home visits, and the GSE was reapplied.

The calls and visits took place monthly by the researchers and lasted an average of 5 minutes. The researchers made monthly calls to the participants of both groups (control and intervention), adolescents and dentists, in order to verify the progress of dental treatment, that is, to know if the adolescent attended the consultations and at what moment the conclusion of the dental treatment would take place. In addition, a dialogue about possible doubts about dental treatment was developed. In an Excel spreadsheet, the identification by code of the participant, the date of the initial clinical examination, the dates of each monthly call, as well as the start and end or abandonment dates of the treatment were recorded, in order to calculate the adherence time.

## Intervention

In the Intervention Group, in addition to the referral for dental treatment and periodic calls to the Control Group, the individuals were invited to participate in a WhatsApp® group for ten months. In the WhatsApp® contacts, a pedagogical method was applied as a behavioral strategy using the problematization approach of the theoretical framework by Paulo Freire (Freire, 1987). The facilitation of the intervention in the WhatsApp® group was carried out by the researchers, as well as the doubts that arose were solved continuously, without a specific day and time.

This author considers empowerment an achievement that occurs internally and critically and as the result of reflection and awareness of the present condition of oppressed individuals. In the problematization approach, educational actions consider the political, economic, social, and cultural context of the individual<sup>15</sup>, which it allows to include the world and society, thus enabling understanding the problem of the subject. Hence, the Maguerez arch method proposed by Charles Maguerez was used in the study<sup>14</sup>.

This technique was developed as a teaching-learning strategy for developing problematization. It involves five stages of social reality: observation of reality, key points, theorization, solution hypotheses, and real-life applications. Thus, the researcher is understood as a facilitator of the educational process, creating conditions for developing a critical and reflexive awareness around the issues related to the life experiences of individuals<sup>14</sup>.

Thus, the messages in the WhatsApp® group allowed the researchers to trigger questions that fomented the discussion and started the problematization of reality. In the first week of the study, the researchers asked the participants to say

which oral health issues they were curious about and experienced daily. The participants chose the following topics: periodontal disease, caries, oral hygiene techniques, implants, dental veneers, single prosthesis, bruxism, and tooth bleaching. Each topic was worked on separately, using the Maguerez arch method, during the months of the study. According to each topic, the researchers asked the adolescents about their experiences with the topic in question and encouraged them to research each topic online and share the texts, videos, and images they found with the WhatsApp® group. Subsequently, the researchers asked the participants about the new knowledge they acquired during the research performed by the group. The doubts that appeared were solved by the researchers. Afterwards, participants were invited to put into practice the new knowledge learned in groups and/or individually.

Participants in both groups, who reached the end of the study without seeking and completing treatment were again instructed to seek dental treatment.

### **Training and Calibration**

Calibration was performed between two dentists. Theoretical and practical activities were conducted in two periods (total of 8 h). There was one clinical training session and one calibration exercise (four hours each). The final calibration obtained mean inter-rater Kappa values of 0.95. To verify the maintenance of diagnostic criteria and inter-examiner error, 10% of the sample was re-examined, showing mean Kappa values of 0.96.

### **Data analysis**

The outcome of the study was adherence to dental treatment assessed by search time (in days) and time of completion of dental treatment (in days) in the Control and Intervention groups.

Sociodemographic data, DMFT, CPI, and self-efficacy were considered independent variables. Initially, the data were descriptively analyzed and the groups and sociodemographic variables were compared.

Initially, an exploratory data analysis was conducted, and based on the results of this analysis, the statistical methodology to be used was defined. Student's-*t*, Mann-Whitney, and Chi-square tests were used. The comparison between the groups regarding the type of treatment was performed with Fisher's exact test, and for the time of starting and completing treatment the Student's-*t* test was used. Generalized linear models for repeated measures over time were used to compare clinical variables and the self-efficacy scores between groups and between times (seeking and completing treatment). The analyses were performed in the SAS software, at a 5% significance level. The total number of participants in each of the two groups was 20. Test power was above 0.99 in time analyses.

### **Ethical aspects**

The research was approved by the Research Ethics Committee of UNICAMP – School of Dentistry of Piracicaba (FOP), under opinion – CAAE, number 62567616.1.0000.5418.

The study was approved on June 21, 2017. The participants answered the research instrument during home visits after signing a Term of Free and Informed Consent.

## Results

Table 1 shows homogeneity between the groups regarding age, sex, family income, number of people in the household, paternal and maternal level of education, type of housing, and occupation of the head of the family ( $p > 0.05$ ).

**Table 1.** Profile of the sample according to the group and variables analyzed - Piracicaba, São Paulo, Brazil, 2017.

Variables	Group		p-value
	Control group (n=17)	Intervention group (n=18)	
	Mean (standard deviation)	Mean (standard deviation)	
Age (years)	20.23 (1.5)	20.33 (1.32)	0.4223 <sup>1</sup>
	n (%)	n (%)	
Sex			0.6254 <sup>2</sup>
Female	8 (47.0)	7 (39)	
Male	9 (53.0)	11 (61)	
Income			0.8452 <sup>2</sup>
Up to R\$ 1866.00	7 (41.2)	8 (44.4)	
From R\$ 1866.00	10 (58.8)	10 (55.6)	
Number of people in the household			0.8902 <sup>2</sup>
Up to 4 people	7 (41.0)	7 (38.9)	
Over 4 people	10 (59.0)	11 (61.1)	
Parental level of education			0.4729 <sup>2</sup>
Up to the 8 <sup>th</sup> grade	12 (70.0)	10 (55.5)	
Above the 8 <sup>th</sup> grade	5 (30.0)	7 (38.9)	
Did not answer	-	1 (5.6)	
Maternal level of education			0.8902 <sup>2</sup>
Up to the 8 <sup>th</sup> grade	10 (59.0)	11 (61.1)	
Above the 8 <sup>th</sup> grade	7 (41.0)	7 (38.9)	
Housing			0.2291 <sup>2</sup>
Owned	11 (64.0)	8 (44.5)	
Rented/Ceded/With parents	6 (36.0)	10 (55.5)	
Occupation of the head of the family			0.8902 <sup>2</sup>
Entrepreneur/Self-employed	7 (41.0)	7 (38.9)	
Employee	10 (59.0)	11 (61.1)	

<sup>1</sup>Student t-test; <sup>2</sup>Chi-square.



Table 2 shows that 23.5% of the adolescents in the control group and 66.7% in the intervention group adhered to treatment ( $p < 0.05$ ). There was also a significant difference between the groups for the time taken to seek treatment, in which adolescents in the intervention group sought treatment earlier ( $p < 0.05$ ).

**Table 2.** Adolescent support according to the group - Piracicaba, São Paulo, Brazil, 2017.

Variables	Group		p-value
	Control group (n=17)	Intervention group (n=18)	
Adherence	n (%)	n (%)	0.0176 <sup>1</sup>
	4 (23.5%)	12 (66.7%)	
	Mean (standard deviation)	Mean (standard deviation)	
Time without seeking treatment <sup>a</sup>	244.9 (109.6)	95.5 (117.4)	0.0002 <sup>2</sup>
Time without finishing treatment <sup>b</sup>	245.1 (111.2)	127.3 (130.4)	0.0036 <sup>2</sup>

<sup>a</sup>Within the maximum follow-up time (303 days), the time (in days) the adolescent was not seeking treatment.

<sup>b</sup>Within the maximum follow-up time (303 days), the time (in days) the adolescent had not finished treatment.

<sup>1</sup>Fisher's exact test. <sup>2</sup>Student t-test.

At the end of the study, the number of decayed teeth was significantly higher in the Control Group (Table 3) and the Intervention Group showed a significant decrease ( $p < 0.05$ ) in the number of decayed teeth and a significant increase in the number of teeth restored ( $p < 0.05$ ). For CPI, there was a significant decrease in both groups ( $p < 0.05$ ). Self-efficacy increased in the Intervention Group ( $p < 0.05$ ) and decreased in the Control Group ( $p < 0.05$ ).

**Table 3.** Results of clinical examinations and self-efficacy according to group and time - Piracicaba, São Paulo, Brazil, 2017.

Variables	Treatment time	Group	
		Control group (n=17)	Intervention group (n=18)
		Median (minimum and maximum)	Median (minimum and maximum)
Number of decayed teeth	Initial	1.0 (0.0-8.0) Aa	1.0 (0.0-2.0) Aa
	End	1.0 (0.0-6.0) Ba	0.0 (0.0-2.0) Ab
p(group)=0.0227; p(time)=0.0002; p(interaction)=0.0010			
Number of missing teeth	Initial	0.0 (0.0-1.0) Aa	0.0 (0.0-2.0) Aa
	End	0.0 (0.0-2.0) Aa	0.0 (0.0-2.0) Aa
p(group)=0.4223; p(time)=0.0815; p(interaction)=0.5837			
Number of restored teeth	Initial	2.0 (0.0-10.0) Aa	4.0 (0.0-10.0) Ab
	End	2.0 (0.0-10.0) Aa	5.0 (1.0-11.0) Aa
p(group)=0.1527; p(time)=0.0008; p(interaction)=0.0728			

Continue

Continuation			
DMFT	Initial	4.0 (0.0-13.0) Aa	5.0 (1.0-11.0) Aa
	End	4.0 (0.0-13.0) Aa	5.0 (1.0-11.0) Aa
	p(group)=0.8288; p(time)=0.3061; p(interaction)=0.3061		
CPI	Initial	1.0 (0.0-5.0) Aa	1.0 (0.0-2.0) Ba
	End	1.0 (0.0-1.0) Ab	0.0 (0.0-1.0) Bb
	p(group)=0.0123; p(time)=0.0027; p(interaction)=0.4821		
Self-efficacy score	Initial	30.0 (17.0-40.0) Aa	24.5 (14.0-38.0) Bb
	End	27.0 (16.0-40.0) Ab	32.5 (16.0-39.0) Aa
	p(group)=0.5183; p(time)=0.0773; p(interaction)=0.0002		

For each variable, medians followed by different letters (capital letters horizontally and lower-case letters vertically, comparing final and initial times) differ from each other ( $p \leq 0.05$ ). CPI (Community Periodontal Index), DMFT (Decayed, Missing, and Filled Teeth).

## Discussion

This study showed that there is a higher level of support for dental treatment when mediated by WhatsApp® associated with active teaching-learning methodologies. Similar findings have been reported in experimental studies that showed that health interventions are capable of motivating the application of the treatment proposed<sup>10,21</sup>.

In addition to the greater level of adherence to dental treatment by the Intervention Group, this activity also had other preventive effects. The results showed that after this experience, the participants in the intervention had a lower number of decayed teeth than those of the Control Group.

This corroborated the findings of Menegaz et al.<sup>22</sup> (2018), who analyzed 11 educational intervention studies and assessed the student learning outcomes as follows: improvements in behaviors related to oral health (dental hygiene, healthy diet, among others) and clinical conditions (caries and periodontal conditions). These outcomes are related to the use of professional guidelines in the daily life of patients and can be considered a development of patient adherence to dental treatment. Among the studies, five showed significant differences at the end of interventions, with effect sizes ranging from 31.6% to 481.6%. Moreover, all studies indicated a reduction in dental caries in the groups submitted to interventions.

As regards the significant difference between the groups relative to the time it took to seek treatment, in which the participants of the Intervention Group sought treatment earlier, no support was found in the literature, however the hypothesis raised was related to the influence of self-efficacy scores.

The increased self-efficacy in the Intervention Group was a positive development because the greater the perception of efficacy, the more determined the subject becomes to solve a given challenge<sup>18</sup>. However, it is undeniable that the problematized discussions held in the WhatsApp® group, by providing greater understanding of problems related to oral health, were decisive in this sense. It is known that as soon

as patients understand the risks and benefits of their health condition, they become more conscious and prone to modifying harmful behaviors and adhering to the treatments proposed. This active participation during all phases of educational actions promotes better involvement of subjects and promotes the development of autonomy and decision-making regarding their health<sup>15</sup>.

In addition to constructing new knowledge, communication, familiarity, and exchange of experiences of the adolescents in the study by means of the application, a bond was established. This relationship may have contributed to increasing self-efficacy, that worked to reinforce behaviors that would lead to building self-knowledge about health and responsibility for health-friendly attitudes<sup>23</sup>.

Thus, the bond certainly collaborated to keep adolescents in the group and, thus, problematizing pedagogical strategy developed was responsible for a higher level of self-efficacy, which may have motivated them to seek dental care<sup>24</sup>. It is noteworthy that the problematizing strategies tend to promote the autonomy of the subjects submitted to it. Thus, it can also be inferred that the intervention contributed to treatment adherence, insofar as, being demonstrably emancipatory, it possibly increased the participant's perceived responsibility and ability to organize their time, as well as clarified their doubts.

Regarding oral problems, both groups showed individuals with therapeutic needs focused on periodontal care. At the end of the study, there was a decrease in the Community Periodontal Index in both groups, which might be justified by the short-term interventions. Lemkuhl et al.<sup>21</sup> (2015) reviewed studies investigating periodontal conditions and showed that most outcomes analyzed demonstrated better results for the group submitted to educational interventions when compared with the control group. However, in the short term, the effects of mediation were inconsistent. Thus, it is suggested that interventions directed to periodontal treatment should use different evaluation times for the interventions proposed and consider different stages of this disease. Based on this, the present study points out that dentists, when faced with patients with periodontal problems, use the strategy described here and do it longitudinally, without haste and knowing that its impacts should occur over time.

The importance of this study to health practices lies in its power to show the possibility of a connection between health, technology, and active teaching-learning methodologies, considering that the literature criticizes most educational intervention approaches are used, based on the individual and traditional pedagogical models<sup>25</sup>.

The methodology of problematization allows for construction of the ability to identify problems and indicate proposals to overcome them, advancing to an apparent reality, free of preconceived models<sup>26</sup>; also contributes to the formation of reflective subjects, who seek the resolution of problems, culminating in the promotion and prevention of injuries<sup>27</sup>.

The knowledge that stimulating healthy behaviors is the most effective way to prevent the main oral diseases, in addition to collaborating with the access to health services and reducing costs of health services to society<sup>28</sup>, reinforces the need for

educational actions, such as the intervention described in the study, in the daily life of public dental services.

Although advances in oral health promotion are noticeable in Brazil, coordinated by oral health teams in primary health care of the Brazilian public health system<sup>29</sup>, the health education actions developed in Dentistry are still developed in the Flexnerian paradigm based on vertical, prescriptive, and disease-focused instructions<sup>30</sup>.

Therefore, it is necessary to reverse the logic of educational actions centered solely on the technical knowledge of professionals and promote room for subjects to speak and listen<sup>31</sup>. This space of dialogue and construction of knowledge between professionals and patients can be virtual and mediated by popular communication applications combined with the problematization of everyday life and, therefore, perfectly within the reach of dentists.

It is noteworthy that the main limitation of the present study was a sample composed of young adults, who did not adhere to dental treatment before this study, and over time, this may have aggravated the clinical condition and motivated the adolescents to seek the dental treatment they had not sought previously. Moreover, unlike the classical clinical interventions, when performed in optimal conditions, educational interventions depend on the players involved. In this case the intervention relied on the active presence of researchers as activators of problematization, which required skills and constant participation. However, the potential of the intervention was evident, as shown by the low loss of follow-up of the participants in the Intervention group, thus conferring greater reliability on the results presented.

Because it is a low-cost intervention and easy operationalization for the professional who performs it, every dentist is recommended to use Whatsapp® or other App (same aim) as a communication tool with their adolescent patients, as well as the constant training of this professional in education in health - especially in problematizing strategies - in order to qualify their communication with these patients and, thus, seek better adherence to treatment and oral health care.

Finally, this information highlights the importance of intervention studies engaged in the daily life of young adults, with the differential of using WhatsApp® combined with active teaching-learning methodologies for closer and more frequent contact with the target audience. These strategies, when performed as indicated in the study, may increase the probability of engagement of individuals in behavioral changes, representing an alternative approach to traditional health guidelines alone.

It was perceived that the use of a communication application associated with active teaching-learning methodologies and applied dental practice could promote the appreciation and resignification of health knowledge and increase adherence to dental treatment.

It is a strategy that instrumentalizes young adults for their transformation, enabling them to develop skills for active participation in health actions. It is believed that technological and pedagogical tools such as those presented in this study, should be incorporated not only into Dentistry, but also into the practice:

of health professionals, to help them overcome the existing problems in health fields, in which strengthening of the autonomy of subjects and their choices is especially required.

The clinical relevance of this paper will help the dental team to understand the processes involved in behaviour change and support their patients to adopt and sustain positive oral health behaviours. We suggest that future studies explore the use of active teaching-learning methodologies and the WhatsApp® application with different audiences and various age groups.

In conclusion, the use of WhatsApp® associated with active learning methodologies increased adherence to dental treatment among young adults.

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## Data Availability

Datasets related to this article will be available upon request to the corresponding author.

## Author Contribution

All authors read and approved the final manuscript. **Michelli Caroliny de Oliveira** participated in the conception, design, and data collection. **Inara Pereira da Cunha** participated in the conception, design, and data collection. **Karine Laura Cortellazi** and **Gláucia Maria Bovi Ambrosano** participated in the article writing. **Fernanda Dandara Marques Gomes de Moraes** participated in the article writing. **Luciane Miranda Guerra** participated in the conception, design, and data collection, and the critical review. **Antonio Carlos Pereira** participated in the critical review. **Jaqueline Vilela Bulgareli** participated in the conception, design, and data collection.

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