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Impact on interprofessional collaboration and oral health-related quality of life from a prenatal care protocol: a mixed method study

Impacto na colaboração interprofissional e na qualidade de vida relacionada à saúde bucal de um protocolo de atenção ao pré-natal: um estudo de métodos mistos

Impacto en la colaboración interprofesional y la calidad de vida relacionada con la salud oral de un protocolo de atención prenatal: un estudio de métodos mixtos

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Abstract
Objective. The aim was to evaluate the potential impact on interprofessional collaboration and oral health-related quality of life from a prenatal care protocol. Method. We conducted an intervention study, with a post-test control group within a mixed-methods approach. The study population comprised 60 pregnant and health professionals enrolled in primary healthcare units. In the tested protocol, oral health technician was an important link with other members of multi-professional teams in the conversation wheels within which values, perceptions, behaviors and needs of pregnant women were shared about changes experienced during the pregnancy. Numerical data and narratives were used to assess self-rated oral health, oral health-related quality of life measured by OHIP-14, perception of pregnant women on interprofessional practices. Results. Patients were young and had incomplete or complete high school with no significant differences between the test and control groups. The perception of women in relation to interprofessional collaboration was greater in the intervention group than in control group. Self-rated oral health and oral health-related quality of life improved after intervention. Conclusions. The intervention encouraged the empowerment of the team to refocus the work process with greater involvement and collaborative professional interaction favored by oral health technician performance. The service organization protocol caused tensions and produced positive effects on interprofessional collaboration and on oral health-related quality of life. Clinical Relevance. The findings showed the relevance of the oral health technician's performance integrating the activities between dental team and multidisciplinary professional team for quality of life related to oral health and interprofessional collaboration.
Keywords: Interprofessional relations; Cooperative behavior; Primary health care; Prenatal care; Quality of life.

Resumo
Objetivo. O objetivo foi avaliar o impacto na colaboração interprofissional e na qualidade de vida relacionada à saúde bucal de um protocolo de cuidado ao pré-natal. Método. Conduzimos um estudo de intervenção, com um grupo controle pós-teste dentro de uma abordagem de métodos mistos. A população do estudo foi composta por 60 gestantes e profissionais de saúde de unidades básicas de saúde. No protocolo testado, o técnico em saúde bucal foi um importante elo com os demais integrantes das equipes multiprofissionais nas rodas de conversa em que se compartilhavam valores, percepções, comportamentos e necessidades das gestantes sobre as mudanças vivenciadas durante a gestação. Dados numéricos e narrativas foram usados para avaliar a autoavaliação da saúde bucal, a qualidade de vida relacionada à saúde bucal medida pelo OHIP-14, a percepção das gestantes sobre as práticas interprofissionais. Resultados. As pacientes eram jovens e tinham ensino médio incompleto ou completo, sem diferenças significativas entre os grupos teste e controle. A percepção das mulheres em relação à colaboração interprofissional foi maior no grupo intervenção do que no grupo controle. A autoavaliação da saúde bucal e a qualidade de vida relacionada à saúde bucal melhoraram após a intervenção. Conclusões. A intervenção estimulou o empoderamento da equipe para reorientar o processo de trabalho com maior envolvimento e interação profissional colaborativa favorecida pela atuação do técnico em saúde bucal. O protocolo de organização do serviço gerou tensões e reflexos positivos na colaboração interprofissional e na

qualidade de vida relacionada à saúde bucal. Relevância clínica. Os achados evidenciaram a relevância da atuação do técnico em saúde bucal integrando as atividades entre a equipe odontológica e a equipe profissional multiprofissional para a qualidade de vida relacionada à saúde bucal e a colaboração interprofissional.
Palavras-chave: Relações interprofissionais; Comportamento cooperativo; Atenção básica à saúde; Cuidado pré-natal; Qualidade de vida.

Resumen
Objetivo. El objetivo fue evaluar el impacto en la colaboración interprofesional y la calidad de vida relacionada con la salud bucal de un protocolo de atención prenatal. Método. Realizamos un estudio de intervención, con un grupo de control posterior a la prueba dentro de un enfoque de métodos mixtos. La población de estudio estuvo constituida por 60 gestantes y profesionales de salud de unidades básicas de salud. En el protocolo ensayado, el técnico en salud bucal fue un vínculo importante con los demás integrantes de los equipos multidisciplinarios en las ruedas de conversación en las que se compartieron valores, percepciones, comportamientos y necesidades de las gestantes sobre los cambios experimentados durante el embarazo. Se utilizaron datos numéricos y narrativos para evaluar la salud bucal autoevaluada, la calidad de vida relacionada con la salud bucal medida por el OHIP-14 y la percepción de las mujeres embarazadas sobre las prácticas interprofesionales. Resultados. Los pacientes eran jóvenes y tenían estudios secundarios incompletos o completos, sin diferencias significativas entre los grupos de prueba y control. La percepción de las mujeres sobre la colaboración interprofesional fue mayor en el grupo de intervención que en el grupo control. La salud bucal autoevaluada y la calidad de vida relacionada con la salud bucal mejoraron después de la intervención. Conclusiones. La intervención estimuló el empoderamiento del equipo para reorientar el proceso de trabajo con mayor involucramiento e interacción profesional colaborativa favorecida por la actuación del técnico en salud bucal. El protocolo de organización del servicio generó tensiones y efectos positivos en la colaboración interprofesional y en la calidad de vida relacionada con la salud bucal. Relevancia clínica. Los hallazgos evidenciaron la relevancia del papel del técnico en salud bucal, integrando las actividades entre el equipo odontológico y el equipo profesional multidisciplinario para la calidad de vida relacionada con la salud bucal y la colaboración interprofesional.
Palabras clave: Relaciones interprofesionales; Comportamiento cooperativo; Atención primaria de salud; Atención prenatal; Calidad de vida.

1. Introduction

One of the most important changes in the production of health care in recent years has been the reorganization of the work process replacing the isolated action of professionals by the action of multi-professional teams. Such a requirement stems from the economic, social and health transformations that occurred in the 20th century and whose consequence has been the change in the demographic structure of populations and their morbimortality patterns, gaining relevance to chronic conditions over acute conditions (WHO, 2010).

There is an increasingly wide, profound and serious inadequacy between the separate, fragmented, compartmentalized knowledge between disciplines, and on the other hand, increasingly multidisciplinary, transversal, multidimensional, transnational, global and planetary realities or problems (Morin, 2004).

In health, specializations and hyper-specializations have also fragmented not only the knowledge preventing from seeing the global, but also the connections and interprofessional relationships that compromise the comprehensive care to the patient. Interprofessional collaboration has been pointed out as a resource that can be mobilized to increase the effectiveness of health systems. As an innovative strategy, it can play an important role in addressing problems of the healthcare model and workforce, contributing to strengthening the health system and improving the results achieved (WHO, 2010).

Interprofessional collaboration refers to a structured collective action through permanent exchange of information and shared decision-making (D'Amour et al, 2005), exerting an important influence on the work of the health teams (Heinneman, 2002).

Studies and reviews carried out have shown that the effects of cooperative practice can achieve from a better resolution of actions, including the increase of the diversity of its offerings, to the improvement of communication between workers, the optimization of the team's participation in decision-making and the enhancement of respect among the team members (D'Amour, 2005; Zwarenstein et al, 2009; Gaboury et al, 2009). It can improve outcomes in caring for patients in specific groups (Sinclair et al 2009); users of complimentary practice services (Gaboury et al, 2009) and family health teams (Goldman et al 2010). Teams

that cooperate with each other seem to be more able to gather greater capacity to coordinate care, identify the real needs of the community, develop new technologies of care producing responses to the demands of health (WHO, 2010).

Since the qualification of prenatal care requires the performance of a multi-professional team guided by an interdisciplinary approach with the purpose of producing comprehensive care centered on the needs of families and individuals (Oral Health Care During Pregnancy Expert Workgroup, 2012) it represents a favorable space for the study of collaborative practices.

Access to dental care during pregnancy is full of obstacles and involves on the one hand anxiety, fear and beliefs of pregnant women (Rocha et al, 2018), and on the other hand, scientific ignorance and insecurity of professionals in planning and lack of preparation in the treatment of pregnant women. Overcoming the distance and the search for greater articulation of actions depend, among other aspects, on how primary health care is structured in each country and the degree of interprofessional collaboration in the development of prenatal care actions (Faquim & Frazão, 2016). Expanded oral health teams in which mid-level workers act as professionals, could have more conditions to build a more integrated practice with other health teams within primary health care (Aguiar et al 2014). Because infections can play an important role in inducing birth and prematurity, and periodontal disease could be a risk factor for adverse pregnancy outcomes, health teams should be committed to interprofessional work aimed at raising the quality of prenatal care (Faquim et al, 2017).

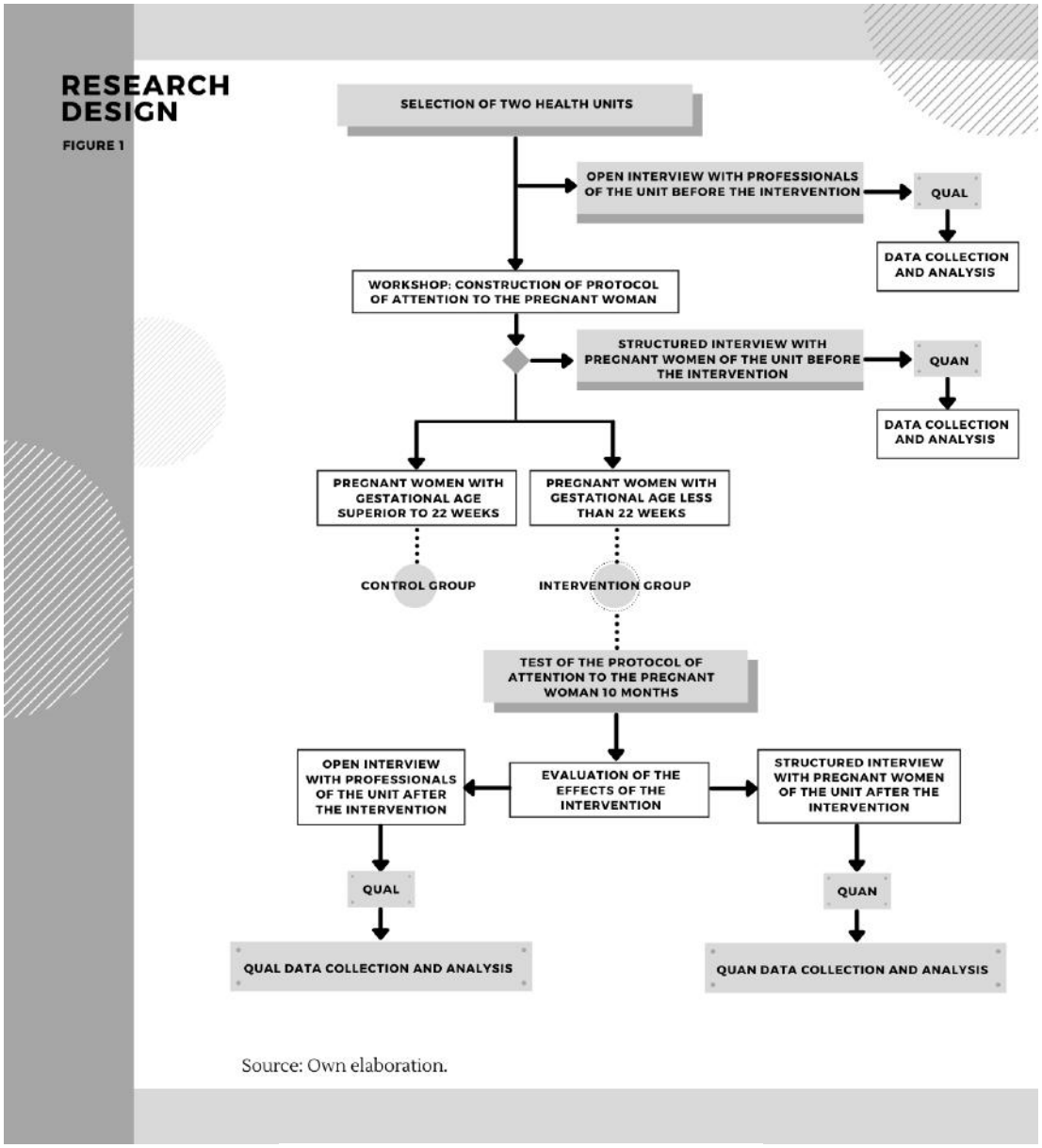
In this context, intervention researches focusing on interprofessional collaboration are important to investigate the effects on interprofessional relationships and the quality of care provided (Zwarenstein et al, 2009). Nevertheless, there are few studies showing empirically the effects from care protocols on collaboration within clinical practice (Zwarenstein et al, 2005), and even more research addressing interprofessional collaboration involving oral health in prenatal care.

This study aimed to evaluate the potential impact on interprofessional collaboration and oral health-related quality of life resulting from a process of collective construction of a new protocol of care for pregnant women in two Brazilian primary health care units.

2. Methodology

An exploratory practice-based before-after intervention study, with a post-test control group within a mixed-methods approach to test the effects of applying a protocol of prenatal care to the pregnant woman was carried out. Practice-based research is recognized as an important approach that can be used to measure, understand and produce evidence of changing trends in public health practice including provision of primary services (Erwin & Brownson, 2017). Numerical data obtained through closed questions, narratives from open questions, and field diary records were used, combining sequential (pregnant women, before and after) and concomitant (professionals and pregnant women) strategies in the integration of information for the interpretation of results (Figure 1).This mixed method strategy sought to integrate the results of quantitative and qualitative approaches during the interpretation phase, in order to explore possible convergences between results as a way of strengthening the knowledge generated by the study (Creswell, 2003).

Figure 1: Research Design.



Source: Own elaboration.

The study was approved by the Research Ethics Committee of the Public Health School of the University of São Paulo, registered in the Brazil Platform (CAAE: 15444013.3.0000.5421) and its realization was authorized by the Coordination of Primary Health Care of the Municipality of Uberlândia. All participants signed the Free and Informed Consent form.

Two primary healthcare units in deprived areas covered by the Family Health Strategy (FHS) of the municipality of Uberlândia were intentionally selected according to characteristics described in a previous survey (Faquim & Frazão, 2016) such as assisted population, similar and favorable conditions of physical structure and interprofessional collaboration, declaration of interest by professionals and management. FHS is the priority strategy to provide integrated primary care in Brazil. It is composed by multidisciplinary professional teams, usually consisting of a physician, a nurse, and about six community health workers called family health team that act under principles such as longitudinality and comprehensiveness care coordination with adjunct services related to supporting diagnosis, specialized care and hospital. Because the high level of shared team identity, clarity, interdependence, integration and shared responsibility, the type of interprofessional practice of them is called teamwork (Reeves

et al, 2018). This core team also may be supported by a simple dental team composed by a general dentist and an oral health assistant, or by an expanded dental team composed by a general dentist, an oral health technician and an oral health assistant. The oral health technician is a mid-level worker that may have an important role on inter-professional relations aiming at more integrated oral healthcare (Aguiar et al 2014). Each group of four or five core teams also may be supported by other professionals like psychologists, community pharmacists, and physiotherapists. As the interprofessional relationships between the core team and the oral health team and also the other supporting professionals have potential to be looser, the type of practice is called collaboration (Reeves et al, 2018).

Based on this organizational framework, the FHS represents a favorable space for increasing the degree of interprofessional collaboration (Matuda et al, 2015). Integrated care requires the active involvement of the workforce as partners in change, while interprofessional collaboration requires strong organizational support (Barr, 2012).

The study population comprised four categories of healthcare professionals from two primary health care units (physicians, dentists, nurses and oral health technicians) totaling eight health professionals. In addition, 60 pregnant women registered in these units throughout the study were involved in the research. The primary health care units attended all women that seek their services and live in their coverage area. Many of the pregnant women seek prenatal care after twenty weeks. As the investigated intervention protocol was planned to be developed in twelve weeks, only those who had twenty weeks or less were invited to participate in the intervention group. Therefore, pregnant women with gestational age greater than 20 weeks were considered as comparison group. Although they were not a randomly selected control group, this type of strategy allowed to select pregnant women not submitted to the intervention that were part of the same reference population and to compare the effects of the intervention. The intervention group comprised 36 pregnant women recruited sequentially that underwent prenatal care within the new protocol and were interviewed before and after the intervention. The comparison group comprised 24 pregnant women that had already begun the conventional prenatal care before the intervention and were interviewed only one time. Given the exploratory feature of the study, thirty participants would be needed in each group for identifying of a difference of 0.5 between mean values taking into account two-sample and paired Student's t tests, similar variance, alpha (type I error) less than 0.05 and beta (type II error) less than 0.20.

2.1 The intervention

With the aim of using permanent education as a strategy to build pacts between professionals and users that place the needs of users as a focus of health work organization, a workshop described in previous publication (Faquim et al, 2018) was carried out using the ZOPP method (Objectives-oriented Projects Planning) under the direction of a specialized professional. The application of this method allowed a process of participatory analysis and a collective construction of a new care protocol for pregnant women involving different professionals and also users in the planning of a new interprofessional approach in prenatal care.

The result of this workshop was a protocol of organization of services, covering mainly the flow of pregnant women and the dynamics of the work process, contemplating four moments: the entrance of women with suspected pregnancy in the network, the reception in the health unit, the diagnosis of pregnancy and in the aftermath, the flow within an interprofessional collaboration perspective.

The protocol was approved by the municipal health council, and tested during ten months in the two units selected, under the governability of the multi-professional team to measure its effects on the quality of care offered to pregnant women and on interprofessional collaboration.

Participants in the comparison group received the standard dental treatment provided by a simple oral health team to pregnant women, comprising one session of supragingival calculus removal and oral hygiene instruction. Those in the test group

were cared by an expanded oral health team that differed by the performance of an oral health technician. The pregnant women of intervention group participated at least in three conversation wheels provided once a month by the multi-professional team for creating a supportive, welcoming and bonding environment that favored listening between professionals and pregnant women to share values, perceptions and behaviors. The intervention was based on a user-centered model in which group prenatal care may improve knowledge among pregnant women and care quality. It is a device that may favor a positive experience during pregnancy, with respectful care, based on a vision of rights, high level of participation and involvement of the pregnant woman (Andrade et al, 2019). The oral health technician collaborated in the wheels as a member of multi-professional team. The conversation wheel is an arrangement in which the participants with different life histories and their own ways of thinking and feeling, share their perceptions so that dialogues born of this encounter do not follow the same logic (Tavares, 2015). Treatment consisted of an initial phase where supragingival plaque control was implemented and oral hygiene instructions was provided by the oral health technician. A second phase began when subgingival scaling and root-planning was performed according to patient's needs. Maintenance appointments were conducted at least once a month according to individual needs to maintain optimal plaque control. Systematic review demonstrated that periodontal treatment improved the OHRQoL in both short and long term period and, therefore, it is beneficial from a patient centered perspective (Shanbhag et al, 2012).

Patients in both groups received pain relief treatment whenever necessary and nonsurgical periodontal therapy 2 to 6 months after delivery.

An intervention study focusing on interprofessional collaboration involves multi-professional teams interacting with the purpose of improving collaborative practices in work routines to impact the quality of the care offered (Zwarenstein et al, 2009). A review of the scope in this area can identify three types of interprofessional interventions: interprofessional education, interprofessional practices, and interventions in the interprofessional organization (Goldman et al 2009). This study refers to an intervention of interprofessional practices also called intervention focusing on practical interprofessional collaboration. An intervention of interprofessional practices involves changes in the work process, incorporation of tools that promote interactions between professionals, or implementation of a new agreed routine or protocol, with the aim of improving collaborative practices and improving the quality of health care offered (Zwarenstein et al, 2009).

2.2 Data collection and analysis

The data collection strategy selected during the intervention was concomitant triangulation, in which quantitative and qualitative approaches were used in an attempt to corroborate the results within a single study and as a way to compensate for the weaknesses inherent in one method, with the strengths of another method (Morgan et al, 1998). At this stage, the collection of quantitative and qualitative data was simultaneous, with equal priority for both methods.

The quantitative data regarding pregnant women were compared before and after the intervention, and also with the post-test control group. Qualitative data in relation to professionals were collected after the intervention and integrated during the interpretation phase, according to Figure 1.

Before and after the intervention, the pregnant women participated in a structured interview in which data were obtained related to age, education attainment, gestational age, oral health self-assessment, quality of life resulting from oral health and the perception about the work of professionals (Figure 2). The quality of life resulting from oral health was measured using the reduced version of the Oral Health Impact Profile (OHIP-14) scale. The instrument distributed in 14 items, included seven dimensions of impact: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and impairment. The answers were distributed in a Likert scale. For each item, was attributed a value (never=0; hardly ever=1; occasionally=2; fairly often=3; and very often=4). The OHIP-14 score ranged from 0 to 56; higher scores denoted higher frequency of negative impacts (Oliveira et al, 2005).

Figure 2: Structured interview: Questions about the interview form answered by pregnant women.

Questions	Categories of the answer
About the team	
1. Do you notice if the professionals of this health unit work as a team?	(1) Absolutely yes (2) Probably yes (3) Probably no (4) Absolutely no (5) Don't know or don't remember
About oral health	
2. How would you describe the health of your teeth and your mouth today?	(1) Excellent (2) Good (3) Reasonable (4) Bad (5) Very Bad
About the quality of life resulting from the oral health condition (OHIP14) In the first interview, the questions refer to the problems that may have occurred in the last three months. In the second interview, the questions refer to the persistence of the problems after dental care: (1) Never (2) Rarely (3) Sometimes (4) Repeatedly (5) Always	
3.1 Did you have trouble saying a word because of problems with your gums and teeth?	
3.2 Did you feel that the taste of food got worse because of problems with your gums and teeth?	
3.3 Did you have pain in your gums or in your teeth?	
3.4 Did you feel uncomfortable eating any food because of problems with your gums and teeth?	
3.5 Did you get worried about problems with your gums and teeth?	
3.6 Did you feel stressed because of problems with your gums and teeth?	
3.7 Has your diet been impaired by problems with your gums and teeth?	
3.8 Did you have to stop your meals because of problems with your gums and teeth?	
3.9 Did you find difficulty to relax because of problems with your gums and teeth?	
3.10 Did you feel ashamed because of problems with your gums and teeth?	
3.11 Did you get angry with other people because of problems with your gums and teeth?	
3.12 Did you have difficulty in performing your daily activities because of problems with your gums and teeth?	
3.13 Did you feel that life in general got worse because of problems with your gums and teeth?	
3.14 Did you feel totally unable to do your daily activities because of problems with your gums and teeth?	

Source: Own elaboration

The professionals were asked about the open question "What is your opinion on what the care protocol to pregnant women represented in general for you, as a health professional, for the team of your unit and also for pregnant women" at the end of the intervention, with the aim of capturing the perception about the effects of the implementation of the pregnancy care protocol, the significance of the intervention for the exercise of its practice, for the care of pregnant women and also for the interprofessional relationships. The material was recorded and transcribed, literally, to a text editor, identifying each respondent by the acronyms P1 to P10, in order to protect anonymity.

Numerical data were transcribed into a spreadsheet. The distribution of age group and education attainment between the test and control groups were compared using Pearson's chi-square test. Differences in gestational age between groups were assessed by Student's t-test.

With regard to the oral health self-assessment data, quality of life resulting from oral health and perception of the professionals' work, measures of central tendency and dispersion (average, median and standard deviation) and the values of the first quartile (Q25) and third quartile (Q75) were calculated. After analysis of adherence to the normal curve (Shapiro-Wilk test), the estimates of the intervention and control groups were compared by Student's t-test and Mann-Whitney test. The differences between the estimates obtained before and after the intervention in the test group were explored using the paired Student's t-test and the Wilcoxon test. Based on the exploratory nature of the study, the null hypothesis was tested with the aid of Stata 12.0 software considering in all analyzes the p-value at a significance level of 10%.

A thematic analysis of the content was made based on the material obtained from the transcription of the answers related to the open question. The statements were interpreted through repeated readings to identify the most relevant and frequent meaning units in the narratives of the respondents. In addition, the records of the research diary were taken into account, containing informal conversations, observations of behavior during the speeches, statements of the interlocutors regarding the various points investigated and also the personal impressions of the researcher. It is recognized that these records can contribute to the understanding of the study object in its multiple dimensions and interrelationships (Bauer et al, 2000).

3. Results

The study population comprised four categories of health professionals and 60 pregnant women. Eight health professionals participated, two doctors, two dentists, two nurses and two oral health technicians, all of them were women, 3 (37.5%) were between 36 and 45 years old and 5 (62.5%) were between 26 and 35 years old. The youngest age group predominated for doctors and nurses, and for dentists, the age group above 35 years of age.

The characteristics of the pregnant women population were described in Table 1. Thirty-six women participated in the intervention group and 24 women in the control group without statistically significant differences regarding age composition and level of education. Both in the intervention group and in the control group, most of the pregnant women were young (less than 26 years of age) and had incomplete or complete high school.

The mean gestational age in the first interview for the intervention group was 14.0 weeks (s.d.=4.04) and in the second interview 29.1 weeks (s.d.=6.14) for the same group. For the control group, the mean gestational age was 22.7 (s.d.=10.03) with statistically significant differences between values (Table 1).

Table 1. Distribution of pregnant women in the intervention and control groups according to age group and level of education. Units of the Jardim Célia and Alvorada Family Health Program, Uberlândia, MG, January to October 2015.

Characteristics		Intervention N (%)	Control N (%)	P
Age group	< 26	23 (63.9%)	17 (70.8%)	0,576*
	> 25	13 (36.1%)	7 (29.2%)	
Education	Incomplete Elementary School	6 (16.7%)	2 (8.3%)	0,638*
	Complete Elementary School	6 (16.7%)	6 (25.0%)	
	Incomplete High School	10 (27.8%)	5 (20.8)	
	Complete High School or more	14 (38.9%)	11 (45.8)	
		Average (s.d.)	**Average (s.d.)**	**P**
Gestational age (1st interview)		14,0 (4,04)	22,7 (10,03)	0,000**
Gestational age (2nd interview)		29,1 (6,14)	..	0,006***

Notes: * Pearson's Chi-Square Test. ** Student's t-test. ***paired Student's t-test. Source: Own elaboration.

The estimates related to oral health self-assessment data, quality of life resulting from oral health and perception of the work of professionals before and after the intervention, both for the test group and for the control group are presented in Table 2. There was no significant difference in the perception on interprofessional collaboration provided by pregnant women before and after the intervention, but there was a significant difference between the control and intervention groups (p=0.069), indicating that the perception on interprofessional collaboration provided by the pregnant women in the intervention group was greater than the women in the control group.

With regard to oral health self-assessment, there was a statistically significant difference before and after the intervention (p=0.006) in the test group, but in the comparison of the post-test estimate with the control group the values did not differ significantly. The same was noticed in relation to the average of OHIP-14. A statistically significant difference was observed before and after the intervention (p<0.000), but there was no difference between the post-test and control group values, indicating a marked improvement in the oral health self-assessment and the quality of life resulting from oral health after the

intervention, however, the values achieved by this improvement did not differ significantly from the values obtained for the comparison group.

Table 2. Descriptive statistics of the study variables according to the pregnant women of the intervention and control groups. Units of the Jardim Célia and Alvorada Family Health Program, Uberlândia, MG, January to October 2015.

(Categories/Questions) Variables	N	Average	S.D.	Q25	Median	Q75	P
Intervention							p*
1. Professionals collaborate with each other (before)	35	1,49	1,15	1	1	1	0,460[d]
1. Professionals collaborate with each other (after)	35	1,31	0,67	1	1	1	..
2. Oral health self-assessment (before)	35	2,77	0,94	2	3	3	0,006[c]
2. Oral health self-assessment (after)	35	2,31	0,83	2	2	3	..
3. OHIP14 (before)	36	21,58	10,37	14	18	26	<0,000[c]
3. OHIP14 (after)	36	16,69	5,56	14	14	16.5	..
Control	N	Average	S.D.	Q25	Median	Q75	p**
Professionals collaborate with each other	23	1,74	1,10	1	1	2	0,069[b]
Oral health self-assessment	24	2,41	0,50	2	2	3	0,661[a]
OHIP14	24	17,20	4,82	14	15	18	0,215[b]

*Comparison between the values of the first and second interview in the intervention group. **Comparison between the values of the control group and the values of second interview in the intervention group. [a]Student's t test; [b] Mann-Whitneytest; [c] paired Student's t-test; [d] Wilcoxon test. S.D.: standard deviation; Q25: value of the 1st quartile; Q75: value of 3rd quartile. Source: Own elaboration.

The thematic analysis allowed the identification of three categories related to the effects of the intervention: one associated with professional practices, another associated with interprofessional relationships and a third one linked to the care offered to pregnant women. With regard to the first category, units of meaning such as team and user empowerment, feeling of authorship, autonomy to think about the team's own work process were identified. This was very evident in the narratives of some respondents.

> ...*"the project was transformative, it has allowed the team to talk and think about its work process and to propose changes, it was a new practice, no one had ever thought about the protocol, and much less thought about alternatives and proposals that were different, so I think that this empowered the team and it was fundamental to change the work relationships and change the way professionals relate to each other"...* (P1)

> ...*"it has allowed health professionals who are on the top to elaborate, think, discuss and execute the protocol they are using"...* (P1)

> ...*"allow the worker to think and not only perform, gives him the opportunity to be part of, to be inserted in what he does"...* (P1)

> ...*"when I saw the protocol there on the unit wall, my eyes sparkled, knowing that I was part, happy because future mommies will have the privilege of having a multidisciplinary team waiting for them, I think that makes all the difference in pregnancy"...* (P2)

On the other hand, in relation to this same category, some tensions were identified mentioning the challenging character of the work, individual difficulties of teamwork, of sharing distinct perceptions about the same object, of producing provisional acceptance and consensus denoting resistance in problematizing one's own beliefs.

> ...*"there is a difficulty of the team in changing the paradigm, changing the look, because a group that is built by many professionals at the same time, they are people who think differently, who have ways of seeing differently, it messes with the ego"... (P3)*

..."if one thinks differently from me and vice versa, one of the ideas will prevail and it is difficult for us to have that time, that disposition to discuss and try to propose something different, the routine of the unity is sometimes so overwhelming, we don't have space for these constructions, these reflections"... (P3)

In the category of the effects of the intervention on the interprofessional relations, there were units of significance that indicated that the work process implemented led to greater involvement, commitment, union, greater interaction and collaboration resulting in a more integrated practice. There was greater dedication in the production of care, collective constructions and a more horizontal interprofessional relationship among the team's members was identified.

..."building the protocol involved all of the team, including the participation of users, this was very important, we also have to consider their side, even better was putting it into practice, see the project come out of the paper and really happen was fantastic, everyone is very involved in doing the best possible, bringing in the largest number of pregnant women and the pregnant women themselves were very happy with the groups, it was fantastic to have united all the specialties..." (P4)

..."for pregnant women is a way to socialize with other women in the community who are also pregnant, to share the anguishes that are different, but that are in a common circle and to be able to have this exchange space, a safety space, that she knows she can speak and will not be reprimanded, criticized"... (P5)

..."we managed to work as a team, of course it can improve, but this way there was interaction among the team, we can't do the protocol alone, then we seek a greater approximation of the team"... (P6)

For this same category, the greatest difficulty pointed out by the respondents was the influence of hierarchical models of care production focused on specializations and hyper-specializations, that if on the one hand bring more knowledge about specific aspects, on the other, strengthen fragmentation, not only in the plane of knowledge, overshadowing the adoption of a more global perspective to look at it, but also in the field of interprofessional actions and relationships, causing harm to collaborative practice and to search for shared therapeutic projects, important resources for comprehensive care focused on the needs of families and patients.

..."these challenges need to be overcome, there are difficulties that are human, to relate to each other and to open the mind to really change a point of view or a paradigm, this has to do with the way we had our educational process of so many years"... (P3)

In relation to the care offered to pregnant women, the perception of some professionals suggested an increase in the qualification of care for pregnant women, a concern to adapt to the needs of pregnant women, generating a greater bond and commitment in the production of a more comprehensive care for pregnant women.

..."I noticed important changes in the quality of care that is offered to the pregnant woman, in the sense of welcoming, before the protocol was implemented, the service was very punctual, impersonal, and the way the pregnant woman understood her health and the process of pregnancy, was not worked at any time"... (P1)

..."I realized that the demands of pregnant women were met, the conversation wheels represented a way to socialize with other women in the community who are also pregnant, to share the anguish that are different, but who are in a common circle and can have a reserved space of exchange, a space of security, in which she knows she can speak and will not be reprimanded, criticized"... (P5)

..."there was a greater commitment in the care of pregnant women, we saw the importance of interdisciplinarity in prenatal care, the team was still more interested and united in relation to pregnant women, because there was a greater commitment resulting in the improvement of prenatal care offered by the unit"... (P7)

From the records of the field diary two aspects deserve to be emphasized. One refers to organizational changes that negatively affected part of the team. Labor bond instability has generated insecurity, causing difficulties in the execution of routine activities of part of the workers.

> *..."look, I am very discouraged, because I am afraid they get me fired, I like a lot of what I do, but I confess that I am not working hard enough because I'm not in the mood, I can't lose my job"...*

The other refers to a record related to the perception of the health unit's doorman. The relevance was considered due to understanding that it had originated from an external look at the health team's work process, and had got to detect changes in the unit routine:

> *..."look, I have never seen a schedule for users in which the room (meeting room) had become so cute... it was the first time, and, look, I am here since this unit was founded"...*

4. Discussion

Interprofessional collaboration can be mobilized to raise the effectiveness of health systems, and play an important role as an innovative strategy to address problems of the health care delivery and workforce. Despite the benefits attributed, knowledge on interprofessional collaboration related to oral health in prenatal care is scarce and this study evaluated the impact on interprofessional collaboration and oral health-related quality of life from a prenatal care protocol.

The characteristics of the study population showed that in both intervention and control groups most of the pregnant women were young (less than 26 years of age) and had incomplete or complete high school. These two findings may indicate more complex need of prenatal care requiring increased level of interprofessional collaboration, since both maternal age and education attainment among other characteristics such as obstetrical, psychological, and genetic, paternal and environmental factors have been pointed out as important indicators of obstetric risk (Torchin et al, 2016).

Low education was associated with low socioeconomic status, a factor that may predispose to potentially risky situations for the mother and the newborn, besides preventing access to information and guidance, restricting the capacity for care and hindering the exercise of rights and citizenship in universal care systems as investigated herein. In the study area the level of education directly interferes with people's living and health conditions and confirms the existing correlation: the lower the level of education, the greater the difficulty of understanding the need for special care during pregnancy, leading to late onset and absence of prenatal care, inadequate feeding and habits incompatible with pregnancy (Ramos & Cuman, 2009).

Studies have suggested an association between adverse perinatal outcomes and maternal morbidity and mortality in adolescents and pregnant women 35 years and older. Teenage pregnancy requires attention to possible harmful consequences to maternal and fetal health, such as low birth weight, micronutrient deficiencies and intrauterine growth restriction and premature birth (Santos et al, 2012).

Among the main results, it is noteworthy that the perception that the professionals collaborated with each other was greater among pregnant women in the intervention group than in the control group. There was also a clear improvement after the intervention in oral health self-assessment and the quality of life resulting from oral health measured by the OHIP-14, although the values achieved by this improvement did not differ from the values obtained for the comparison group.

Despite the complexity of the perceptions of this target audience, the fact that the pregnant women in the intervention group realized the interprofessional collaboration may indicate that the reorganization of the work process resulting from the intervention, and the sharing of actions required by the protocol may have been important for these perceptions of pregnant women who experienced the intervention. Based on the protocol, the oral health technician was an important link with other members of the multi-professional team in the conversation wheels within which values, perceptions, behaviors and needs of

pregnant women were shared about changes experienced during the pregnancy. According to earlier study (Aguiar et al 2014) , the oral health technician proved to have qualities that can contribute richly and meaningfully to collaborative models in a context of health care reform, in which overwhelming oral health needs and growing associations between oral and systemic wellness add to the mid-level worker high relevance in the interprofessional arrangements (Fried, 2013).

Integrated teams implies interaction in accordance with the proposal of health action comprehensiveness. Collaboration between health teams does not occur solely by a technical summation of partial work, but requires coordinated work, communicative interaction among agents and overcoming isolation of knowledge (Peduzzi, 2001). Collaboration is the element that most influences teamwork (Heinneman, 2002) . Interprofessional collaboration in health teams represents the structuring of collective action through information transmission and shared decision-making (D'Amour et al, 2005).

Both the improvement of oral health self-assessment and the improvement of the quality of life resulting from oral health measured by OHIP-14 can be explained, to some extent, by the reorientation of the work process that produced an adequate articulation between oral health actions and other health actions. In addition, prenatal oral health care during the intervention was redesigned in order to obtain greater sharing of the actions between the dentist and the oral health technician and also between expanded oral health team and the family health team, envisioning a greater scope of collective and preventive measures, the possibility of increasing coverage and greater effectiveness in responding to the needs of pregnant women.

When healthcare professionals are able to work collaboratively, positive results are expected for both patients, professionals, organizations and the system (Sullivan, 1998).

Furthermore, the relevance of understanding how individuals perceive the oral health condition is linked to the fact that their behaviors are conditioned by this perception, by the importance given to it, for their cultural values and past experiences in the health system (Rocha et al, 2018) . Self-perception data are important, because they make it possible to verify when there is a need for behavior change (Rocha et al, 2018) , but in the case of pregnant women, it is important to add that one of the greatest difficulties of implanting a dental service in prenatal care comes from the beliefs that arise from the association between pregnancy and dentistry (Rocha et al, 2018) . This confrontation also required skills from the multi-professional team to overcome the beliefs and fears that pregnant women have about dental treatment. Research comparing the impact of oral health on quality of life of a group of pregnant women enrolled in a program of oral health with respect to a control group of non-pregnant women showed to be beneficial in limiting periodontal illness and could increase their positive perception of oral and general quality of life (Martínez-Beneyto, et al, 2019; Musskopf et al, 2018).

Intervention researches focusing on the understanding of multi-professionalism and interdisciplinarity has led to a growing use of mixed research methods involving quantitative and qualitative approaches. This research design, despite the challenges related to data collection, narrative analysis and numerical data, has been an alternative to obtaining a more comprehensive interpretation of the research problem, in particular, in primary care (Morgan et al, 1998).

Among the limitations of the investigation it is necessary to mention the capacity of response of quality of life measures related to oral health by the sensitivity of the OHIP instrument. In previous studies, OHIP demonstrated reliability, but showed modest sensitivity to change indicating that its psychometric properties of global transition judgments that provide the "gold standard" for responsiveness studies need to be investigated (Locker et al, 2004).

On the other hand, the present study is one of the first oral health studies investigating interprofessional collaboration, looking at the relationships and interactions between prenatal care professionals. Earlier study reported the implementation of a prenatal oral health program in an academic setting involving dental and medical students (Jackson et al 2015). The understanding of the issues raised by interprofessional collaboration in prenatal care represents a unique contribution to the current debate and may support health system managers in the challenge of consolidating spaces that promote discussion and improvement of interprofessional relationships, and of defining theoretical and methodological guidelines that contribute to the

future elaboration of public policies on interprofessional collaboration and intervention strategies for professional development in health.

In the face of the results found, it can be concluded that interprofessional collaboration based on horizontal relationships and shared decision-making can be an important element for integrating oral healthcare in the prenatal care.

The construction of the care protocol for pregnant women taking into account the previous experiences of professionals, the vision of users and the overcoming of isolated actions and the performance of oral health technician represented important factors in the adequacy of services to the needs of pregnant women, in the commitment of the team, besides allowing the teams to perform, think and discuss their work process.

The collective construction of the protocol allowed experiencing collaboration from planning to execution as a gradual construction process, prior to practical application. This allows understanding interprofessional collaboration as a process, a part of the work itself, which can be applied to management and planning using methodologies (such as the ZOPP method used) that mobilize collaboration and planning in a horizontal and participatory way.

This intervention research, focusing on interprofessional collaboration, based on practice, was transforming and allowed for more comprehensive and humanized prenatal care. It impacted on the interprofessional relations of the health teams, the production of care offered and the quality of life of pregnant women during prenatal care in the two health units of the study.

The use of mixed methods combining quantitative and qualitative approaches, although requiring greater effort in data collection and numerical and textual data analysis, was noteworthy for its methodological contribution in generating more reliable and substantiated results. Mixed methods can be a good methodological choice to allow a better understanding of the meaning of relationships found in health services almost always situated in complex contexts.

Although it is a clipping of a reality the findings of this study has contributed to the development of competencies related to collaborative work with a view to increasing the quality of care and the quality of life resulting from oral health in pregnant women.

5. Final Considerations

In the face of the results found, it can be concluded that interprofessional collaboration based on horizontal relationships and shared decision-making can be an important element in the organization of teamwork.

The construction of the care protocol for pregnant women taking into account the previous experiences of professionals, the vision of users and the overcoming of isolated actions represented important factors in the adequacy of services to the needs of pregnant women, in the commitment of the team, besides allowing the teams to perform, think and discuss their work process.

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Although it is a clipping of a reality, therefore, further studies are needed, it is considered that the findings of this study has contributed to the development of competencies related to collaborative work with a view to increasing the quality of care and the quality of life resulting from oral health in pregnant women.

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