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Does the level of education influence the treatment of type 2 diabetic?

O nível de escolaridade influencia no tratamento do diabético tipo 2?

¿El nivel de educación influye en el tratamiento de la diabetes tipo 2?

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ABSTRACT

Objective: This study aimed to analyze the clinical profile of patients with type 2 diabetes mellitus and the influence of educational level on treatment. **Method**: the research was conducted in the city of Colinas - MA using the exploratory-descriptive means and quantitative approach. The data collection period comprised the months of July and August 2017. To perform the population sample calculation, the StatCalc function of the EPI INFO software was used. **Results**: The evaluation showed that 48% of diabetics are not literate, and 85% of the population cannot describe their disease. The study found that 74% of diabetics undergo treatment, of these 94% know the dose of drug therapy, 24% know about the effects of the drug and 91% reported no difficulties in therapy. **Conclusion**: it was concluded that the level of education factor was not an influencer in relation to drug therapy.
Descriptors: Diabetes Mellitus; Schooling; Pharmacological treatment.

RESUMO

Objetivo: este estudo buscou analisar o perfil clínico dos portadores de diabetes mellitus tipo 2 e a influência do nível de escolaridade no tratamento. **Método:** a pesquisa foi realizada no município de Colinas - MA utilizando os meios exploratório-descritivos e abordagem quantitativa. O período de coleta de dados compreendeu os meses de julho e agosto de 2017. Para a realização do cálculo amostral da população utilizou-se a função StatCalc do software EPI INFO. **Resultados:** a avaliação mostrou que 48% dos diabéticos não são alfabetizados, além disso, 85% da população não sabe descrever sua doença. O estudo evidenciou que 74% dos diabéticos realizam tratamento, destes um total de 94% conhece a dose da terapia medicamentosa, 24% sabem sobre os efeitos do medicamento e 91% relataram não possuir dificuldades na terapia. **Conclusão:** concluiu-se que o fator nível de escolaridade não foi um influenciador em relação à terapia medicamentosa.
Descritores: Diabetes Mellitus; Escolaridade; Tratamento Farmacológico.

RESUMÉN

Objetivo: Este estudio tuvo como objetivo analizar el perfil clínico de pacientes con diabetes mellitus tipo 2 y la influencia del nivel educativo en el tratamiento. **Método:** la investigación se realizó en la ciudad de Colinas - MA utilizando los medios descriptivos exploratorios y el enfoque cuantitativo. El período de recopilación de datos comprendió los meses de julio y agosto de 2017. Para realizar el cálculo de la muestra de la población, se utilizó la función StatCalc del software EPI INFO. **Resultados:** La evaluación mostró que el 48% de los diabéticos no saben leer y escribir, y el 85% de la población no puede describir su enfermedad. El estudio encontró que el 74% de los diabéticos se someten a tratamiento, de estos, el 94% conoce la dosis de la terapia farmacológica, el 24% conoce los efectos del medicamento y el 91% informó no tener Dificultades en la terapia. **Conclusión:** se concluyó que el factor de nivel educativo no influyó en relación con la terapia farmacológica.
Descriptores: Diabetes Mellitus; Escolaridad; Tratamiento farmacológico.

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INTRODUCTION

Diabetes Mellitus (DM) is defined as a multifactorial metabolic syndrome characterized mainly by an insulin dysfunction in the body, that is, the person does not produce enough insulin or when it does not perform its function properly in the body. In addition, it is accompanied by chronic hyperglycemia and changes in metabolism of vital energy sources such as proteins, carbohydrates and lipids. Among the various classifications for the disease are: type 1 diabetes, type 2 diabetes, gestational diabetes and DM in association with other conditions or syndromes.[1]

Type 2 diabetes, formerly called non-insulin dependent, because it is controlled very well with diet and oral antidiabetics not requiring insulin for most of its evolution, results from a decrease in insulin sensitivity, ie there is a hormone resistance. It may also be a result of a reduction in the amount of insulin secreted. This problem can lead to the onset of metabolic syndrome, which leads to various symptoms such as hypertension, hypercholesterolemia, abdominal obesity and other abnormalities.[1]

The Brazilian Society of Diabetes, classifies type 2 as the most common diagnosis after 40 years, affecting about 90 to 95% of cases, being almost entirely linked to environmental and genetic factors. Physical inactivity with a high fat diet and aging are the main factors related to the diagnosis of diabetes, as well as overweight or obesity.[2]

Due to its direct relationship with some cardiovascular, cerebrovascular and renal diseases, type 2 diabetes has become one of the leading causes of death worldwide. Other problems resulting from this chronic disease are blindness, amputations, erectile dysfunction, diarrhea and gastroparesis,[3] patients are also susceptible to retinopathies, nephropathies and diabetic foot which is one of the main pathologies that cause lower limb amputation worldwide.[4]

Diabetic foot is a complication of DM, where an infected foot area develops a plantar ulcer in response to the association of peripheral neuropathy, along with peripheral vascular disease and extrinsic factors, resulting in most cases in severe infections and even partial or total amputations, when not directed to early and adequate treatment.[5]

Due to the great social and economic impact, both in terms of productivity and costs, DM has been recognized in many countries as a public health problem with important social consequences. This chronic problem has become a common cause of hospitalization and physical disability.[6]

A rate of 50% of people with diabetes are unaware that they have the disease, and remain unaware until the first signs of complications begin to appear. Therefore, what preventive programs are essential in diagnosing the disease through screening tests, which is an appropriate method for testing asymptomatic patients.[7]

The Brazilian Society of Diabetes, presents that DM is not just an isolated disease, being considered a set of metabolic disorders presenting in common with hyperglycemia and that results in the malfunction of the action of insulin hormone.[2] Nowadays, diabetes is

considered a major public health problem in the world, due to the great complications and magnitude that is causing in the lives of individuals.[8-10]

One factor that directly influences DM treatment is schooling. Studies show a 9.6% prevalence of diabetics with lower education and also find that the low level of education is among the majority of diabetics surveyed in Mexico, with 74% patients with incomplete elementary school. The influence of educational level is a serious problem in diagnosis, as patients will have difficulty following medical recommendations.[8]

This study aims to analyze the clinical profile of patients with type 2 diabetes mellitus and the influence of educational level on treatment.

METHODS

This study uses the exploratory-descriptive methods and quantitative approach. The research was conducted in the city of Colinas - MA, located in the Alto Itapecuru region in the Midwest of Maranhão 437 km from the capital São Luís. The municipality has a Primary Health Care network consisting of: 14 Strategy teams of Family Health (FHS), being 8 in the urban area and 6 in the rural area of the municipality and 1 Program of Community Health Agents Program = installed in the urban area. The study had as scenario the Guanabara neighborhood FHS.

The total population of type 2 diabetic patients in the Guanabara ESF coverage area is 56 patients. To perform the population sample calculation, the StatCalc function of the EPI INFO version 7.2.1.0 software was used. With prevalence of 50%, margin of error of 5% and confidence interval of 95%.

During the data collection, of the 56 patients only 46 participated in the study, where some were not located and others were not accepted to participate in the research. To select participants, the following inclusion criteria were adopted: being over eighteen; bear type 2 DM; freely and spontaneously accept to participate in the study by signing an Informed Consent Form. To exclude participants, the following criteria were used: being type 1 diabetic; pregnant women diagnosed with gestational diabetes; people without cognitive ability to answer the form.

For data collection, a questionnaire containing 13 questions was applied in order to collect socioeconomic, drug treatment and clinical information. During collection, anthropometric data and blood glucose level were measured for health status analysis. The collection period comprised the months of July and August 2017 and was held at the participants' home in two moments: first the questionnaire was applied with previous acceptance of ethical terms, after application the participant was advised to remain fasting between 7 and 8 am the next day; the day after the questionnaire was applied, anthropometric data, blood pressure and fasting blood glucose were collected.

The process of analysis of the collected data was performed through relative and absolute frequencies in several variables such as the participant's gender, professional categories, age and education level. The EPI INFO version 7.2.1.0 and Excel version 16.0.4266.1003

software were used as a resource.

The study complied with Resolution No. 466/12 of the National Health Council of the Ministry of Health. For this purpose, a clear and objective language was used to inform about the study and its objectives, favoring understanding and acceptance, where the Research Project was approved by a CAAE ethics committee No. 65597817.0.0000.5554.

RESULTS

This study performed a socioeconomic analysis in order to draw a profile of the diabetic population. Table 01 shows the frequency of type 2 diabetics according to socioeconomic variables.

Table 01: Socioeconomic profile of type 2 diabetics. Maranhão, Brazil, 2017

Category	**Female**		**Male**		**Total**	
	N	**%**	**N**	**%**	**N**	**%**
Age group						
30 – 39	1	2	-	-	1	2
40 – 49	4	9	1	2	5	11
50 – 59	9	19	1	2	10	22
60 – 69	15	33	1	2	16	35
70 ou >	10	22	4	9	14	30
Total	39	85	7	15	46	100
Race						
White	9	20	2	4	11	24
Black	10	22	-	-	10	22
Brown	20	43	5	11	25	54
Total	39	85	7	15	46	100
Education						
Non-literate	18	39	4	9	22	48
Literate	14	30	2	4	16	35
Elementary	3	7	-	-	3	6
Medium	3	7	1	2	4	9
Higher	1	2	-	-	1	2
Total	39	85	7	15	46	100
Familiar income						
< 1 minimun wage	5	11	1	2	6	13
1 minimun wage	25	54	6	13	31	67
> 1 minimun wage	9	20	-	-	9	20
Total	39	85	7	15	46	100

According to Table 01 it is possible to observe a higher prevalence of female participants 85% (39) and only 15% (07) males. According to age, the largest sample of diabetics was found between 60 and 69 years 35% (16), the second highest prevalence was in the range of 70 or more 30% (14). Regarding race, most of the population surveyed was brown 54% (25), whites add up to 24% (11) and blacks 22% (10).

Table 02: Distribution of type 2 diabetics. Maranhão, Brazil, 2017

	Yes		No		Total	
Knows the disease	**N**	**%**	**N**	**%**	**N**	**%**
Female	6	13	33	72	39	85
Male	1	2	6	13	7	15
Total	7	15	39	85	46	100
	Female		**Male**		**Total**	
Reasons for dropping therapy	**N**	**%**	**N**	**%**	**N**	**%**
I do not need the medication	6	50	2	17	8	67
Side effects	1	8	-	-	1	8
I forgot to take it	-	-	1	8	1	8
Lack of Information and assistance	2	17	-	-	2	17
Total	9	75	3	25	12	100
	Female		**Male**		**Total**	
Drug distribution by therapeutic scheme	**N**	**%**	**N**	**%**	**N**	**%**
Glycenclamide	17	37	5	11	22	48
Glibenclamide and Metformin	11	24	-	-	11	24
Metformin	8	17	1	2	9	19
Insulin	3	7	1	2	4	9
Total	39	85	7	15	46	100

Table 02 shows the answers obtained for the question, where it can be observed that along with low income and poor education, it was also found that most diabetics do not have knowledge about their pathology. Of all patients, 85% did not know about diabetes and 15% showed some knowledge about the disease. These results are worrisome as to how these people will deal with the treatment and control of this disease as the disease is chronic.

The reasons for giving up disease control therapy are shown in Table 02.

Of the diabetics who underwent treatment and, however, decided to quit because they "did not think they needed the drug", correspond to 67% (8), giving up therapy due to "lack of information and help" is 17% (2). , 8% (1) reported that they dropped out due to "side effects" and 8% (1) for "forgetting" to take the drug. The main drugs used by therapeutic scheme are shown in Table 02.

Among the major therapeutic regimens used by diabetic patients, the most prevalent in this study was monotherapy with glyburide which 48% (22) of the respondents reported their use, secondly was glibenclamide and metformin 24% (11), followed by monotherapy metformin 19% (9) and lastly the exclusive use of insulin reported by 9% (4) of the participants. Table 03 relates schooling with knowledge about the variables: dosage and expected effects of drug therapy and its difficulties. From the results of

Table 03: Relationship between education and level of knowledge to treatment. Maranhão, Brazil, 2017

Category	**Yes**		**No**		**Total**	
	N	**%**	**N**	**%**	**N**	**%**
Do you know the prescribed dosage?						
Non-literate	13	38	1	3	14	41
Literate	13	38	-	-	13	38
Elementary	3	9	-	-	3	9
Medium	2	6	1	3	3	9
Higher	1	3	-	-	1	3
Total	32	94	2	6	34	100
Do you know the expected effects?						
Non-literate	1	3	13	38	14	41
Literate	4	12	9	26	13	38
Elementary	1	3	2	6	3	9
Medium	1	3	2	6	3	9
Higher	1	3	-	-	1	3
Total	8	24	26	76	34	100
Difficulties to perform the treatment?						
Non-literate	-	-	14	41	14	41
Literate	2	6	11	32	13	38
Elementary	-	-	3	9	3	9
Medium	1	3	2	6	3	9
Higher	-	-	1	3	1	3
Total	3	9	31	91	34	100

Table 03 it is observed that 38% (13) of the patients are not literate and yet know the dosage prescribed by the doctor, in general 94% know how to use their drug treatment correctly and only 6% do not know the correct dose of drugs. The question of knowledge about the expected effects of the drug confirms that most participants (76%) are unaware of the expected effects of the drug. Results show that 38% (13) are not literate and 26% (09) are literate.

About the difficulty to perform the treatment, it was observed that only 9% (3) of the participants stated that they have some problem to follow the treatment. Patients who answered having no difficulty correspond to non-literate 41%, literate 13%, elementary level 9%, average 6% and higher 3%. Table 04 illustrates the blood pressure classification of diabetic patients.

Table 04: Blood pressure classification of type 2 diabetics. Maranhão, Brazil, 2017

Blood Pressure Rating				
	SBP (mmHg)	DBP (mmHg)	N	%
Normal	≤ 120	≤ 80	16	35
Prehypertension	121 – 139	81 – 89	9	20
Hypertension stage I	140 – 159	90 – 99	13	28
Hypertension stage II	160 – 179	100 – 109	5	11
Hypertension stage III	≥ 180	≥ 110	3	6
Total			46	100

The measurement of the patients' blood pressure showed that 34% (16) were normal, 20% (09) were classified as prehypertensive, 28% (13) were classified as stage I hypertension, 11% (05) had stage hypertension. II and 6% (03) in stage III. It is noteworthy that blood pressure levels evidence the measurement at the time of data collection, and cannot state that patients are classified through a single verification. Hypertension is diagnosed and classified by blood pressure measurements in three consecutive weeks.

The Brazilian Society of Diabetes has established an ideal value for blood glucose control based on the recommendations of several medical societies, including the American Diabetes Association, the International Diabetes Federation and the American Association of Clinical Endocrinologists. The ideal range for blood glucose was established between 80 - 130mg / dl and altered blood glucose >130mg/dl.

The study showed that 22% (10) of diabetics have normal fasting capillary blood glucose levels, while 52% of the total present alterations even in treatment. Diabetes in treatment dropout add up to 6% of the total with normal glycemic level and 20% with altered blood glucose, as we can see in Table 05. It can be observed that most participants who take treatment and those who abandoned have altered fasting glucose.

Table 05: List of drug treatment. Maranhão, Brasil, 2017

Patients who underwent or not drug treatment	Ideal blood glucose (80 – 130 mg/dl)		Altered blood glucose (> 130 mg/dl)		Total	
Category	**N**	**%**	**N**	**%**	**N**	**%**
Patients under treatment	10	22	24	52	34	74
Patients on treatment dropout	3	6	9	20	12	26
Total	13	28	33	72	46	100

BMI in type 2 diabetics

Classification	BMI (kg/m^2)	N	%
Low weight	< 18.5	-	-
Normal weight	18.5 – 24.9	20	44
Pre-obese	25.0 – 29.9	14	30
Obese I	30.0 – 34.9	9	20
Obese II	35. 0 – 39.9	3	6
Obese III	≥ 40.0	-	-
Total		46	100

For classification of BMI conducted the study with diabetic participants, was taken as reference values set according to the Brazilian Association for the Study of Obesity and the Metabolic Syndrome where the values considered for each classification are: low body mass index (BMI <18.5 kg/m2), normal mass (between 18.5 - 24.9 kg/m2), pre-obese (between 25.0 - 29.9 kg/m2), obese I (between 30.0 - 34.9 kg/m2), obese II (between 35.5 - 39.9 kg/m2) and obesity III (values ≥ 40.0 kg/m2). Regarding BMI, the study showed 44% (20) were normal weight; 30% (14) were pre-obese; 20% (09) had obesity I; 6% (03) have type II obesity. As can be seen from Table 05.

DISCUSSION

Some studies have shown prevalence of diabetes in females, with prevalence in the range of 7%, against only 5.4% in men.[11-12] In Brazil, women also have a higher rate than men, with 6% for women and 5.2% for men. Even with the growth of 0.8% of cases in males in the period from 2006 to 2011, reaching the rate of 5.4% of cases of diabetes in men, is still lower than the data presented in females.[7]

According to studies conducted in 2016 by the Brazilian Society of Diabetes, there was an increase of 2.7% in the 30-59 age group and 17% in the 60-69 age group. Data that justify the higher prevalence of diabetics among elderly over 60 years. Another important fact about diabetes is that it affects 18% of the elderly and

50% of people with type 2 diabetes are over 60 years old.[2]

There are similar studies in the literature, with an equal percentage of whites and browns totaling 43%.[13] And also a prevalence of brown people among participants with a rate of 52%, followed by white with 32% and black 16%.[14] A survey conducted in Pelotas-RS found that the racial profile of most diabetics was white with a prevalence of 76.6%.[15-16]

About the level of education, it was found in the literature results of higher prevalence 9.6% of diabetics with lower education, corroborating the data presented by the present study.12 It also demonstrates that the low level of education is among most diabetic patients surveyed in Mexico, and the number of patients with incomplete primary education is 74% of the population.13 We emphasize that low education is a serious public health problem, as patients will have greater difficulty in complying with the guidance given by health professionals. health.[16-17] Regarding income, it is observed that most respondents earn only one minimum wage 67.4% (31), income below one minimum wage was cited by 13% (6), and 19.6% (9) receive monthly value exceeding one minimum wage as illustrated in table 01.

Studies show that the majority of patients with some type of diabetic complication fall into the lowest wage income categories, thus implying greater difficulties to follow the treatment properly, such as the access of drugs not distributed by the public network. In addition to not having a balanced diet,[18] also highlights a precarious economic situation among retirees, as more than 1/3 had only family income of up to one minimum wage. Therefore, diabetic patients with worse living conditions present greater difficulties in treatment, and are at high risk for early death.[19-20]

About the participants have knowledge about the disease, studies in the literature present data similar to those presented in this study, where they found that a large number of diabetic patients have little knowledge about its pathology. They further describe that health education is a key aspect in treating diabetic patients, demonstrating that a greater focus on educating diabetic patients provides improved treatment for diabetic patients.[21]

Regarding the dispersion of the scores obtained in relation to users' knowledge of type 2 diabetes, it was found that most participants 64.6% obtained scores less than or equal to eight, indicating unsatisfactory results for understanding self-care of the disease.[22]

Forgetfulness and delay in the use of medications were pointed as the main causes for non-adherence,[23] also highlight the side effects caused by certain medications, which has a strong relationship with the patient's non-adherence to drug therapy. Since these side effects have become a major barrier to non-adherence, justifying the patient's decision to change their pace of life or accept certain adverse effects.[24] Studies indicate that the greater the uncertainty regarding the disease in the face of diagnosis and treatment, the more diabetic patients feel unmotivated to adopt a healthy lifestyle, correctly following drug treatment, maintaining glycemic control and good exercise practices.[25]

Studies on the pharmacoepidemiological

profile present in the literature also pointed to the drug glibenclamide, which is the most used for glycemic control in type 2 diabetic patients, corresponding to 43.3% of the researched population.[26] Results that corroborate those presented in this study, as shown in table 02. However, a pharmacoepidemiological survey with a patient from a Paraná FHS showed that the combination of glibenclamide and metformin drugs was more prevalent among participants with about 33.3%, NPH insulin was the second most used, accounting for 23.33%, patients using metformin monotherapy corresponded to 16.67% and only 13.33% the use of glibenclamide.[27]

The widespread use of metformin in pharmacological treatment studies of type 2 diabetes is in line with international recommendations, where it is considered a first-line drug and best demonstrated to reduce mortality and morbidity in patients with diabetes.[28]

Regarding the relationship of schooling influence in drug treatment, and knowledge about dosage as well as possible adverse side effects that may cause, the results of the present study differ from some studies found in the literature, indicating that about 72.7% of diabetics are unaware of the dose of the drug,[23] other results also show this difference, with a rate of 40% of interviewed patients who reported having no knowledge of the dosage prescribed by their doctor for disease control, however, data on the lack of knowledge of the dosage of the prescribed drug resemble , where it is possible to verify that the low level of education is a harmful factor and that can lead to the aggravation of the disease or the dropout, due to the inadequate treatment and the side effects felt by the patients.[29]

Low education may favor non-adherence to the therapeutic plan due to the difficulty of reading and understanding the medical prescription, thus increasing health risks. In addition, poor education may limit access to information as well as understanding of the complex mechanisms of disease and treatment.[30-31]

The data on treatment difficulties presented in table 03 show that the factor “level of education” was not influential with regard to drug treatment, since the vast majority of patients, regardless of education level, had no difficulty in performing the prescribed treatment. This result was quite satisfactory, as good adherence to drug treatment can lead to more satisfactory self-care and contribute to the health-disease process.

Regarding the classification of type 2 diabetic blood pressure and systemic arterial hypertension (SAH), these are generally associated clinical conditions. About 40% of patients diagnosed with type 2 diabetes already have high blood pressure. These data were very consistent with the study, which showed that 45% of patients had some type of hypertension,[2] as we can see in table 04. The literature also presents data that indicate that most diabetics were also diagnosed with hypertension, approximately 68% and that hypertension is three times more prevalent in diabetics when compared to non-diabetics.[32]

Type 2 DM is a chronic disease, where several factors can influence the control of glycemic levels. It can be observed that

inadequate glycemic control is prevalent in diabetic participants with percentages above 70%. The fact that most patients are on treatment and not yet at optimal glycemic levels may be related to factors such as sedentary lifestyle, unbalanced diet and inadequate drug treatment, among others. Thus, it can be inferred that only isolated drug therapy will not be able to guarantee an optimal glycemic level.[33-34]

Regarding overweight, the Body Mass Index (BMI) of the diabetics studied is shown in table 05, showing that most participants were above their ideal weight, where 20% of participants had grade I obesity and 6% grade II obesity. Similar data are found in the literature, showing 37% of diabetics at their ideal weight, 32% were overweight, 19% had grade I obesity and 5% had grade II obesity.[16] The correlation between obesity and type 2 diabetes 2 exists, and most participants are obese or overweight and the increase in blood glucose is directly related to the increase in BMI.[35]

A study analyzing microvascular complications in type 2 diabetics revealed that people with a high BMI, ie overweight or obese, were twice as likely to have diabetes complications compared with patients with adequate weight.[36]

We highlight the methodological limitations regarding the results obtained on hypertension, where blood pressure levels that evidence the measurement at the time of data collection cannot be stated that the participants of this study are classified through a single verification, because hypertension is diagnosed and classified through blood pressure measurements in three consecutive weeks,[37] however this method was not adopted in this study.

It was also possible to observe the need for epidemiological studies of chronic diseases in this region, since in the literature there are no publications that can help public health agencies in these areas further from the capital (São Luís), which would facilitate the work with data that can define the conditions. characteristics of people with chronic disease, level of education, age group of people with the disease, level of social class, etc., data that would be of great value to competent bodies to develop programs for prevention and fight against the disease as well as their drug treatment, providing the community with quality public health.[38]

CONCLUSION

In our study, most diabetics do not have difficulties in performing drug treatment, even if they do not know their disease properly. The study showed that a large portion of participants had risk factors for the development of diabetes complications such as BMI, blood pressure and altered glycemic level. Although most patients undergo drug treatment and have no difficulty in performing it, many were diagnosed with unsatisfactory fasting glucose.

Based on the results obtained in the present study, we evidenced that the level of education does not directly interfere with drug treatment; however, health education is the best ally against the problems arising from the lack of knowledge presented by the majority of the population affected by chronic diseases,

non-communicable, as better education of these patients may lead to a better quality of life.

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There are no conflicts of interest to declare.

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Available upon request to authors.

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Does not apply.

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