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ORIGINAL ARTICLE

KNOWLEDGE OF NURSING AND MEDICINE STUDENTS ON TOXOPLASMOSIS CONHECIMENTO DOS ACADÊMICOS DE ENFERMAGEM E MEDICINA SOBRE TOXOPLASMOSE CONOCIMIENTO DE LOS ESTUDIANTES DE ENFERMERÍA Y MEDICINA SOBRE TOXOPLASMOSIS

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ABSTRACT

Objective: to identify the knowledge of toxoplasmosis among nursing and medicine students. **Method:** cross-sectional, descriptive study, conducted at the Federal University of Sergipe (UFS). The sample was non-probabilistic and intentional, comprising 46 and 61 students of nursing and medicine, respectively. Data collection occurred in October and November 2013, using self-administered questionnaire, after approval by the Research Ethics Committee, CAAE: 18162613.8.0000.5546. Data were analyzed using simple statistics and presented in tables and charts. **Results:** there is a greater knowledge among students of 8th and 9th grades than in the 5th grade. There was a decline in the number of correct answers about the infective forms, prevention, diagnosis and pharmacological treatment in case of infection. **Conclusion:** there is a lack of knowledge among these students about to become professionals, demonstrating the need for plundering the theoretical knowledge and its application in practice. **Descriptors:** Knowledge; Prenatal Care; Nursing Students; Medical Students; Toxoplasmosis.

RESUMO

Objetivo: identificar o conhecimento sobre toxoplasmose entre acadêmicos dos cursos de enfermagem e medicina. **Método:** estudo transversal, descritivo, realizado na Universidade Federal de Sergipe (UFS). A amostra foi não probabilística e intencional, composta por 46 e 61 alunos de enfermagem e medicina, respectivamente. A coleta de dados ocorreu nos meses de outubro e novembro de 2013, utilizando-se questionário autoaplicável, após aprovação pelo Comitê de Ética em Pesquisa, CAAE: 18162613.8.0000.5546. Os dados foram analisados por meio da estatística simples e apresentados em tabelas e quadro. **Resultados:** evidenciou-se maior conhecimento entre os alunos do 8º e 9º períodos, em relação aos do 5º. Houve declínio do número de acertos em questões sobre as formas infectantes, prevenção, diagnóstico e tratamento farmacológico na ocorrência da infecção. **Conclusão:** existe déficit de conhecimento entre esses acadêmicos na iminência de se tornarem profissionais, demonstrando necessidade da apropriação do conhecimento teórico e sua aplicação na prática assistencial. **Descritores:** Conhecimento; Cuidado Pré-Natal; Estudantes de Enfermagem; Estudantes de Medicina; Toxoplasmose.

RESUMEN

Objetivo: identificar el conocimiento sobre toxoplasmosis entre académicos de los cursos de enfermería y medicina. **Método:** estudio transversal, descriptivo, realizado en la Universidad Federal de Sergipe (UFS). La muestra fue no probabilística e intencional, compuesta por 46 y 61 alumnos de enfermería y medicina, respectivamente. La recolección de datos se dio en los meses de octubre y noviembre de 2013, utilizándose cuestionario auto aplicable, después de ser aprobado por el Comité de Ética en Investigación, CAAE: 18162613.8.0000.5546. Los datos fueron analizados por medio de la estadística simple y presentados en tablas y cuadros. **Resultados:** se mostró mayor conocimiento entre los alumnos del 8º y 9º período, en relación a los del 5º. Hubo declino del número de aciertos en preguntas sobre las formas infectantes, prevención, diagnóstico y tratamiento farmacológico en la ocurrencia de la infección. **Conclusión:** existe déficit de conocimiento entre esos académicos en la inminencia de tornarse profesionales, demostrando necesidad de apropiamiento del conocimiento teórico y su aplicación en la práctica asistencial. **Descriptors:** Conocimiento; Cuidado Pre-Natal; Estudiantes de Enfermería; Estudiantes de Medicina; Toxoplasmosis.

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INTRODUCTION

Toxoplasmosis is a zoonotic disease of worldwide distribution, present in different geographical regions of the world with different serological prevalence, reaching higher seroprevalence than 90%. It is a generally benign disease in immunocompetent hosts, however, it gives significant risks to the fetus due to the occurrence of vertical transmission, as well as to immunocompromised individuals¹.

In the national context, the seroprevalence of antibodies to *Toxoplasma* varies from 31% in Caxias do Sul (RS) to 91.6% in Mato Grosso do Sul, Brazil^{2,3}.

Studies with pregnant women in the state of Sergipe revealed seroprevalence of 0.4% for IgM and 69.3% for IgG. In the capital, Aracaju, this seroprevalence was 43.5%⁴⁻⁵. The estimate of congenital toxoplasmosis in this state was 4/10.000 live births⁶. The data presented show that toxoplasmosis is a public health problem in Sergipe.

The academic graduation is the time in which the health care professional future have the opportunity to acquire knowledge and develop skills that will enable them to exercise their activities competently.

The largest employer market for medical and newly graduated nurses is the Unified Health System (SUS), especially in the care services acting of the Family Health Strategy, which will assist to pregnant women and newborns. In addition, prenatal care is the right time for health education, aimed at promoting and disease prevention, seeing the best outcome for the mother-fetus-family⁷.

Being congenital toxoplasmosis a major cause of perinatal morbidity and mortality, with development of sequelae that compromise the quality of life, it is of fundamental importance that future pre-natal professionals have knowledge to prevention and proper management.

OBJECTIVE

- To identify the knowledge of toxoplasmosis among nursing and medicine university students.

METHOD

Cross-sectional study, quantitative and descriptive, held on the Health Campus Prof. João Cardoso de Nascimento Júnior of the Federal University of Sergipe (UFS), in the city of Aracaju (SE). Data collection was from October to November 2013.

The population of the study consisted of 381 students of the nursing course distributed

in nine periods, with 40 students entering each semester; and 609 medical students divided into 12 periods, with 50 students entrance in each semester, totaling 990 students duly enrolled.

The sample was non-probabilistic and intentional with 107 individuals who met the inclusion criteria: be properly enrolled in the 5th period of both courses after attended human parasitology subject; be properly enrolled in the 8th period of the nursing course, after attended the nursing discipline in public health; be properly enrolled in the 9th medical school period after attended public health III; agree to participate and sign the free and informed consent form (TCLE). These subjects were chosen because they contain the specific contents worked on parasitology and prenatal care. Thus, there 46 nursing students and 61 medical school students being part of the sample.

The research began after approval of the pro-rector of graduation and approval of the project by the Ethics Committee in Research with Human Beings of UFS (CAAE: 18162613.8.0000.5546), meeting the ethical principles set out in Resolution 466/12 of the National Health Council.

For the data collection instrument a wide literature review was carried out and for its suitability a "pilot" with five students was applied, which were excluded from the final sample. The instrument resulted in a questionnaire composed of 19 questions related to knowledge about toxoplasmosis and 10 questions covering socio-demographic aspects of the students to characterize the sample.

For data analysis, a simple statistics through Microsoft Office Excel 2010 was used. Data software are presented in tables and charts.

RESULTS

Out of the 107 students who were part of the sample, 47 (44%) were on the 5th period of nursing and medicine course and 60 (56.0%) in the 8th and 9th grades, representing those immediately before starting the supervised traineeship. The mean, mode and median age of these students was 24, 22 23, respectively. The predominant gender was female with 66 students (61.7%), especially in the nursing program. There were 98 students (91.6%) single and 100 (93.5%) living in grande Aracaju composed by the cities of Aracaju, Barra dos Coqueiros, São Cristóvão and Nossa Senhora do Socorro. The father was considered the main sponsor of the family for 51 (47.6%) students. Regarding the educational level, 56 (52.4%), mothers attended higher education, lower

proportion found among fathers with 50 (46.8%).

Table 1 shows the knowledge of the students about the life cycle of *Toxoplasma gondii*. The item called “other” is composed of all the alternatives that were not right. Regarding the classification of *T. gondii*, stands out that seven (6.5%) did not know to rate it as protozoa. It is noteworthy that 32 (29.9%) students are unaware of the true definitive host and 19 (17.8%) are unaware of the intermediate hosts. It is worth highlighting

that less than half, 52 (48.6%) knew the type of reproduction in the definitive host and the place where it occurs. A small fraction of the sample, six (3.0%), pointed out the correct answer to the question which was about the infective forms of the parasite and more than half of the students listed at least one of the three infective forms.

When asked about the routes of transmission, only seven (6.5%) students cited the hematogenous, oral and placenta routes.

Table 1. Distribution of the nursing and medicine students, according to their *T. gondii* biological cycle knowledge. Aracaju (SE), Brazil, 2013.

Variables	Nursing						Medicine						Total	
	5º		8º		Total		5º		9º		Total		n	%
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Etiological agent														
Protozoan	24	96.0	19	90.4	43	93.5	22	100.0	35	90.0	57	93.4	100	93.5
Other	-	-	01	4.8	01	2.2	-	-	03	8.0	03	5.0	04	3.7
Did not answer	01	4.0	01	4.8	02	4.3	-	-	01	2.0	01	1.6	03	2.8
Definitive host														
Cat	12	48.0	14	67.7	26	56.5	16	72.7	33	84.6	49	80.3	75	70.1
Other	13	52.0	07	33.3	20	43.5	06	27.3	06	15.4	12	19.7	32	29.9
Did not answer	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Intermediate hosts														
Mammals including man	17	68.0	18	85.7	35	76.1	19	86.4	34	87.2	53	86.9	88	82.2
Other	08	32.0	03	14.3	11	23.9	03	13.6	05	12.8	08	13.1	19	17.8
Did not answer	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reproduction of the definitive host and place where it occurs														
Sexual/gut	11	44.0	08	38.1	19	41.3	12	54.5	21	53.8	33	54.1	52	48.6
Other	12	48.0	13	61.9	25	54.4	10	45.5	17	43.6	27	44.3	52	48.6
Did not answer	02	8.0	-	-	02	4.3	-	-	01	2.6	01	1.6	03	2.8
Infective forms of Toxoplasma gondii														
Oocyst + bradizoíto + tachyzoite	-	-	03	14.3	03	6.5	-	-	-	-	-	-	03	3.0
Cited one form	13	52.0	08	38.1	21	45.7	19	86.4	28	71.8	47	77.0	68	63.5
Cited two forms	01	4.0	03	14.3	04	8.7	-	-	02	5.1	02	3.3	06	5.6
Other	01	4.0	02	9.5	03	6.5	-	-	01	2.6	01	1.7	04	4.0
Did not answer	10	40.0	05	23.8	15	32.6	03	13.6	08	20.5	11	18.0	26	24.0

Table 2. Distribution of nursing and medical students according to diagnosis and treatment of Toxoplasmosis in pregnant women. Aracaju (SE), Brazil, 2013.

Variables	Nursing				Total		Medicine				Total		Total	
	5°		8°				5°		9°					
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Situation to repeat serology														
IgG- and IgM-	-	-	-	-	-	-	01	4.5	10	25.6	11	18.1	11	10.3
IgG- and IgM+	-	-	-	-	-	-	02	9.1	11	28.2	13	21.3	13	12.1
IgG+ and IgM-	24	96.0	16	76.2	40	87.0	06	27.3	04	10.2	10	16.4	50	46.7
IgG+ and IgM+	01	4.0	05	23.8	06	13.0	04	18.2	07	18.0	11	18.0	17	16.0
More than one option	-	-	-	-	-	-	01	4.5	05	13.0	06	9.8	06	5.6
I do not know	-	-	-	-	-	-	08	36.4	02	5.0	10	16.4	10	9.3
Indication or suspicion of active or recent infection														
IgM+; IgG with low avidity ; IgM+ and IgG with low avidity	02	8.0	13	62.0	15	32.6	10	45.5	22	56.4	32	52.5	47	43.9
Only IgG+; IgG with high avidity; IgM+ and IgG with high avidity	07	28.0	02	9.5	09	19.6	04	18.0	12	30.7	16	26.2	25	23.4
It is not possible to see	03	12.0	02	9.5	05	10.9	-	-	01	2.6	01	1.6	06	5.6
I do not know	13	52.0	04	19.0	17	36.9	08	36.5	03	7.7	11	18.1	28	26.2
Did not answer	-	-	-	-	-	-	-	-	01	2.6	01	1.6	01	0.9
Drugs of choice in the 1 st pregnancy trimester														
Spiramycin	-	-	01	4.8	01	2.2	01	4.5	06	15.4	07	11.5	08	7.5
Pyrimethamine, sulfadiazine and folic acid	-	-	-	-	-	-	-	-	05	12.8	05	8.2	05	4.7
Other	09	36.0	12	57.1	21	45.7	05	22.8	22	56.4	27	44.3	48	44.8
I do not know	15	60.0	07	33.3	22	47.8	16	72.7	05	12.8	21	34.4	43	40.2
Did not answer	01	4.0	01	4.8	02	4.3	-	-	01	2.6	01	1.6	03	2.8
Drugs of choice in the 3 rd pregnancy trimester with fetus reportedly infected														
Pyrimethamine, sulfadiazine and folic acid	-	-	-	-	-	-	-	-	03	7.7	03	5.0	03	2.8
Spiramycin	-	-	01	5.0	01	2.2	-	-	08	20.5	08	13.0	09	8.4
Other	03	12.0	08	38.0	11	23.9	02	9.1	16	41.0	18	29.5	29	27.1
I do not know	22	88.0	12	57.0	34	73.9	20	90.9	12	30.8	32	52.5	66	61.7

Table 2 shows the data related to the knowledge of the diagnosis and treatment of toxoplasmosis in pregnancy. When asked what the situation is required repeat serology, only 11 (10.3%) students answered correctly. Regarding the indication or suspicion of active or recent infection, only 47 (43.9%) chose the correct alternative for the IgM+ and IgG+ with low avidity. As for drug treatment in the first trimester of pregnancy, only eight (7.5%) students demonstrated knowledge, even smaller proportion when questioned about the drug of choice in the third trimester, with three (2.8%).

Table 3 shows the knowledge about the risk of transmission of *T. gondii* and complications to the fetus. When asked about the trimester higher risk of complications and the largest transmission to the fetus, there was a little knowledge, since 76 (71.0%) and 39 (36.4%) responded correctly.

As for the groups that assume clinical importance, most 80 (74.8%) cited pregnant women. However, 17 (15.9%) students cited other options than the right one, among them, the elderly and children under 10 years old.

In Figure 1, it is possible to see that 91 (85%) students reported being the immune tests/serological the best diagnostic methods.

However, 24 (22.4%) cited the stool test as a diagnostic method for toxoplasmosis. Regarding the forms of prevention options related to hygiene and dietary measures, 73 (68.2%), said washing hands before meals, 69 (64.5%) avoid contact with the earth and 66 (61.7%) wash fruits and correctly vegetables, the most mentioned by students. However, only 43 (40.2%) students cited eating raw or undercooked meat.

By comparing students' knowledge of the different periods, it was observed that the students of the 8th and 9th grades had slightly higher knowledge to those in the 5th grade of both courses.

Variables	Nursing						Medicine						Total	
	5°		8°		Total		5°		9°		Total		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Diagnostic methods														
Immuno-serological tests	17	68.0	16	76.2	33	71.7	21	95.4	37	94.9	58	95.1	91	85.0
PCR	03	12.0	03	14.3	06	13.0	02	9.1	13	33.3	15	24.6	21	19.6
Detection of the parasite in fluids	03	12.0	02	9.5	05	10.9	01	4.5	03	7.7	04	6.5	09	8.4
Parasitological stool	11	44.0	08	38.1	19	41.3	-	-	05	12.8	05	8.2	24	22.4
I do not know	01	4.0	-	-	01	2.2	02	9.1	01	2.6	03	4.9	04	3.7
Ways to prevent toxoplasmosis														
Avoid consumption of unpasteurized raw milk	-	-	13	62.0	13	28.3	03	13.6	11	28.2	14	23.0	27	25.2
Properly wash fruits and vegetables	14	56.0	18	85.7	32	69.6	09	41.0	25	64.1	34	55.7	66	61.7
Wash hands before meals	16	64.0	21	100.0	37	80.4	11	50.0	25	64.1	36	59.0	73	68.2
Avoid untreated water consumption	10	40.0	14	66.7	24	52.2	07	31.8	21	53.8	28	46.0	52	48.6
Do not eat raw or undercooked meat	03	12.0	21	100.0	24	52.2	03	13.6	16	41.0	19	31.1	43	40.2
Wash utensils	04	16.0	13	61.9	17	36.9	03	13.6	16	41.0	19	31.1	36	33.6
Avoid direct contact with the ground	21	84.0	17	81.0	38	82.6	13	59.1	28	71.8	31	50.8	69	64.5
Avoiding embedded food consumption	01	4.0	04	19.0	05	11.0	02	9.1	03	77.0	05	8.2	10	9.3
Avoid consumption of fish and seafood in general	-	-	-	-	-	-	-	-	02	5.1	02	3.3	02	1.9
Avoid indoor environments	-	-	01	4.8	01	2.2	01	4.5	-	-	01	1.6	02	1.9
Avoid contact with carriers	02	8.0	01	4.8	03	6.5	03	13.6	06	15.4	09	14.7	12	11.2
avoid crowding	-	-	01	4.8	01	2.2	-	-	-	-	-	-	01	0.9
I do not know	-	-	-	-	-	-	02	9.1	01	2.6	03	5.0	03	2.8

Figure 1. Distribution of nursing and medicine students according to knowledge about risk groups, diagnostic methods and toxoplasmosis prevention measures. Aracaju (SE), Brazil, 2013.

DISCUSSION

The sample characterization revealed prevalence of young students in nursing and medicine courses, confirming census of the Ministry of Education (MEC)⁸. There was predominance of female, this prevalence was higher than the national average of higher education reported by MEC, which was 55.1%⁸. However, when separated by course, it is observed that the nursing program was 84.8%, while the medicine was 44.3%. This is justified because it is the nursing program historically sought by women. A study conducted in Belo Horizonte asserts that the historical context of nursing is marked by the predominance of the female workforce in activities involving the care.⁹

Students expressed being singles, corroborating findings in a study conducted in Belo Horizonte, whose prevalence was 77.7%.⁹ Only about half of parents attended higher education, with a higher proportion of mothers with tertiary education over from parents. These data are corroborated by MEC data on which demonstrate that most college conclusive are from women⁸. A study in

Curitiba suggested that the lower academic education of parents can serve as incentive for children to seek a superior level.¹⁰ In this sample, the father was the main sponsor for 47.6% of the students, less than average national census in 2010, which was 62.7%.¹¹

Students know that the classification of the etiological agent of toxoplasmosis, but the fact that seven students not knowing how to rate it is worrying, considering being basic knowledge. According to the taxonomic classification, *T. gondii* is a protozoan, obligate intracellular parasite of the phylum Apicomplexa.¹

In this study, the ignorance about the evolutionary and infective forms *T. gondii* was worrying, namely: tachyzoites (or trophozoites), bradyzoites (or cistozoites) and oocysts (or sporozoites).¹²

With regard to the final and intermediate hosts, most students demonstrated knowledge, nevertheless it is worrying that some students do not know the type of reproduction in the definitive host and place where it occurs. The life cycle of the parasite has optionally heterogeneous character, developing into two distinct phases, one

sexual, in the intestines of cats, definitive host, another asexual, which occurs in intermediate hosts, warm-blooded animals such as birds, man and other mammals.¹² In addition, it was evidenced little knowledge about the mechanisms of transmission of toxoplasmosis, which can result from contact with cat feces contaminated with oocysts present in contaminated food or water, gardens, sandbox; by eating tissue cysts found in raw meat or undercooked, blood transfusion, contaminated patients transplants and vertical or trans-placental route.¹³⁻⁴

The lack of knowledge about the interpretation of diagnostic tests can harm the prognosis. Early diagnosis promotes timely treatment positively affecting the neonatal prognosis.¹⁵⁻¹⁷

It was shown little knowledge about the pharmacological treatment, considering that almost all the students did not recognize the spiramycin as the drug of choice in the first trimester, or the triple treatment (sulfadiazine, pyrimethamine and folic acid) which aims to treat pregnant women with infected fetuses.¹⁵

Although primary prevention is one of the most effective ways to reduce infection rates by *T. gondii*, and its vertical transmission¹⁸, especially the hygienic-dietary measures, it is worrying ignorance shown by students.

When it comes to diagnostic methods, most students said knowing the serological methods of detecting antibodies specific for toxoplasmosis, which is consistent with the recommendation of the Ministry of Health of Brazil related to screening for toxoplasmosis during pregnancy.⁷ However, the fact that students have cited the stool test as a diagnostic method was highlighted.

Other studies corroborate our findings to the low level of knowledge about aspects of toxoplasmosis. In Maringá (PR), health professionals had little knowledge about the evolutionary forms of *T. gondii*, conducts adopted before an expectant mother with positive serology, pregnancy that poses greatest risk to the fetus and prophylactic measures that should be informed to pregnant women¹⁹. In Juiz de Fora (MG), doctors and nurses were also evaluated and it was concluded that the level of knowledge is inconsistent with their important role as educators, especially during prenatal aimed at prevention and health promotion.²⁰ Nursing and medical students in Pernambuco also showed unsatisfactory performance²¹. A study conducted in Cascavel in Paraná, Brazil recently published, also demonstrated that there is need for strategies to increase

knowledge among professionals and patients aiming prophylaxis for congenital toxoplasmosis.²²

Considering the importance of toxoplasmosis as a public health problem that increases the perinatal morbidity and mortality rates, there is an urgent need to prepare nursing students and medical differently to when exercising their profession can provide prenatal care quality, with enough subsidies allowing them to work to prevent the disease or the improvement of the mother-child binomial prognosis.

CONCLUSION

Nursing and medicine students in general have little knowledge about the toxoplasmosis, regarding the infective forms, mode of transmission, preventive measures, diagnosis and treatment, although this content is covered in parasitology courses and content on prenatal taught in Health Collective III, Nursing Public Health subjects and in Obstetrics and Gynecology Nursing subject. It can be inferred that the lack of knowledge among them incurs the need for plundering the theoretical knowledge and its application in practice.

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